

UK Offshore Energy Strategic Environmental Assessment



OESEA2 Appendices 1, 2, 4, and 5

Future Leasing/Licensing for Offshore Renewable Energy, Offshore Oil & Gas, Hydrocarbon Gas and Carbon Dioxide Storage and Associated Infrastructure

February 2011

APPENDIX 1 – TABLE OF KEY ISSUES AND INPUTS TO THE SEA

The following is a distillation of the key issues for consideration in the SEA assessment, identified through the stakeholder consultation as described further in Appendix 2. As the present SEA represents an extension of OESEA (DECC 2009b) issues previously identified for aspects of the plan/programme relevant to OESEA2 are carried forward for the purposes of this assessment.

Table A1.1 – Key issues identified through stakeholder consultation in 2008/09 and 2010 and where they are addressed in OESEA2 where appropriate

Issue	SF	SW	AW	ER location
Spatial conflict with other users, particularly navigation & fisheries*	✓		✓	Sections 5.7 & 5.15; Appendix 3h
Impacts on designated sites*	✓	✓	✓	Section 5; Appendix 3j
Noise effects, particularly marine mammals and fish spawning (what is biologically significant?)*	✓	✓	✓	Section 5.3; Appendices 3a5 & 3a8
Landscape/seascape - aesthetic and visual impacts*	✓		✓	Section 5.8; Appendix 3c
Impacts associated with pipelines and cables – particularly at landfall*	✓	✓	✓	Sections 5.4, 5.7, 5.8 & 5.15; Appendix 3h
Assessment of cumulative effects*	✓	✓	✓	Sections 5.3-5.16
Drill cuttings			✓	Sections 5.9, 5.10
Produced water			✓	Section 5.9
Bird displacement (what is biologically significant?)*	✓	✓	✓	Sections 5.6 & 5.16; Appendix 3a.7
Incorporation of feedback from Rounds 1 & 2	✓	✓	✓	
Military radar (OWFs)			✓	Section 5.7; Appendix 3h
Grid availability and accessibility, including impacts of upgrades	✓	✓	✓	Section 5.14; Appendix 3h
Timeframe - meeting energy targets (OWFs)			✓	Section 2
Cumulative impacts with future OWFs in Scottish territorial		✓		Sections

Issue	SF	SW	AW	ER location
waters				5.15, 5.16
Flexibility over 6nm exclusion zone for turbines around O&G platforms		✓	✓	Section 5.15
Ongoing studies to fill data gaps	✓	✓		Section 6; Appendix 3
Conflicts between OWFs and O&G*	✓			Section 5.15
Identification of areas suitable and not suitable for OWF development*	✓	✓		Sections 2.5, 5.15
Impact on energy consumption/CO ₂ emissions due to diversion of shipping*	✓			Sections 5.7, 5.11 & 5.12
Impacts of OWFs on common fisheries*	✓	✓		Sections 5.7 & 5.15; Appendix 3h
OWF interactions with coastal processes and introduction of hard substrata*	✓			Sections 5.4, 5.5 & 5.6 Appendix 3b
Adopting a precautionary approach to unknown impacts*	✓			Section 6
Consideration of alternatives to the draft plan and activity scenarios	✓			Sections 2 & 5.17
Impacts associated with gas storage and recovery*	✓	✓		Section 5
Climate change implications from end use of the licensing product*	✓			Section 5.12
New issues raised in OESEA 2 feedback				
Potential for CO ₂ leakage and impacts on marine life	✓	✓		Section 5.13
Collision risk and displacement effects on feeding birds from wave technologies	✓	✓		Section 5.6
A lack of information regarding potential impacts from emergent technologies	✓	✓	✓	Sections 5 & 6
Sediment transport issues and potential impacts on coastal processes	✓	✓	✓	Sections 5.4 & 5.5
Effects on sediment dynamics and changes in shellfish distributions which may be associated with large-scale renewables	✓	✓	✓	Sections 5.4 & 5.6
Hydrographic and hydrodynamic changes resulting from wind, wave and tidal devices	✓		✓	Section 5.5
Energy losses due to tidal and wave devices			✓	Section 5.5
Leaching of salt and ejection of brine to sea from salt cavern construction.	✓	✓		Sections 5.9 & 5.13
Interaction with MCZs and the MCZ process		✓		Section 5.15; Appendix 3j
Socio-economic impacts of environmental effects (e.g. surfing)	✓	✓		Section 5.15; Appendix 3h
Coastal erosion		✓		Section 5.4; Appendix 3b
Landscape effects of electricity and gas grid infrastructure		✓		Section 5.8

Issue	SF	SW	AW	ER location
Medium to far-field (i.e. down stream) environmental impacts	✓			Sections 5.4 & 5.5
Atmospheric emissions associated with construction and initiation of CCS facilities	✓			Sections 5.11 & 5.12
Adopting an ecosystem approach to ecological effects (e.g. effects of construction on fish may have indirect effects on predatory birds and mammals)	✓			Sections 5.6 & 5.16
Impact of operational noise for gas storage and oil and gas projects on marine mammals, birds and fish	✓			Section 5.3
EMF effects			✓	Section 5.6
Ship-strike on marine mammals		✓		Section 5.6
Expansion of ports and unloading sites			✓	Sections 5.7, 5.8 & 5.14

Notes: SF = issue raised in scoping feedback; SW = issue raised in one or more stakeholder workshops; AW = issue raised in assessment workshop; OWFs = offshore windfarms; O&G = oil & gas, * = issue also raised in OESEA2 stakeholder consultation.

Delegates attending stakeholder workshops for OESEA in 2008 and OESEA2 in 2010 were asked to provide details on their views of what comprises a “hard constraint” when determining the siting of offshore developments. These constraints, along with those identified during the assessment workshop and scoping feedback have been tabulated below, along with the number of times these constraints were mentioned. This information has informed the spatial considerations that form a key part of the OESEA2 assessment process (Section 5.15).

Table A1.2 – Areas to avoid/hard constraints with regard to offshore windfarm leasing (unless stated otherwise) in 2008/09

Area to avoid/hard constraints	SF	SW	SW Count	AW
Important areas for navigation (commercial and recreational), including shipping lanes, routes and areas of radar conflict		✓	15	✓
UK defence interests, including radar, MoD Danger Areas		✓	11	✓
Key conservation sites, specifically Natura 2000 sites		✓	10	
Grid connection		✓	9	
Major seabird and marine mammal concentrations (for breeding, feeding, migration)		✓	7	✓
Important fishing grounds		✓	7	
Existing oil and gas activities/infrastructure when incompatible		✓	7	
Technological/economic challenges (water depth, geology, meteorology)		✓	6	
Keep hard constraints to an absolute minimum – allow developers to find solutions and consenting bodies to make value judgements on uses of the sea		✓	6	
Existing wind farms		✓	5	
Undersea cables and pipelines		✓	4	
Dredging areas (current and future), including routes to and from		✓	4	
Aviation radar		✓	3	
Important archaeological sites, particularly protected wrecks		✓	3	
Future MCZs		✓	2	
Coastal buffer zone, particularly for seascape but also birds	✓	✓	2	✓
Wave and tidal resource areas		✓	1	
Wrecks (for safety)		✓	1	

Area to avoid/'hard' constraints	SF	SW	SW Count	AW
Important areas for turtles		✓	1	
Not conservation areas: they can be worked around		✓	1	
Sites potentially particularly suitable for carbon capture and storage		✓	1	
Not fish spawning/nursery areas - absence of fishing activity would be a bonus.		✓	1	
With regard to O&G, Moray Firth and Cardigan Bay SACs			n/a	✓
With regard to OWFs, Cardigan Bay			n/a	✓
Variable coastal buffer, for seascape, bird movement and fisheries sensitivities			n/a	✓
With regard to O&G, areas which are particularly favourable for OWFs			n/a	✓

Notes: SW = issue raised in one or more stakeholder workshops; SW count = total number of stakeholders raising issue in all workshops; AW = issue raised in assessment workshop; SF = issue raised in scoping feedback; OWFs = offshore windfarms; O&G = oil & gas.

Table A1.3 – Areas to avoid/hard constraints with regard to offshore windfarm leasing (unless stated otherwise) in 2010

Area to avoid/'hard' constraints	SF	SW	SW Count	AW
Navigation routes including recreational traffic		✓	6	
Grid connections		✓	4	
Displacement of other activities/incompatibility in co-location		✓	3	
Socio-economic impact of fisheries displacement		✓	2	
Marine Conservation Zones		✓	2	
MoD interests (PEXAs and submarine lanes)		✓	2	✓
Areas of existing oil and gas activity		✓	2	
Areas with existing leases/licences and associated structures		✓	2	
6nm exclusion zone around offshore platforms		✓	1	
Aviation impacts (e.g. Precision Approach Radar)		✓	1	
Limit of sites suitable for CCS		✓	1	
Nationally designated landscapes and associated seascapes		✓	1	
Visibility from shore		✓	1	
Recreational constraints		✓	1	
Technical constraints (e.g. water depth)		✓	1	
Access to electricity storage technologies		✓	1	
Large congregations of electro-sensitive species		✓	1	
Presence of historic wrecks		✓	1	
Ammunition dumps on seabed		✓	1	
Presence of important biological features (e.g. <i>Lophelia</i> reefs)		✓	1	
Limited to the ability of a location to deliver the project (i.e. suitable substrata for engineering and resource)		✓	1	

Notes: SW = issue raised in one or more stakeholder workshops; SW count = total number of stakeholders raising issue in all workshops; AW = issue raised in assessment workshop; SF = issue raised in scoping feedback.

APPENDIX 2 – SEA WORKSHOPS

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- A2.2 Stakeholder workshop

A2.1 Introduction

A key element of the SEA process is stakeholder engagement. In addition to meetings with individual stakeholders and presentations to other fora and SEA Steering Group meetings, several workshops were held to gain stakeholder input and to inform the assessment and production of the Environmental Report. These workshops included:

- **Assessment workshop (London)** - participants included the SEA Steering Group, members of the SEA team and selected stakeholder representatives.
- **Three stakeholder workshops (London, Bristol, Aberdeen)** - participants included a wide variety of potential stakeholders such as UK regulators, government advisors, local authorities, other industry representatives, academics, non-governmental organisations, potential international stakeholders and those who registered with the SEA website.

The assessment workshop aimed to bring together the expertise of the participants to consider the key issues to be addressed in the assessment for the Offshore Energy SEA. The stakeholder workshops aimed to gather industry perspectives and stakeholder input on the key issues to be addressed in the assessment for the Offshore Energy SEA, along with input to and comments on the information and analysis on which the SEA is being based.

All workshops were run under the Chatham House rule to allow free discussion, with issues and outputs captured without attribution. This Appendix compiles the outputs of the various workshops; full lists of attendees are provided at the end of each of these reports in Tables A2.1-A2.4 and Table A2.13.

A2.2 Assessment Workshop

A2.3 Stakeholder workshops

A2.2.1 Introduction

A series of three stakeholder workshops took place during the preparation of the environmental report; these were held in London, Bristol and Aberdeen on the 28th October, 2nd and 3rd November 2010 respectively. A wide variety of potential stakeholders were invited to the workshops, these included UK regulators, government advisors, local authorities, other industry representatives, academics, non-governmental organisations, potential international stakeholders as well as those who registered with the SEA website.

A2.2.2 Aims and structure

All workshops followed the same aims, structure and agenda. The workshops had two key objectives:

- To provide stakeholders with an overview of the energy policy context and background to the Offshore Energy SEA 2.
- To gather stakeholder input to and comments on the information and analysis on which the Offshore Energy SEA 2 is being based.

The workshop was structured into three sessions:

Session 1

Session 1 comprised a series of introductory presentations covering:

- Offshore Energy SEA 2 context and scope
- Energy policy, supply and security; renewable energy strategy; climate change context

A question and answer session followed to allow delegates to clarify any issues. The output from this session is captured in the summary of the plenary discussion below.

Session 2

Session 2 took the format of a poster session with the delegate feedback questionnaires providing a framework for stakeholders to capture feedback.

Posters were divided into the following themes:

- Offshore Energy SEA background, scope and purpose
- Offshore renewables, resource, consents and controls
- Offshore oil and gas and gas storage, prospectivity, sources of effects, controls and mitigation
- Carbon capture and storage, prospective areas, controls and mitigation
- Information base - physical and chemical environment, ecology, conservation
- Information base - material assets, human users, seascape and heritage considerations
- Issues and assessment

Delegates were asked to capture feedback through the use of the following questions:

1. Are there additional sources of potentially significant environmental effects from the technologies covered current draft plan?
2. What do you view as “hard” spatial constraints for the siting of major marine energy developments in the context of the multiple uses/designations of the seas around the UK, together with the need for security of energy supply and response to climate change?
3. Are there sources of potentially significant environmental effects from the technologies covered in the current draft plan which you feel are not fully covered by existing operational controls/permitting requirements?
4. Are there additional practical mitigation techniques for sources of potentially significant environmental effects from the technologies covered current draft plan which you would like to draw to our attention?
5. Are there recent studies, reports, or other information which should be considered for the OE SEA 2 Environmental Report?

Session 3

Session 3 was a facilitated discussion in plenary. Discussions were initiated either by the SEA team on frequently occurring topics/issues in feedback questionnaires, or by stakeholders wishing to raise any other issues for discussion.

A2.2.3 Outputs

Plenary discussions were captured and are summarised below for each individual workshop in Tables A2.5-A2.7. Written feedback in response to the above questions is tabulated below in Tables A2.8-A2.13, also separated for each individual workshop and with feedback listed in no particular order of importance. Where two or more stakeholders provided very similar feedback, these are displayed as one representative comment followed by information on the number of stakeholders making the comment e.g. "(x3)".

Table A2.5 – London workshop discussion

London workshop
<p>How are socio-economic issues of importance being considered in the SEA?</p> <p>The SEA is considering socio-economic issues, and in the absence of Marine Spatial Planning being in place, the SEA will outline key spatial interactions to inform Government decisions on the draft plan. For instance, OESEA made explicit recommendations in relation to navigation, fisheries, tourism etc.</p>
<p>What is the timescale for the SEA? Why are we conducting the SEA now?</p> <p>It was explained that the SEA is partly driven by the policy context (e.g. renewable energy and carbon reduction targets) and the desire to progress CCS (i.e. through demonstration projects). Hence the public consultation on this SEA was expected to start in December or early in the New Year.</p> <p>In terms of a lack of information on which to base an assessment, the last OESEA made recommendations that certain decisions would need to be made at a project level. This SEA will make as detailed an assessment as is possible based on the information available.</p>
<p>Are there considerations of international interactions with regard to Renewable Energy Zoning?</p> <p>MCA etc. are liaising in relation to international co-ordination on Renewable Energy Zoning. A recent map by the Wind Energy Agency shows the emerging international scale of renewable (wind) energy zones in European waters. The OESEA will make recommendations based on its findings.</p>
<p>Are alternatives going to consider different scenarios/technology mix etc.?</p> <p>The alternatives will be alternatives to the plan, i.e. to adopt the plan, adopt it with spatial/temporal restrictions. Despite various discussions with the steering group since the commencement of the SEA programme, a different set of alternatives has not been suggested on which the SG could agree. It is important to realise that we are operating in an environment with incomplete information, so the SEA should lay the groundwork for project specific investigations, and where it is possible, outline areas which should be avoided for certain types of development.</p>
<p>How will spatial planning issues be considered in the SEA?</p> <p>Offshore energy in the future is going to require a different approach (e.g. Marine Spatial Planning). Renewable Energy developments have a significant footprint and may present a significant source of spatial conflict. The SEA can suggest areas where mitigation may be necessary. It's not only renewables however, for instance CCS may require multiple structures due to shallow location of suitable structures for storage in saline aquifers</p>
<p>Will the SEA promote the multi-use of areas?</p> <p>It was confirmed that the SEA will consider and promote multi-use. It was noted that there was</p>

London workshop
already extensive multi-use of UK seas, with multiple industries and social uses coexisting.
How will the SEA consider grid connections?
A technical report by National Grid was commissioned as part of the OESEA process. We would be looking to update this based on zones leased, projections and discussions on trunk electricity lines. This would only be site specific where possible.
How will the SEA deal with cumulative/in-combination effects?
It was explained that the assessment in the SEA is evidence based in order to provide a comprehensive background and audit trail to the conclusions reached. Cumulative effects are considered though are often difficult to assess, for instance, in the case of terns, there are so many factors influencing their population dynamics, that it's a real challenge to attribute the cause of any change to cumulative effects of development.
How are landfall and grid connections considered in the SEA?
There will be a generic assessment of landfall and grid connections, as the techniques and likely impacts will be similar for certain areas. It will not be spatially specific.
Future use of existing oil & gas facilities – the trend over recent years has been to capitalise on existing infrastructure for new developments. There could be some re-use of facilities for CCS though there are some metallurgic issues with the transportation of acidic substances. The SEA is not expected to make any site specific considerations with regard to this.
Will HRA be conducted?
The 26 th seaward oil and gas Round was subject to Habitats Regulations Assessment, some blocks need further and more detailed assessment (Appropriate Assessment). For Round 3, The Crown Estate conducted the AA as the responsible (leasing) authority. For CCS the route has not been decided; there is the need for both licence and lease (i.e. there are essentially two competent authorities, DECC and The Crown Estate)
Why, given the consideration of a range of other users of the sea, have recreational sailing routes had not been presented?
It was emphasised that recreational users of the sea are considered in the SEA and that the SEA team had access to the RYA cruising routes atlas mentioned (partly sponsored through the SEA programme). It was confirmed that a national scale cruising routes map was present on one of the posters.
Can effects on diving birds from visible surface energy wave structures be scoped out?
It was stated that there is not adequate information to scope this out yet.
Some of the impacts have no basis and would lead to recommendations for excessive monitoring on the industry which was an economic burden that it may not be able to accept.
It was stated that the issues listed on the posters were not a judgement of significance, but based on inputs from various parties. Where, following an assessment, it is regarded that there is not a significant issue then the SEA will state that.
Is, for instance, the consideration of climate change vs. small local impacts part of the strategic thinking of this SEA?
The SEA applies to the draft plan/programme put forward by Government, and though the reason for this may be policy driven, the SEA does not assess Government policy.
It seems that there are lots of organisations doing similar things to the matrix of Potential Sources of Effect (e.g. the MCZ programme) – how does this go forward?
Earlier similar impact matrices include those prepared by the Marlin programme. We have put question marks in the matrix where we aren't sure about the source/significance of a potential effect.

London workshop
The SEA sits in a continuum of environmental assessment extending to project specific EIA, with increasing certainty in the assessment as more definitive information becomes available.
How does the SEA incorporate the technology of long-distance transmission and storage? (Qualified to state the question relates to the storage of energy produced by renewable sources).
There are a number of European level studies available regarding long-distance transport that we are aware of. The SEA will consider grid connections for offshore renewables.
Will it be encouraged for infrastructure to be shared?
It was stated that this would be the case for renewables, CCS and oil & gas. There is pressure put on oil and gas companies by government to cooperate and share infrastructure to encourage new entrants to the industry.
Have the thermal effects of the nuclear power programme been considered as a source of cumulative effect?
Not at this stage but it seems an unlikely cumulative effect given the location of the power stations and the developments that could follow adoption of the draft plan.
How will data be disseminated – there were promises as part of the Round 2 programme that data would become publicly available?
The SEA data has been publicly available for some time through the UK Deal website, and has now been moved over to a BGS data portal.
Developer generated information: environmental information should also be available (indeed it is a FEPA licence requirement) although commercially sensitive material (e.g. device efficiencies etc.) is unlikely to be made available.
Seascapes – read poster about visual aspects and about seascape sensitivity, and the capacity of seascapes in terms of how they accommodate change. Some studies are stepping away from sensitivity and moving towards the concept of seascape accommodating change – methodologies for assessment have been developed.
Natural England are believed to be initiating a project to further assess the seascape sensitivity/capacity in England along the lines of work CCW has completed for Welsh coasts and waters.
Will a draft Environmental Report be produced and then amended?
The DECC Offshore Energy SEA Environmental Reports have previously been issued for public consultation in final form. Consultation responses are considered and a post-consultation report produced. The draft plan may be altered subject to the recommendations of the SEA etc. though it is not planned that the SEA Environmental Report itself will be altered.

Table A2.6 – Bristol workshop plenary discussion

Bristol workshop
How do we keep up with the SEA programme of research?
The primary route is through the SEA website where technical reports underpinning the SEAs should be posted. SEA data is publicly available and was previously stored on the UKDeal website but has recently been transferred to the BGS data portal.
Will the maps be made publically available, if so will they be available from the one source?
The maps presented in the posters are a work in progress and will be finalised for the Environmental Report. The Environmental Report makes extensive use of maps and where they are generated

<p>Bristol workshop</p>
<p>through SEA funded work then they will be made publicly available. For instance the GIS layers of navigation routes developed from analysis of the AIS data provided by MCA are available through the MCA and The Crown Estate.</p>
<p>Are there thematic interactions (i.e. between plan elements) which may be mutually exclusive?</p>
<p>In the Southern North Sea, there are existing or proposed areas for gas production, aggregate extraction, wind development and CCS. In practice, many activities can (and currently do) coexist within an area; where activities are incompatible the SEA can point out the spatial issues but it will be for Government to decide priorities.</p>
<p>What influence does The Crown Estate have?</p>
<p>They are part of Government under the Treasury, so decisions on leasing can be expected to take proper account of other interests.</p>
<p>Does the SEA consider direct and indirect issues such as those from transmission lines? Corridors will need to be shared and we therefore need joined up thinking.</p>
<p>The SEA does consider these issues. A National Grid study was commissioned for the last SEA looking at likely OWF capacity, where this is logically to come ashore and the necessary grid capacity required, including when it will become available (e.g. when power stations are likely to close) and grid reinforcement. With oil and gas, the consensus view is that there is unlikely to be major new infrastructure installed, with new developments typically tied back to existing facilities. Carbon capture will be sited in areas of high CO₂ emissions and will require a multi-access distribution network to offshore storage.</p>
<p>For oil and gas, blocks in Moray Firth and Cardigan Bay were excluded in the last Round, will this be reconsidered?</p>
<p>The Habitats Regulations Assessment for the Moray Firth block is currently undergoing public consultation. The HRA for Cardigan Bay is in abeyance as there is limited new information on which to revise the assessment. We are not aware of any new proposals for the area.</p>
<p>How is the MCZ process interacting with the SEA?</p>
<p>There have been various meetings and information has been shared. This SEA has a limited 3 to 5 year lifespan in recognition of the rapid changes occurring in technology and marine management initiatives, including decisions on MCZ boundaries and degrees of protection.</p>
<p>The Severn tidal SEA provided strong indicators as to why it was beneficial not to take it forward (economic and environmental). What messages are coming from this SEA in relation to all technologies – what are we putting at risk?</p>
<p>The SEA uses an evidence based assessment which marshals information on receptors, what activities there are, what the effects are, and any information gaps in legislative controls and baseline information. All the SEAs have made recommendations and these are tracked to monitor their implementation and status. The SEA will flag up areas considered to need research and monitoring.</p>
<p>It has been stated that the currency of the SEA is 3-5 years. To what extent is the plan considering Welsh Assembly Government ambitions?</p>
<p>The SEA is not an exercise in isolation and we have close links with Welsh Marine Renewable Energy Strategy Framework, DOENI and the Scottish Government. We factor information from these in tot eh SEA and the underpinning studies to avoid duplication of effort.</p>
<p>Is there an opportunity to have the voice of surfers heard?</p>
<p>The ER will undergo a 12 week public consultation period after which comments are compiled and distilled for DECC ministers to consider. The SEA team are aware of relevant reports by Surfers against Sewage, e.g. Waves are Resources.</p>
<p>Have you consulted with experts?</p>

Bristol workshop
Through a variety of mechanisms including direct liaison and participation on several steering groups and fora the SEA team engages with a range of experts. In addition, the SEA programme initiates and/or supports a number of research projects.
What approach is being taken to cumulative effects?
This is a challenging area. Considerations are based on the evidence. We have experimented with matrices but have a concern that the results can lack transparency. We are reviewing the evidence and making decisions based on that, in a similar way to OESEA.
Are the interactions with other types of development (not just other energy developments) being considered?
We attempt to consider the range of existing and projected developments across sectors. Summaries such as Charting Progress 2 and the OSPAR Quality Status Report 2010 are useful indicators of existing environmental problems and trends over time.
Do we have scenarios to base the assessment on?
Scenarios which are realistic for the timescale we are considering will be used, for instance it is not considered that wet renewable devices will cover a substantial area (e.g. ~100km ²). A broadscale idea of the scale and spatial location of likely deployment will be used. This is not like previous SEAs which were geographically and geologically constrained. There is a clear idea of the scale of likely oil and gas activity and broad understanding of CCS.
Is installation security considered?
This has not been a consideration of the SEA, though this will probably become more of an issue as renewables become critical to energy supply. It was confirmed that this comes under the Government science and surveillance remit as well as COBRA.
Have there been studies to fill gaps in environmental knowledge, e.g. seabird aggregations?
There have been a range of aerial surveys, boat based surveys of marine mammals and birds for instance to ground truth earlier data. There have been studies of seal usage away from haul out sites and tagging information from previous studies is being comprehensively reviewed at the University of St. Andrews. Support for the CODA and SCANS2 surveys were cited as examples of SEA programme support.
In relation to information gaps, are we aware of the lack of seascape characterisation for England?
This was flagged up in the last SEA; the new guidance being presently drafted was noted.
The seabed is difficult to map – Is there the resource to find gaps and fill them?
The SEA has funded several sidescan and multibeam sonar surveys particularly in deeper waters to the west. This has led to the identification of cold water coral reefs of a scale previously unrecorded in UK waters.
Will the SEA tackle the mitigation issues of CO₂ storage to the seabed?
These will be tackled though there is limited information. Some studies have been using ecosystem models. NERC research with Plymouth University, BGS and others is using deviated drilling to allow the release of CO ₂ deep into seabed sediments to investigate the impacts of CO ₂ escape.
Is the multi-use of areas (e.g. aquaculture) considered? The centre for sustainable aquaculture have a lot of interest around the Welsh coast and have an interest in algal growth, biomass production etc. both in isolation and multi-use.
This is not part of the draft plan objectives. Most installations would be too far from shore for aquaculture to be likely to be economic though some coastal locations may be suitable.
Will the SEA consider the impacts of the plan on the dispersal of non-native species?

Bristol workshop
We have previously considered this in the OESEA. With regard to bottom living species we are unconvinced that these will act as stepping stones as there is plenty of glacial material deposited after the last ice age that could provide suitable means of dispersal for most species. There may be more potential for such stepping stone spread for species that occupy the photic zone.
Understand that the currency of this SEA is likely to be 3-5 years. Could argue that there is hardly any wave and tidal definition – what is next?
Envisage the programme will be defined by the rate of deployment – when the Government decides there is sufficient demand for technology deployment at a commercial scale there may be a new energy plan proposed and SEA conducted if necessary.
Does the SEA consider ancillary development?
We have tried to reflect this in the SEA. In the absence of concrete plans, a best estimate will be made.
Will there be wet renewable leasing rounds?
This will be down to a decision by The Crown Estate. They have been held in Scotland, and looking at the tidal stream resource we can conceptualise what a Round may look like in England and Wales.

Table A2.7 – Aberdeen workshop plenary discussion

Aberdeen workshop
How are the recommendations of OESEA being addressed in OESEA2?
These were included in the scoping report. They will be extended and revised based on feedback and what's happened since the last SEA. This SEA is closely linked to the last ER so the text of a number of the recommendations will be recognised.
Is the SEA considering any new areas?
There is nothing new geographically but there are new elements to the plan (e.g. carbon dioxide transport and storage).
With regard to spatial planning (e.g. wind leasing rounds) – how are these incorporated into the SEA?
The Round 3 areas were still at a draft stage for the last SEA so the assessment tried to be blind to these and considered areas of <60m depth. This time, deeper waters are being considered due to the advancement of foundation designs.
For CCS, is the area considered quite broad or is there a steer on what's economically viable?
A lot of work has been done to look at where the existing major sources of CO ₂ are, as well as potential disposal sites. Would anticipate developments would transport CO ₂ to storage structures as close to sources as possible. Based on this there is some steer to the likely areas and proposals through the DECC CCS competition. It is similar to oil and gas in the past in that viable areas are geologically constrained.
How will the SEA process take account of marine planning?
This will be addressed in due course. The SEA has a relatively short time span (3-5 years) as there will be a number of changes in the coming years (e.g. Marine Plans, MSFD etc.).
Will the MMO carry out a SEA for each Marine Plan?
The Marine and Coastal Access Act 2009 (and the Marine (Scotland) Act 2010) require an Appraisal of Sustainability for each Marine Plan.
What mitigation or enhancements are proposed as part of this SEA?

Aberdeen workshop
Assessment is evidence based; we look at the natural environment, potential sources of effects, controls including regulations, other users and look for areas not adequately covered so that recommendations can be made. We look at the opportunities for enhancement in terms of information base and controls, but not in the sense of environmental enhancement.
When published, will there be a plan document which sits alongside the Environmental Report?
An outline of the plan/programme which being assessed will be included as a chapter within the Environmental Report.
Are we anticipating significant effects?
Without question that without mitigation there is the potential for significant effects. A balance has to be struck in the assessment regarding the level of detail available at the strategic level and the site specific information available at the project specific level. Effects on other users are of particular importance, as are collision risks with birds and marine mammals.
Will there be an Appropriate Assessment/HRA?
As the competent authority The Crown Estate carried out the AA for Round 3, and DECC has carried out a screening exercise for the 26 th seaward oil and gas licensing Round, with a number of blocks identified for further AA assessment.
Will the draft plan have targets/indicative limits on the scale of developments?
The previous 33GW wind target was aspirational and developments of up to 500MW were considered based on developer feedback. There are no target capacities for wave and tidal devices but indicative scenarios will be used on which to base an assessment of potential effects.
The Crown Estate didn't conduct HRA for Round 2 extensions – are extensions not required to be assessed in this way?
It was clarified that the extensions were not considered to constitute a plan and were therefore not subject to SEA and AA, with the competent authority dealing with assessments at the individual project level.
Are there plans for future SEAs?
Another SEA would be initiated if there was a significant shift in technology. It is anticipated that this SEA will have a currency of 3-5 years.

Table A2.8 - Question 1

Are there additional sources of potentially significant environmental effects from the technologies covered by the current draft plan?
London workshop
<ul style="list-style-type: none"> • Cumulative effects from all technologies. (x4) • Cumulative effects with a focus on understanding how any landscape/seascape can accommodate change, but also on relative impacts on a site-specific basis. • The cumulative impacts, particularly with relation to sediment movement/water quality issues during installation, and potential discharges during operation. • Must keep in mind there are new uncertainties with multiple technologies which may mean that two relatively benign activities may cause a significant scenario. • CO₂ storage – possible leakage and impacts on marine life. (x3) • I am particularly concerned by the potential impacts of CCS in other storage areas apart from hydrocarbon reservoirs (potential for spills may be higher here?). • Danger of decommissioned oil and gas facilities not abandoned to a suitable level for

<p>Are there additional sources of potentially significant environmental effects from the technologies covered by the current draft plan?</p>
<p>CO₂ storage.</p> <ul style="list-style-type: none"> • Wave (depending on technology) could have collision risk or displacement (and so loss of feeding opportunity) impacts on birds. • Regarding wave and tidal stream energy specifically, I would say that there are too many sources of potentially significant effect already listed without sound justification (e.g. results from seal monitoring at SeaGen). It is not clear that the impact matrix is based on sound scientific evidence, but rather people's perceptions. • Regarding wave energy, as technology is immature, we don't know what the impacts will be and won't until we have commercial scale projects with monitoring. So at this stage have to be precautionary and flag risks even if we are unsure of their scale. • The onshore impacts from associated onshore infrastructure, particularly power transmission. • Decommissioning of offshore wind farms. • Cable laying – impact of unexploded WW2 ordnance. • Cover flood risk and coastal erosion in dedicated sections. • Sediment transport issues for all technologies. • Further consideration of waste issues, use of seabed for moving wastes. • Ensure water environment covers water quality, water resources and Water Framework Directive (inc. hydro/morphology) issues. • Consideration of climate change issues, and consequences/requirement for “climate proofing” developments. • Focus on offshore wind – EIA including multi-modal renewables, for example impact on sea mammals. • Displacement of fishing effort into other areas which then increases by-catch of diving birds. • On a regional seas/marine planning area level expert knowledge will be needed to estimate these effects, particularly in terms of displacements of other users and risks of accidents. • The typical example of an additional effect is that of identifying a feature of archaeological interest. By early involvement in planning it is possible to identify such sites, to consider risk and to plan the project accordingly. • Nuclear Power will become increasingly important; therefore need to include environment and socio-economic impact from the location of such sites. • The quantity of seawater required for cooling, discharge of radioactive and non-radioactive material needs to be assessed in terms of ecosystem impact and radiological dose.
<p>Bristol workshop</p>
<ul style="list-style-type: none"> • Cumulative effects. (x3) • In-combination effects for mobile species. • The onshore impacts from landfall infrastructure (x4), including intertidal areas. • Possible leakage from CO₂ storage sites. • Leaching of salt and ejection of brine to the sea from salt cavern construction. • Impacts from the transportation of liquids and gas, including the reuse of existing infrastructure. • Issues associated with CCS infrastructure. • The wider scale impacts of the deployment of larger wind and wave arrays. • Impact on surfing and associated socio-economic impacts. • Consideration of MCZ process including any proposed management measures (though these differ for each of the four project areas).

Are there additional sources of potentially significant environmental effects from the technologies covered by the current draft plan?
<ul style="list-style-type: none"> • Effects of offshore renewable development on MPAs. • Seabed impacts during construction and use on species which take a long time to recover from disturbance. • Effects of marine growth – effect on performance of technology (most applicable to wave and tidal). • Short-term effects such as those associated with construction and disposal of waste. • Coastal process (e.g. erosion, protection, scouring of sand from beaches). • Far field impact of tidal range schemes on hydrology and geomorphology. • Distinction between known/observed impacts and predicted/potential impacts (i.e. established industry vs. emergent industry). • Socio-economic effects of deleterious environmental impacts. • Effects of construction noise. • Effects on seascape. • Collision risk for marine mammals, diving birds and fish with tidal stream technologies.
Aberdeen workshop
<ul style="list-style-type: none"> • Effects on non-commercial and commercially exploited fish species.

Table A2.9 - Question 2

What do you view as “hard” spatial constraints for the siting of major marine energy developments in the context of the multiple uses/designations of the seas around the UK, together with the need for security of energy supply and response to climate change?
London workshop
<ul style="list-style-type: none"> • Grid connection – all technologies (x4) • Access to electricity storage technologies. • Important areas for shipping and recreational traffic / shipping lanes / areas traditionally used for navigation. (x3) • Development should not increase passage times or making navigation difficult in confined channels (allow for deep draught vessels confined to relatively restricted under sea canals). This applies to all technologies. • CCS – spatial constraints including limits on sites/areas that can be used for CO2 storage. • High intensity fishing grounds/areas where displacement would lead to high socio-economic impacts on fishing ports. Mediated by compatibility of technology – applies especially to large arrays of renewable installations only – large footprints. • Areas of large congregations of electrosensitive species – applies to electricity generation sources. • Seismic surveys over wind farms not possible once built. Practical considerations required in the spatial planning area of what can be achieved. • Not existing oil and gas licensing areas which are active. • Landscape/seascape visibility - should not be seen from shore. • Hard spatial – submarine lanes – how are they included? • How are defence estates steering the SEA away from their areas of interest which are hard constraints? • Care should be taken with the multi-use approach. Some technologies are not able to be co-located. • In practice, the hard spatial constraints for any new technology are likely to come from “he who shouts loudest” and those sectors with the strongest political lobby. • What takes priority, energy (energy security/policy) vs. fisheries (local community, socio-

<p>What do you view as “hard” spatial constraints for the siting of major marine energy developments in the context of the multiple uses/designations of the seas around the UK, together with the need for security of energy supply and response to climate change?</p>
<p>economic policy)?</p>
<p>Bristol workshop</p>
<ul style="list-style-type: none"> • Major navigation routes. (x4) • Recreational (and associated receptor) constraints. • Displacement of other activities. • Seabed obstacles such as historic wrecks, ammunition dumps, special biological features (e.g. <i>Lophelia</i> reefs). • MoD Practise and Exercise Areas (PEXAs). • Water depth for wind deployment, at least within the currency of this SEA. • Areas with existing leases/licences and physical structures, not including designated sites. (x2) • Consideration should be given to the positive effects of displacing damaging activities. • Areas of importance for cetaceans, particularly with regards to technologies for which little information is available. • Nationally designated landscapes and their adjacent seascapes. • MPAs (unless a similar AA process is applied to these). • SACs/MCZs • A tiered approach to constraints should be established, considering the relative importance of resources (x2) • Hard constraints should be limited to the ability of a location/area to deliver the project (i.e. substrata in terms of engineering and resource). • More importance needs to be given to climate change and energy supply security. • Consider SEA carried out by other countries.
<p>Aberdeen workshop</p>
<ul style="list-style-type: none"> • Effects of Precision Approach Radar (PAR). • 6nm exclusion zone around offshore platforms. • Precautionary principle would suggest the avoidance of large wind farm construction in proximity to feeding seabirds, but this requires further research (e.g. fishing displacement may enhance food resource). • Potential political constraint of the displacement.

Table A2.10 - Question 3

Are there sources of potentially significant environmental effects from the technologies covered in the current draft plan which you feel are not fully covered by existing operational controls/permitting requirements?
London workshop
<ul style="list-style-type: none"> • CCS, and the associated potential significant environmental effects e.g. how do you monitor and address leakage through fractures/faults etc.? Lots more evidence is required to inform policy decisions. (x2) • Wave and tidal: long-term impact upon marine bird breeding patterns. • Offshore wind – defining significant environmental effects is difficult as it also depends on scale and which area. Is displacement of another use considered significant? • A strategic overview (block-specific considerations) would be useful, perhaps to define exclusivity criteria for block licensing. • Grid connection (design of multi-modal platform use and shared transmission). • Options for species renewal through protection of spawning grounds (e.g. Dogger Bank). • Changes in sediment transport/ecosystem function. • Climate change is putting a high pressure on coastal ecosystems, which needs to be considered in terms of future resilience especially to accidental pollution events. • There is a significant risk that the Planning Act 2008/MCAA 2009 regime will undermine the construction of an integrated offshore electricity transmission network due to the increased complexity of dealing with IPC & MMO vs. developing a set of point-to-point connections from offshore renewables, as this would only require consent from the IPC (or ministers when the IPC is abolished). An integrated offshore network clearly has the potential to have much lower overall environmental impact.
Bristol workshop
<ul style="list-style-type: none"> • Need to ensure that effects of all technologies are robustly understood with regards to the effects on seascape character (not just visual resource). • Operational controls required to take on board potential effects on landscape/seascape character. • Demonstration within the SEA of a proper understanding of surfers, other recreational water users and their resources, and how these may be impacted by development. • Current survey/research effort is insufficient to support decisions in many areas relating to cetaceans. The level of work undertaken in the Moray Firth should be replicated elsewhere. • Monitoring during construction is required to ensure compliance – what happens if not? Needs to be feedback systems to modify consents in light of research. • A deploy and monitor approach to novel technologies seems the best approach, provided the monitoring is realistic and proportional, and with results being publically available. • Should take precautionary approach to siting new technologies for which impacts are uncertain. • In-combination effects of noise. • Marine mammal ship strike.
Aberdeen workshop
<ul style="list-style-type: none"> • Impacts of wind turbines on sediment migration and turbidity in the water column (see images from Thanet wind farm) which could have effects on turbidity and habitats.

Table A2.11 - Question 4

Are there additional practical mitigation techniques for sources of potentially significant environmental effects from the technologies covered current draft plan which you would like to draw to our attention?
London workshop
<ul style="list-style-type: none"> • CCS – important to consider existing regulation for practical mitigation techniques, such as is included in EU CCS Directive. • Use space exclusion from marine renewable “farms” as sanctuary site for fish population enhancement + space gives conservation objective positives. • Key mitigation techniques from for windfarms - siting in areas we think are less sensitive, with monitoring of impacts to inform further development and appropriate mitigation - should be extended to the other technologies. • There should be possible mitigation of cumulative and in-combination impacts through Marine Spatial Planning. This applies to all technologies. • For buried and submerged prehistoric landscape features the mitigation is to produce a rudimentary sequence model for the area subject to development. The model must be produced to professional standards and placed in the public realm to produce valid mitigation. For site-specific interests detailed survey and direct investigation to produce a project archive equates to archaeological mitigation. • Consideration of future generations of uses and the potential to educate. Plan for new jobs. • Improve clarity in communicating offshore renewables to other stakeholders. • Need to improve engagement with public e.g. use of TV/radio with a regional focus. • The importance of identifying mitigation measures needs to be highlighted so that change can go ahead in a sustainable way. • Did not see anything about mitigation techniques today.
Bristol workshop
<ul style="list-style-type: none"> • Need to ensure that SEA/EIA process is iterative (including in project design). • Important to consider whether rock protection of cables etc. has a beneficial effect on breeding of commercial fish species. • Mitigation includes displacement of damaging activities. • Can protection of protected areas be strengthened in the context of additional coastal pressures? • Consideration of national climate change benefits. • Coordination of approval of noisy activities subject to limitation based on established critical noise thresholds (as per recommendations of OESEA), to avoid significant in-combination effects.
Aberdeen workshop
None.

Table A2.12 - Question 5

Are there recent studies, reports, or other information which should be considered for the OE SEA 2 Environmental Report?
London workshop
<ul style="list-style-type: none"> • The information base gathered by MCZ projects for environmental data will be useful to update the Environmental Report, especially the species, habitats and fisheries data. It will be useful regarding current uses inside 12nm in particular. (x4) • Other policies, plans and programmes – National Policy Statements (including recent re-consultation), especially ports, Marine Policy Statement (energy), Welsh Assembly

- Government Energy Policy Statement - these need consideration and integration. (x3)
- Lessons learned through monitoring data from Round 1 and Round 2 offshore wind projects. (x2)
 - Need to be clear about how the SEA is being updated and environmental data are being disseminated.
 - MMO and spatial planning needs to be more adequately addressed.
 - VMS fishing data UK/EU D6-09 released to English regional MCZ projects – provided by Cefas (Defra contract MB0106).
 - Role of Inshore Fisheries Conservation Areas (IFCAs).
 - Information on % stocks harvested within precautionary limits – see Charting Progress II.
 - The fish spawning data is out of date (1998) given recent climate change impacts.
 - Consideration should be given to the European Climate Foundation’s recent report in Renewables to 2050, which contains useful analysis of potential grid requirements.
 - South West RDA ORRAD Report.
 - RYA UK Atlas of cruising routes and sailing/racing areas (Jan 2009 issue)
 - Implementation of new technologies to reduce Greenhouse Gases GHG by shipping adopted by the last MEPC 61/IMO in London (September 27th – October 1st 2010 – see IMO.org)
 - ALSF Regional Environmental Characterisation (REC) studies for Humber, East Anglia, Thames and Solent. COWRIE (in press) Geotechnical survey investigations and the historic environment.
 - English Heritage Action plan for the implementation of the ELC.
 - There are better impact matrices in EIAs for wind – see Lincs ES.
 - MEDIN marine information network, GIS, is this meeting wider stakeholder needs?
 - Offsetting/Natural Capital Initiative – see www.naturalcapitalinstitute.org.uk and legacy value.
 - CCS – for saline aquifers it may be important to contact BGS who are doing further work to investigate saline aquifer potential. Also, Crown Estate are considering what work they can do to validate/prove saline aquifers.

Bristol workshop

- Data gathered through the regional MCZ projects. (x2)
- Monitoring information gathered by existing wind farm developers as part of their FEPA requirements.
- Evidence gaps may partly be covered through new larger scale offshore developments.
- European developments such as BIMEP and PILOT ZONE.
- University of Plymouth SOWFIA project.
- Marine Renewable Energy and the Natural Heritage (SNH). Particularly the issue of co-location of marine renewables and designated sites.
- Enhanced resources studies which may help update the atlas of energy resources and offer better underpinning evidence
- Waves are Resources report - available from sas.org.uk
- EIA guidance available from sas.org.uk
- Crown Estate “enabling actions”
- Crown Estate MaRS tool
- MRESF bibliography
- Towards Marine Protected Areas for cetaceans in Scotland, England and Wales, available from info@wdcs.org
- Research/reports sponsored by CCW
- CCW’s wave and tidal mapping work
- Seabed surveying which contributes to the MARLIN database.
- There wasn’t much mention of the Marine Strategy Framework Directive and the target

to demonstrate Good Environmental Status by 2020.
Aberdeen workshop
<ul style="list-style-type: none"> • Potential EMF effects arising from inter-array cabling (Doggerbank)

Table A2.13 – Other Comments

London workshop
<ul style="list-style-type: none"> • An issue of concern is that baseline environmental data is not sufficient to inform leasing for windfarms, with Round 2 windfarm surveys identifying internationally important populations of animals. This was attempted to be addressed by Round 3, but still the baseline was inadequate. • How can climate change impacts on marine ecosystems be factored in? • The wave and tidal energy sector is likely to deploy outside of the timeframe of the SEA. However, confidence will be adversely affected if there is not recognition of potential sites for the deployment of these technologies. The SEA’s recognition of the sector is therefore very welcome. • Could UK SEA activities (experience) help other countries develop their strategies? Any links with Columbia? (Starting major offshore oil and gas and renewables developments). • I have a real concern that every potential impact that received a “tick in the box” in the SEA will automatically be carried forward to require monitoring for an individual project. Monitoring costs threaten to strangle the embryonic wave and tidal stream industries. • Cumulative effects/impacts on the wave environment from onshore/nearshore activities e.g. new nuclear. Potentially significant effects table – air quality is not a potentially significant effect for offshore wind. • Compatibility between development and MPAs by conservation feature. • The “offshore” is a misnomer. A very large number of future developments are planned inside the “nearshore” 12 miles where the environment is most productive and important to offshore waters and communities. • There are significant land and seascape effects which relate to the way in which the offshore electricity and gas (particularly CO₂) transmission network is constructed offshore. For example, recent work by National Grid shows that a radical approach to offshore grid connections could require close to 600km of new overhead power lines to be developed, compared to ~160km for a coordinated offshore grid. It is important that the SEA makes clear that decisions about offshore grid development may require onshore infrastructure to be constructed. This infrastructure will often be constructed under a separate consenting regime and may also take place significantly after offshore consents have been sought. • As Round 2 offshore wind comes forward and more monitoring is undertaken, are you getting the monitoring data from CEFAS and local authorities, Natural England, Crown Estate etc? • Regarding wave and tidal stream energy specifically, but probably all technologies, it is not clear that the impact matrix is based on sound scientific evidence, but rather people’s perceptions. There is evidence from the Seagen project that the tidal stream device there has no impact on the local seal population, yet this remains in the matrix (risk of collision). This is just one example. Therefore, far from there being additional environmental effects, I would say that there are too many listed without sound justification. • Thank you for an informative event.
Bristol workshop
<ul style="list-style-type: none"> • Would like to see more detail on ports/harbours and what they do as a baseline data

<p>layer, and their role in supporting the offshore industry.</p> <ul style="list-style-type: none"> • How fully are mitigation measures identified? • A useful exercise – thanks. • OESEA2 should review the recommendations of OESEA and consider progress against these and how the remaining measures will be implemented.
Aberdeen workshop
<ul style="list-style-type: none"> • A marine capacity study should be undertaken to assess how many projects can be physically accommodated. • Welcome the regional approach taken in the assessment. • Would IMO routing measures be a constraint to development? • Are MoD PEXAs likely to change with defence reviews? • The rate of change in environmental conditions should be considered (e.g. how quickly <i>Sabellaria</i> reefs can change, and re-growth over areas of disturbance such as pipeline installation).

A total of 70 organisations (87 delegates) including statutory advisors and regulators, developers, consultants and NGOs, attended the stakeholder workshops held in London, Bristol and Aberdeen.

Table A2.13 - Attendees at the Stakeholder Workshops

Organisation	No. of delegates	Workshop
Aberdeen Harbour Board	1	A
Aberdeenshire Council	1	A
ABP Mer	1	B
BAE Systems	2	B
BCG Energy	1	A
Birmingham University: Dept of Political Science & International Studies	1	L
Black & Veatch Ltd	1	L
Bright Angel Coastal Consultants	1	L
British Geological Survey	2	A, B
Campaign to Protect Rural England	1	L
Carbon Capture & Storage Association	1	L
CCW	1	B
CEFAS	3	L
Centrica Energy	1	L
Coastline Surveys	1	B
Corporate Risk Associates Ltd	1	L
DECC	3	A, B, L
DONG Energy	1	L
E.ON Climate & Renewables	1	B
E.ON New Build & Technology	1	L
Ecologic UK	1	A
English Heritage	1	L
Environment Agency	1	L
ERM UK Ltd	1	L
Forewind Ltd	1	B
Graduate School of the Environment, Centre for Alternative Energy	1	B
Halcrow Group	1	B
Hanson Aggregates Marine on behalf of BMAPA	1	L

Organisation	No. of delegates	Workshop
Hartley Anderson Ltd ¹	6	A, B, L
Heriot Watt University	2	L
HiDef Aerial Surveying Ltd	2	B, L
JNCC	1	A
Marine Current Turbines	1	L
Marine Energy Research Group – Swansea University	1	B
Marine Management Organisation	1	L
Marine Scotland	3	A
MEM (UK)	2	B
Moray Offshore Renewable	1	A
National Federation of Fishermen's Organisations	1	L
National Oceanography Centre	1	B
Natural England	2	B
North Somerset Council	1	B
Ocean Electric Power	1	L
Pelagica	1	A
Portland Port Ltd	1	B
PRImARE/University of Exeter	1	B
Renewable Energy Association	1	L
RenewableUK	1	L
Royal Haskoning	1	B
Royal Yachting Association	1	L
RPS Energy	1	L
RPS Group	2	B, L
RSPB	3	A, B, L
RWE Npower Renewables	1	L
Scottish Government	2	A
Scottish Power Renewables	1	A
SeaEnergy Renewables	1	A
South West Regional Development Authority	1	B
Statoil (UK) Ltd	1	L
Surfers Against Sewage (SAS)	1	B
Swansea University	1	B
Terence O'Rourke Ltd	1	L
The Energy Institute	1	A
Tidal Energy Ltd	1	B
UK Chamber of Shipping	1	L
UKTI Defence and Security Organisation	1	B
University College London	1	L
University of Plymouth	2	B
Waveney District Council	1	L
Whale & Dolphin Conservation Society	1	B
WSP Environmental	1	B

Notes: ¹ SEA team. "Workshop" column indicates the workshop(s) attended; A = Aberdeen, B = Bristol, L = London.

APPENDIX 4 – OTHER POTENTIALLY RELEVANT INITIATIVES

CONTENTS

- A4.1 Introduction
- A4.2 Biodiversity, habitats, flora & fauna (including conservation)
- A4.3 Geology, substrates & coastal geomorphology
- A4.4 Landscape/seascape
- A4.5 Water environment
- A4.6 Air quality
- A4.7 Climate & meteorology
- A4.8 Population & human health
- A4.9 Other users & material assets (infrastructure, other natural resources)
- A4.10 Cultural heritage

A4.1 Introduction

The *Environmental Assessment of Plans and Programmes Regulations 2004* require that within a SEA Environmental Report consideration is given to:

“an outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes” and that consideration is given to the degree to which the “plan or programme influences other plans and programmes including those in a hierarchy”

“the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation”.

The following sections outline the main objectives/requirements of a range of other initiatives (including plans and programmes) established at international, European Union, UK and UK constituent country level, which are relevant to this plan/programme. These initiatives are arranged by SEA topic as will be the environmental baseline for this SEA. Where legislation is listed, these are the most pertinent acts/bills/regulations etc. and should not be regarded as a part of a definitive list.

A4.2 Biodiversity, habitats, flora & fauna (including conservation)

Biodiversity, Habitats, Flora & Fauna	
International	<ul style="list-style-type: none"> Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973) Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (1971, 1982) United Nations Convention on Biodiversity (the Rio Convention, 1992) Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention, 1979) The International Council for the Exploration of the Sea (ICES) Code of Practice for the Introduction and Transfer of Marine Organisms International Convention for the control of ships ballast water and sediments (adopted 2004, still to enter into force)
Regional	<ul style="list-style-type: none"> Convention for the Protection of the Marine Environment of the North East Atlantic (the OSPAR Convention, 1992) OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas OSPAR Agreement 2005-6 on the Agreement on Background Concentrations for Contaminants in Seawater, Biota and Sediment OSPAR List of Threatened and/or Declining Species and Habitats. Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention, 1979) Agreement on the Conservation of Small Cetaceans of the Baltic North East Atlantic, Irish and North Seas (1994) Convention for the Conservation of Salmon in the North Atlantic Ocean (1983) Council of Europe Strategy on Invasive Alien Species (2003) OSPAR Quality Status Report 2010

Europe	<p>Directive 92/43/EEC, on the Conservation of Natural Habitats and of Wild Fauna and Flora Directive 2004/35/EC, on environmental liability The WFD with respect to achieving good ecological status in transitional waters. Marine Strategy Framework Directive 2008/56/EC Council of Europe Strategy on Invasive Alien Species (2003) EU Biodiversity Communication (2006) The Sixth Environment Action Programme of the European Community 2002-2012 Action Plan: Halting the loss of biodiversity by 2010 and beyond (2006) Directive 2009/147/EC, on the Conservation of Wild Birds</p>
UK	<p>UK Government Sustainable Development Strategy: Securing the Future (2005) The Wildlife and Countryside Act (WCA)1981 National Parks and Access to the Countryside Act 1949 Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) Natural Environment and Rural Communities Act 2004 Biodiversity: UK Action Plan (1995, 2005) Safeguarding our Seas: A strategy for the conservation and sustainable development of our marine environment (2002) Invasive non-native species framework strategy for Great Britain (2008) Marine and Coastal Access Act 2009 The Conservation of Habitats and Species Regulations 2010 The Marine Strategy Regulations 2010 The Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended) Our Seas - a shared resource. High Level Marine Objectives (2009) Review of Marine Nature Conservation (Defra 1999 onwards) and response, Safeguarding Sea Life (2005) Charting Progress 2 - An Assessment of the State of UK Seas (2010) Natural England and JNCC Marine Conservation Zone Project (England territorial and offshore waters, and the Irish Sea) The Eels (England and Wales) Regulations 2009 Marine Aggregate Levy Sustainability Fund (MALSF) Regional Environmental Characterisations , including the South Coast and Thames and forthcoming East Coast and the Humber studies. NERC Marine Environmental Mapping Programme (MAREMAP) Draft Marine Policy Statement Draft National Energy Policy Statements</p>
Local	<p>Working with the grain of nature: a biodiversity strategy for England (2002) Scotland's Biodiversity: It's In Your Hands (2004) A Follow up to Seas the Opportunity: A Strategy for the Long Term Sustainability of Scotland's Coasts and Seas 2007 Northern Ireland Biodiversity Strategy (2002) Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended) Countryside and Rights of Way (CRoW) Act 2000 (England and Wales) Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 Wildlife (Northern Ireland) Order 1985 Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended) Nature Conservation (Scotland) Act 2004 Planning Policy Statement 1: Delivering Sustainable Development (England) Planning Policy Statement 9: Biodiversity and Geological Conservation (England) Technical Advice Note 5: Nature Conservation and Planning (Wales) Planning Policy Statement 2: Planning and Nature Conservation (Northern Ireland) Draft list of Priority Marine Features within Scottish waters (available June 2010) Local Biodiversity Action Plans Wales Biodiversity Framework Environment Strategy for Wales and One Wales, One Planet: Sustainable Development Scheme for Wales Consultation on Planning Policy Statement: Planning for a Natural and Healthy Environment (2010) Technical Advice Note 5: Nature Conservation and Planning (Wales) (2009) Marine (Scotland) Act 2010 Scottish Planning Policy (2010) The National Planning Framework for Scotland 2 (2010) Planning Circular 1/2009: Development Planning Appendix 1: The Habitats Regulations Planning Policy Statement 2: Planning and Nature Conservation (Northern Ireland) Draft list of Priority Marine Features within Scottish waters (2010) Planning Policy Wales Edition 3 (2010)</p>

Key objectives and targets

Note that the following narrative covers the topic areas of biodiversity, habitats, flora & fauna (Appendix 3a), and conservation (Appendix 3j).

Article 3 of the Habitats Directive 92/43/EEC (as amended) provides for the creation of a coherent ecological network of European sites (Natura 2000) made up of Special Areas of Conservation (SACs), which are set up to conserve those species listed in Annex I and habitats listed in Annex II of the directive; and those sites designated as Special Protection Areas (SPAs) for bird species under Annex I (rare or vulnerable) and II (migratory) of the Wild Birds Directive 2009/147/EC.

The *Conservation of Species and Habitats Regulations 2010* consolidates the *Conservation (Natural Habitats, &c.) Regulations 1994* and also implements certain aspects of the *Marine and Coastal Access Act* (above), principally the transfer of certain licensing functions from Natural England to the Marine Management Organisation, and the recognition of Marine Enforcement Officers to be able to use powers under the *Marine and Coastal Access Act 2009* and to enforce offences under the Habitats Regulations, within England, Wales and Scotland and their respective territorial seas (though Scotland maintains some devolved functions). The *Conservation of Species and Habitats Regulations 2010* transpose the Habitats Directive into legislation in England, Wales and Scotland, including their territorial seas out to 12nm, as do, in Northern Ireland and its adjacent territorial seas, the *Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995* (as amended). Under the *Conservation of Species and Habitats Regulations 2010*, Regulation 35 (formerly 33 in the 1994 Regulations) requires that Natural England and CCW produce advice for relevant authorities on the conservation objectives and activities likely to cause deterioration/disturbance to those habitats and/or species associated with Natura 2000 or Ramsar sites in England and Wales. CCW has produced such advice for a range of marine sites, referred to as the 'Regulation 33 pack'.

The Wild Birds Directive is implemented through the above regulations, and also through the *Wildlife & Countryside Act 1981* (as amended), the *Wildlife (Northern Ireland) Order 1985* and the *Nature Conservation and Amenity Lands (Northern Ireland) Order 1985*. The *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended) apply the Habitats Directive and the Birds Directive beyond territorial waters (beyond 12nm). These Regulations together provide for the designation and protection of European sites and the protection of European Species in the UK and UK waters.

The *Wildlife and Countryside Act 1981* (as amended) (WCA) is one of the principal pieces of legislation relating to nature conservation in Great Britain. Although protection under the WCA generally includes adjacent territorial waters (12nm), for certain species, protection is limited to 6nm from coastal baselines due to the interaction with the Common Fisheries Policy and for the designation of Marine Nature Reserves out to 3nm. The WCA is supplemented by various other pieces of legislation including the *Countryside and Rights of Way (CROW) Act 2000* (in England and Wales), and the *Nature Conservation (Scotland) Act 2004* (in Scotland). In Northern Ireland, the main legislation is contained in the *Wildlife (Northern Ireland) Order 1985* (as amended) and *The Environment (Northern Ireland) Order 2002*. This legislation provides for the protection of species and the designation of nationally important sites known as Sites of Special Scientific Interest (SSSI) in England, Wales and Scotland and as Areas of Special Scientific Interest (ASSI) in Northern Ireland. Many SSSIs and ASSIs are also designated as European Sites. SSSI sites have until present extended only to Mean Low Water (e.g. intertidal areas), though the *Marine and Coastal Access Act* (see below for further details) has allowed for the all new SSSIs to extend below this line.

The Marine Strategy Framework Directive establishes a framework within which Member States must take measures to achieve or maintain good environmental status in the marine environment by the year 2020. These measures include the establishment of a cohesive network of Marine Protected Areas (MPAs) which is intended to build on the areas already protected as European marine sites under the Birds and Habitats Directives.

Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage (transposed through the *Environmental Damage (Prevention and Remediation) Regulations 2009* – separate regulations apply in the devolved administrations) applies to environmental damage caused to *inter alia* species and habitats protected at the community level, i.e. those covered under the Birds and Habitats Directives.

The *Marine and Coastal Access Act 2009* (and equivalent Acts/Bills of the devolved administrations) will aid the completion of an ecologically coherent and well-managed network of Marine Protected Areas, suggested as a contributory measure to achieving good environmental status in the Marine Strategy Framework Directive, and as required in similar commitments regarding MPAs under international conventions such as the Convention on Biological Diversity. These sites will be known as Marine Conservation Zones (MCZs) in England and Wales and Marine Protected Areas (MPAs) in Scotland, administered at the local level in each UK constituent country. The Marine Conservation Zone project in England and Wales is delivered through four regional projects administered by Natural England and the JNCC, covering the South-West (Finding Sanctuary), Irish Sea (Irish Sea Conservation Zones), North Sea (Net Gain) and Eastern Channel (Balanced Seas). These projects exclude Scottish territorial and offshore waters, and the territorial waters of Wales which are subject to their own programmes of MCZ/MPA identification and designation. In Wales, the Welsh Assembly Government is running the Wales MCZ Project, which is advised by a Steering Group and a Technical Advisory Group. The former consists of WAG, CCW, the Environment Agency, the Welsh Local Government Association and other relevant bodies in Wales, with the latter having a broader array of advisers including the JNCC and Cefas. The Welsh Assembly Government intends to use the new MCZ powers to supplement the existing network of marine protected areas (e.g. offshore SACs) with a limited number of highly protected sites. The first consultation on possible sites is expected from May to July 2011. In UK offshore waters adjacent to Scotland, MPAs will be identified through a Scottish Marine Protected Area Project. Non-Natura MPAs will be established in Scottish Territorial Waters through the Marine (Scotland) Act 2010. The Department of Environment (DoE) (Northern Ireland) consulted (ending July 2010) on policy proposals which form part of the process contributing to the delivery of a Northern Ireland Bill, likely to be implemented in 2012. The Northern Ireland Government are to implement their part of the UK MPA network using a combination of European protected sites and a new MCZ designation, analogous to that under the Marine and Coastal Access Act for English and Welsh waters. The intention is to have a network of effectively managed sites (European protected and MCZs) by 2020.

Studies and site specific surveys carried out on behalf of conservation agencies in support of site designations including Natura 2000 sites and MCZs continue to contribute to knowledge of the UK context for the range of topics covered in Appendix 3a. In relation to Natura 2000 sites, Natural England has identified seven 'Areas of Search' (AoS) within English waters, thought to contain outstanding examples of two subtidal Habitats Directive Annex I habitats, Sandbanks covered by seawater at all times and Reefs. Natural England has commissioned studies to investigate the occurrence of Annex I habitat within these areas, and to characterise the Annex I habitat. The seven AoS identified by Natural England are:

- Area 1 - Outer Wash Sandbanks
- Area 2 - Greater Thames Estuary
- Area 3 - Lyme Bay to Poole Bay
- Area 4 - Salcombe to Yealm and Eddystone
- Area 5 - Lizard Point
- Area 6 - Land's End and Cape Bank
- Area 7 - Outer Morecambe Bay, Shell Flat and Lune Deep

More generally, the High Level Marine Objectives agreed by the UK Government and Devolved Administrations set out an approach to the sustainable use of UK seas, including the recognition that healthy marine habitats and ecosystems, species and biodiversity should be maintained and where appropriate recovered. The most recent policy paper by Defra on the Marine and Coastal Access Act indicates that the forthcoming Marine Policy Statement will build on *inter alia* these principles, and so should help to confer a good degree of protection to European and national level designations and to the wider marine environment.

To date the vast majority of designated conservation sites in the UK have been terrestrial or terrestrial with marine components, with very few being entirely marine in nature. More recently a number of offshore SACs are in the process of being designated and work is underway to identify and extend a number of marine SPAs. These sites, and those sites to arise from the designation of MCZs, are a key step in extending the network of national and European sites into offshore waters and the creation of an ecologically coherent network in the marine environment.

The UK Biodiversity Action Plan provides a national strategy for the conservation of biological diversity and the sustainable use of biological resources as required under Article 6 of the Rio Convention. A number of species (1,150) and habitats (65) have been identified as being priorities for conservation action in the UK, and these include a number of marine components, for instance 28 BAP habitats are marine. Though the plans for these species and habitats have no statutory status, they are given some legal basis in the *Countryside and Rights of Way Act 2000* and the *Natural Environment and Rural Communities Act 2006* (e.g. list of species of principal importance designated under Sections 41 and 42 of the Act).

In 2010 the EU published guidance on the development of wind farms in accordance with EU nature legislation, specifically Natura 2000 aimed at (including others) planners, developers and consultants. In addition to planning guidance and policy background, the document identifies potential impacts arising from both onshore and offshore wind farms on birds, bats and aquatic species (e.g. cetaceans), and how strategic planning can help to avoid or minimise environmental conflicts.

Additionally, study programmes to support regional assessments of long-term effects of oil and gas developments (on behalf of Oil and Gas UK and the UK Government/Industry Environmental Monitoring Committee); and studies to support assessment and monitoring of specific offshore or nearshore energy projects (e.g. those associated with the SeaGen development in Strangford Lough) have also contributed to the knowledge in the topic areas covered by Appendix 3a.

Draft National Policy Statements were released for consultation in 2009 and subject to a second round of consultation in 2010. These statements are aimed at providing a policy steer for Nationally Significant Infrastructure Projects (NSIPs) as detailed in the Planning Act 2008 (see Appendix 4 for more details). Those which are of close relevance to OESEA2 are:

- Draft Overarching National Policy Statement for Energy (EN-1)
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)
- Draft National Policy Statement for Gas Supply Infrastructure and Gas and Pipelines (EN-4)

Each National Policy Statement was subject to an Appraisal of Sustainability (AoS) incorporating Strategic Environmental Assessment and Habitats Regulations Assessment (HRA). The Overarching National Policy Statement for Energy (EN-1) addresses policy in relation to generic biodiversity impacts; whereas the energy specific policy statements contain more detailed considerations, although still at a high policy level. Each National Policy Statement contains considerations relevant to potential impacts on the natural environment including birds, marine mammals, fish and intertidal habitats.

In addition, the draft Marine Policy Statement (MPS) and its accompanying AoS and HRA were released for consultation in July 2010. This statement is wide reaching and provides a policy steer for marine decision makers (primarily the MMO but also those involved in NSIPs) in relation to most marine activities. A number of potential impacts on the natural environment from energy developments relevant to OESEA2 are similarly identified in the MPS. More widely and in relation to all marine activities, high level environmental considerations are provided by reaffirming the conservation responsibilities of the UK Government which are to be taken account of in the preparation of Marine Plans. This includes the commitment to establishing a UK network of MPAs incorporating the new MCZ designation under the Marine and Coastal Access Act 2009 (see above) and existing and future marine sites including SACs and SPAs.

Implications for SEA

The SEA should consider the implications of the draft plan/programme and its alternatives in relation to the features of conservation sites of European and national importance, and on the wider marine environment, and those areas for which designations are proposed. The SEA will need to draw attention to the current location of these sites and the species or habitats for which they are designated, and any sites which are currently being considered for designation, in addition to characterising the present baseline condition and issues relating more generally to the marine environment. At this more general level, the SEA must consider the potential implications of the draft plan/programme on attaining good environmental status of both marine and coastal/estuarine waters as determined by the Water Framework and Marine Strategy Framework Directives. The creation of MCZs and MPAs under the Marine and Coastal Access Act 2009 and Marine (Scotland) Act 2010 respectively, represents a new type of offshore designation, the number, size and location of which are unknown at present.

A4.3 Geology, substrates & coastal geomorphology

Geology, Substrates & Coastal Processes	
International	The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (the London Convention) and 1996 Protocol Thereto (amendment on the storage of CO ₂ in geological formations came into force 10 February 2007).
Regional	OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas OSPAR Agreement 2005-6 on the Agreement on Background Concentrations for Contaminants in Seawater, Biota and Sediment OSPAR Recommendation 2006/5 on a management regime for offshore cuttings piles OSPAR Decision 2007/2 on the Storage of Carbon Dioxide Streams in Geological Formations
EU	Directive 2007/60/EC on the assessment and management of flood risks (2007) EC Habitats Directive 92/43/EEC (1992) Water Framework Directive (2000/60/EC) Marine Strategy Framework Directive 2008/56/EC Communication from the Commission Report to the European Parliament and the Council: An evaluation of Integrated Coastal Zone Management (ICZM) in Europe 2007. COM(2007)308 final Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide
UK	Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) The Wildlife and Countryside Act 1981 Geological Conservation Review (GCR) The Conservation of Habitats and Species Regulations 2010 Flood and Water Management Act 2010 Marine and Coastal Access Act 2009 Marine Conservation Zones (and equivalent designations under the devolved administrations) Defra's Consultation on Coastal Change Policy (2009) Making Space for Water: National Coastal Erosion Risk Mapping Project (ongoing) The Framework for the Development of Clean Coal (FDCC) The Government Response to the Consultation on the Proposed Offshore Carbon Dioxide Storage Licensing Regime and Draft Regulations (2010) The Energy Act 2008 (Consequential Modifications) (Offshore Environmental Protection) Order 2010

Cleaner Coasts Healthier Seas, Working for a better marine environment, Our strategy for 2005-2011 (Environment Agency)
 Local Coastal Partnerships and the Scottish Coastal Forum
 A Follow up to Seas the Opportunity: A Strategy for the Long Term Sustainability of Scotland's Coasts and Seas 2007
 Marine Strategy for Scotland's Coast and Marine Environment
 Making the Most of Wales' Coast. The Integrated Coastal Zone Management Strategy for Wales
 Earth Science Conservation Review (Northern Ireland)
 An Integrated Coastal Zone Management Strategy for Northern Ireland 2006-2026
 Planning Policy Statement 9: Biodiversity and Geological Conservation (England)
 Minerals Policy Statement 1: Planning and Minerals (England)
 Marine Mineral Guidance Note 1: Guidance on the Extraction of Sand, Gravel and Other Minerals from the English Seabed
 Technical Advice Note 14: Coastal Planning (Wales)
 Technical Advice Note 15: Development and Flood Risk (Wales)
 Interim Marine Aggregates Dredging Policy (Wales)
 Planning Policy Statement 15: Planning and Flood Risk (Northern Ireland)
 Environment Agency Shoreline Management Plans - currently under review (SMP2) (England and Wales)
 A Strategy for Promoting an Integrated Approach to the Management of Coastal Areas in England
 Making space for water: Taking forward a new Government strategy for flood and coastal erosion risk management in England
 Planning Policy Statement 5: Planning for the Historic Environment (England)
 Consultation paper on a new Planning Policy Statement: Planning for a Natural and Healthy Environment - consolidates *inter alia* PPS9: Biodiversity and Geological Conservation
 Planning Policy Statement 25: Development and Flood Risk and supplement Development and Coastal Change (England)
 Planning Policy Guidance 20: Coastal Planning (England) - note that PPS25 supplement replaces the policy on managing the impacts of coastal erosion to development set out in PPG20, which is cancelled with the exception of paragraphs 2.9, 2.10 and 3.9. PPG20 will be cancelled following introduction of the new Planning Policy Statement: Planning for a Natural and Healthy Environment (above).
 Technical Advice Note 5: Nature Conservation and Planning (Wales)
 Scottish Planning Policy
 CRoW Act 2000 (England and Wales)
 Flood Risk Management (Scotland) Act 2009

Key objectives and targets

The Geological Conservation Review (GCR), launched in 1977, identifies the most important (nationally and internationally) terrestrial geological sites in Britain. GCR sites are chosen such that they satisfy the legal requirements of SSSI designations for geology and physiography, and therefore they often geographically coincide with notified Earth Science-SSSIs or those which are awaiting notification. More important sites are locally recognised through the Regionally Important Geological and Geomorphological Sites (RIGS) programme, though only SSSI features have any form of statutory protection.

In the marine environment, many geological features are gaining protection through designations for which they are a qualifying habitat feature (e.g. SACs designated under the *Conservation of Habitats and Species Regulations 2010* and *Offshore Marine Conservation (Natural Habitats, &c.) (Amendment) Regulations 2010*). The *Marine and Coastal Access Act (MCAA)* and *Marine (Scotland) Act* provide a means for the conservation of specific “features of geological and geomorphological interest” through the designation of Marine Conservation Zones (MCZs) and Marine Protected Areas (MPAs) respectively. It may be reasonably anticipated that a similar designation may emerge from a Northern Ireland Bill. In addition, the *Marine and Coastal Access Act* amends the *Wildlife and Countryside Act 1981* in such a way that SSSI notifications can be made in England and Wales below the Mean Low Water Mark (MLWM) under certain statutory conditions, set out in the Act (e.g. the flora, fauna or features leading to the notification of the SSSI are also present in the subtidal area to which SSSI protection is to

extend). The Act also provides powers to remove SSSI notifications where they coincide with new MCZs in England and Wales.

At the coast, natural denudation processes are leading to shoreline retreat and increased flood risk in many cases, which may be accentuated by projected climate and associated environmental change, which may include increased storminess and sea-level rise (e.g. Lowe *et al.* 2009). Integrated Coastal Zone Management and appropriate planning policy aims to help manage and mitigate the problems associated with *inter alia* coastal erosion and flood risk. The *Flood and Water Management Act 2010* (England and Wales) and the *Flood Risk Management (Scotland) Act 2009* make provisions for the creation of flood risk (and in the case of England and Wales, coastal erosion) management strategies/plans. In addition to these, planning policy for England and the devolved administrations provides policy and guidance for developers and authorities on how to manage development at the coast, incorporating aspects relating to climate change (such as increased sea-levels) and the prohibition of unnecessary development in areas subject to erosion and coastal flooding. Shoreline Management Plans (In England and Wales) are already taking a longer term view by identifying sustainable management approaches of relevance for up to the next 100 years. Each SMP (or revised SMP2) provides policy recommendations for coastal areas which may advise Holding the Line (HTL), through the maintenance of present defences or where monitoring and assessment provide evidence that new defences would be beneficial; No Active Intervention (NAI), where defences are not maintained and Managed Realignment (MR) or Retreat (R), where defences are removed and/or moved inland to allow for natural coastal denudation. Policies are provided in each SMP over three 'epochs', 2009-2025, 2025-2055 and 2055-2105.

The Water Framework Directive (WFD) seeks to achieve good ecological status for coastal and estuarine water bodies. River Basin Management Plans (RBMPs) now completed for England and the devolved administrations are one of the principal means that the WFD has been implemented in the UK and will be used in combination with other plans including SMPs to achieve a fully integrated approach to coastal management. RBMPs identify relevant morphological and hydrodynamic issues and the measures to manage such issues. Similarly, the Marine Strategy Framework Directive (MSFD) seeks to achieve good environmental status, which incorporates geological conditions, in the marine environment. These objectives, aligned with the upcoming Marine Plans associated with the MCAA should provide a holistic consideration of the geological aspects of the marine and terrestrial environment across the intertidal and coastal areas of the UK.

The storage of carbon dioxide in geological formations is likely to take place in the UK within the next 10 years at least at a demonstrator level. Suitable formations may consist of saline aquifers, halite deposits or depleted hydrocarbon reservoirs. UK Government will provide £1bn towards the first UK CCS demonstration project, with up to another three potentially being partly funded through incentive (e.g. through the electricity supply levy). It is expected that after 2020 the technology will be economically and technologically feasible. In preparation for this, all new fossil fuel power stations must be designed so as to be Carbon Capture Ready (initially for ~25% of their capacity or 400MW), and all coal plants must be retrofitted within five years of CCS being proven. CCS demonstrator projects are likely to be located in areas of high CO₂ emissions (e.g. Thames Estuary, Humber, Merseyside, the Firth of Forth, Teesside and Tyneside), and the UK Government plans to promote their co-location. A market sounding exercise has recently been completed which sought information from industry in order to inform the selection process for the demonstration projects – the results of this are yet to be published.

Internationally, the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972* (the London Convention) and 1996 protocol provide environmental law for the permanent storage of CO₂ in geological formations. The amendments to the 1996 protocol, which entered into force on 10 February 2007, state that, “carbon dioxide streams may only be considered for dumping, if: disposal is into a sub-seabed geological formation; they consist overwhelmingly of carbon dioxide (they may contain incidental associated substances derived from the source material and the capture and sequestration processes used); and no wastes or other matter are added for the purpose of disposing of them.” *OSPAR Decision 2007/02 on the Storage of Carbon Dioxide Streams in Geological Formations*, states that all contracting parties should not allow storage of CO₂ in geological formations without authorisation or regulation from their competent authorities. The decision also indicates what any permit or approval should, at least, contain. Directive 2009/31/EC establishes a European level legal framework for the environmentally safe storage of CO₂ by member states in their EEZ and Continental Shelf. The basis for this Directive is that CCS can provide a bridging technology whereby carbon emissions can be attenuated while renewable technologies and associated technologies provide a more sustainable energy source. The Directive also sets out a number of requirements of member states in the selection of geological stores and a permitting and monitoring regime. At the UK level, the *Energy Act 2008* provides a legislative basis permitting carbon storage on the UKCS, implemented by the Secretary of State for Energy and Climate Change, or Scottish Ministers in their Territorial Waters. In August 2010 the UK Government set out a response to the proposed licensing regime for offshore carbon dioxide storage forming part of the transposition of EU Directive 2009/31/EC (see above). Regulations implementing this decision are due to come into effect in October 2010.

Implications for SEA

Activities which arise from adoption of the plan/programme should, through national (including devolved) planning policy and environmental regulation, avoid any impact on geological features of conservation interest including coastal GCRs and geological SSSIs. MCZs may extend some earth science SSSIs to below the low water mark and create new geological conservation zones offshore, though the nature, scale and number of these is presently uncertain and interactions with any aspect of the plan/programme in this respect is presently uncertain. In addition to these surficial geological features, the CCS Directive makes provision (by insertion in the WFD) for the appropriate use of geological reservoirs which may be used for CCS, stating; “...injection of carbon dioxide streams for storage purposes into geological formations which for natural reasons are *permanently unsuitable for other purposes*, provided that such injection is made in accordance with Directive 2009/31/EC of the European Parliament and of the Council...”, which is to be transposed into the Environmental Permitting (England and Wales) Regulations.

UK River Basin Management Plans, and Shoreline Management Plans, have provided an ecological and morphological baseline for UK estuaries and coasts which may be influenced by plan/programme activities, for instance the imposition of tidal range technologies could negatively impact both estuarine morphology and ecology and reduce the likelihood that targets in relation to achieving good ecological status are met by 2015. More widely, and in combination with other topics including climate change, an understanding of the impacts from energy removal and sedimentary impacts of wet renewables will be necessary. It will be important that a suitable consideration of such impacts is made at a development specific level.

A4.4 Landscape/seascape

Landscape/Seascape	
Regional	World Heritage Convention 1972
Europe	Council of Europe European Landscape Convention 2000
UK	<p>Draft Overarching National Policy Statement for Energy (EN-1)</p> <p>Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)</p> <p>Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)</p>
Local	<p>The National Character Areas of England</p> <p>English Heritage Historic Landscape and Seascape Characterisation Programmes</p> <p>Seascape Assessment for Wales</p> <p>Natural Heritage Zones: A National Assessment of Scotland's Landscapes</p> <p>Landscape Character Areas of Northern Ireland</p> <p>LANDMAP Wales programme</p> <p>Cadw/ICOMOS Register of Landscapes of Outstanding Historic Interest or Special Historic Interest</p> <p>Natural England's Landscape Policy 2008 and detailed policies on designated landscapes, future landscapes and historic landscapes</p> <p>Natural England's European Landscape Convention A: Framework for Implementation (2007)</p> <p>SNH's Landscape policy framework (2006)</p> <p>Planning Policy Statement 1: Delivering Sustainable Development (England)</p> <p>Planning Policy Statement 7: Sustainable Development in Rural Areas (England)</p> <p>Technical Advice Note 12: Design (Wales)</p> <p>Planning Policy Statement 1: General Principles (Northern Ireland)</p> <p>The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985</p> <p>Severn Tidal Feasibility Study Phase 1 Consultation (2009)</p> <p>The European Landscape Convention – The English Heritage Action Plan for Implementation (2009)</p> <p>Coastal Access: An audit of coastal paths in England (2008-09)</p> <p>Coastal Access: Natural England's Scheme: consultation version (2009)</p> <p>English Heritage Historic Landscape and Seascape Characterisation (ongoing)</p> <p>Planning Policy Statement 5: Planning and the Historic Environment (England)</p> <p>Scottish Planning Policy (2010)</p> <p>The National Planning Framework for Scotland 2 (2010)</p> <p>Strategic Environmental Assessment of Draft Plan for Offshore Wind Energy in Scottish Territorial Waters (Scotland) (2010)</p> <p>Pentland Firth and Orkney Waters Marine Spatial Plan Framework & Regional Locational Guidance for Marine Energy (2010)</p> <p>Planning Policy Wales (2010)</p> <p>Technical Advice Note 12: Design (Wales) (2009)</p> <p>Landscape Character Map for Wales (2009)</p> <p>Planning Policy Statement 18: Renewable Energy and Wind Energy Development in Northern Ireland's Landscapes (Northern Ireland) (2009)</p> <p>Offshore Renewable Energy Strategic Action Plan 2009-2020 and Offshore Wind and Marine Renewables Energy SEA Environmental Report (Northern Ireland) (2010)</p>

Key objectives and targets

The European Landscape Convention and associated initiatives are presently targeting a move away from focussing on aesthetically "outstanding" areas to adopt a general focus which looks at the quality and sustainability of all landscapes. This is reflected in the National Character Area network in England, more local Landscape/Historic Character Assessment, the analogous Landscape Character Map for Wales and that for Northern

Ireland, and recent policy statements (e.g. Natural England's Position Statement, *All Landscapes Matter*, Technical Advice Note (Wales) 12: Design).

The draft Marine Policy Statement (MPS) arising from the *Marine and Coastal Access Act 2009* was released for consultation in July 2010. The MPS states that all coastal landscapes should be considered in the preparation of the next phase of marine spatial planning (Marine Plans), not just those which are protected through designations, which is broadly complementary to the tenets of the ELC. In addition to direct considerations of landscape, the MPS and the *Marine and Coastal Access Act* provide a legal and policy framework for the construction of a new national coastal trail in England and amenity land associated with this route which the public is free to use. The scheme for the implementation of this part of the Act in England and its methodology has been drawn up by Natural England (2010). The *Marine (Scotland) Act 2010* makes no similar provisions though both Scotland and Wales are planning their own equivalent trails, with the Welsh route planned to be open in 2012. A number of existing routes were detailed in [Appendix 3h of OESEA](#). Though this may not in itself have a significant impact on seascape, it is likely that it will encourage more people to visit the coast for recreation and hence enhance the number of visitors (visual receptors) there.

Planning policies, for instance PPS 7 and more recently the draft Energy National Policy Statements (e.g. EN-1 and EN-3), exact the highest degree of protection to "most valued" sites (i.e. statutory designated areas such as AONBs), but do not propose that development should be precluded within them where project design would not conflict with the interests and features for which the sites are designated. More generally, they state that all developments should be well designed and in keeping with the scale and character (modern and historic) of the local area.

Where developments fall within the visual range of receptors (i.e. people of all sorts, resident and transient) on the coast, or are intervisible from other viewing locations at sea, for instance from recreational or commercial vessels, their character, form, aspect, spatial extent and type of movement all influence how the seascape is experienced. In association with the 3rd round of offshore wind farm (OWF) leasing and the likely use of turbines of greater size and in greater number than those used previously, a number of studies and guidance documents have emerged which relate to the assessment of seascapes in relation to OWFs, but which have findings that may be more widely applicable to other marine energy devices which have surface infrastructure. These documents include, amongst others, *Welsh Seascapes and their Sensitivity to Offshore Developments*, *DTI Guidance on the assessment of the impact of offshore wind farms*, the *Guide to best practice in seascape assessment* and an *assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms*.

Implications for SEA

Activities that may arise from the draft plan/programme could introduce a number of new, possibly conflicting visual elements to the landscape/seascape of the UK. It will be important at the project level, and in the drafting of the regional Marine Plans, to account for the degree of change in visual character that this will represent. With the exception of offshore wind, (which in any case will begin to occur further offshore as Round 3 developments begin to emerge) most activities such as carbon dioxide storage, wave and tidal energy are likely to be represented by demonstration phase or pre-commercial devices or developments in the currency of this SEA. The visual impacts of these, particularly due to their small vertical aspect, is likely to be negligible compared to offshore wind, but development specific assessments will be required as, at present, a high number of generic device types have been postulated.

Relevant planning policy will help to protect those landscapes designated as nationally important, and the adoption of the tenets of the European Landscape Convention by the national conservation agencies (and indeed in the draft Marine Policy Statement) should also help to achieve an appropriate consideration of landscape and seascape issues.

A4.5 Water environment

Water Environment	
International	<p>IMO International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78)</p> <p>International Convention for the Control and Management of Ships' Ballast Water and Sediments (adopted 2004, still to enter into force)</p> <p>International Convention on Oil Pollution Preparedness, Response and Co-operation (1990)</p> <p>Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972, as amended) 1996 protocol - revision to convention (2006) and amendments to 1996 protocol</p>
Regional	<p>Convention for the Protection of the Marine Environment of the North East Atlantic (the OSPAR Convention 1992)</p> <p>OSPAR Recommendation 2003/1 on the Strategy for the Joint Assessment and Monitoring Programme</p> <p>OSPAR Decision 2000/3 on the use of organic-phase drilling fluids (OPF) and the discharge of OPF-contaminated cuttings</p> <p>OSPAR Decision 2000/2 on a harmonised mandatory control system for the use and reduction of the discharge of offshore chemicals (as amended by decision 2005/1)</p> <p>OSPAR Decision 2007/1 to Prohibit the Storage of Carbon Dioxide Streams in the Water Column or on the Sea-bed</p> <p>OSPAR Decision 2007/2 on the Storage of Carbon Dioxide Streams in Geological Formations</p> <p>OSPAR Recommendation 2000/5 on a Harmonised Offshore Chemical Notification Format (HOCNF), as amended by OSPAR Recommendation 2005/3 and 2008/2</p> <p>OSPAR Recommendation 2005/2 on Environmental Goals for the Discharge by the Offshore Industry of Chemicals that are, or Contain Added Substances, Listed in the OSPAR 2004 List of Chemicals for Priority Action</p> <p>OSPAR Recommendation 2006/3 on Environmental Goals for the Discharge by the Offshore Industry of Chemicals that are, or which Contain Substances Identified as Candidates for Substitution</p> <p>OSPAR Recommendation 2001/1 for the Management of Produced Water from Offshore Installations as amended by Recommendation 2006/4</p> <p>OSPAR Strategy to Combat Eutrophication</p> <p>OSPAR Biological Diversity and Ecosystems Strategy</p> <p>OSPAR Hazardous Substances Strategy</p> <p>OSPAR Offshore Oil and Gas Strategy</p> <p>OSPAR Radioactive Substances Strategy</p> <p>OSPAR Co-ordinated Environmental Monitoring Programme (CEMP)</p> <p>OSPAR (2010) Quality Status Reports (QSRs) of the North Atlantic and its sub-regions</p>
EU	<p>Water Framework Directive (2000/60/EC) and daughter directives: the Groundwater Directive (2006/118/EC) and Priority Substances Directive (2008/105/EC)</p> <p>Bathing Waters Directive (2006/7/EC)</p> <p>Shellfish Waters Directive (2006/44/EC)</p> <p>Urban Wastewater Treatment Directive (91/271/EC)</p> <p>Priority Substances Directive (2008/105/EC)</p> <p>Marine Strategy Framework Directive (June 2008)</p> <p>Nitrates Directive (91/676/EC)</p> <p>Integrated Pollution Prevention Control Directive (2008/1/EC)</p> <p>Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)</p> <p>Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage</p> <p>Environmental Impact Assessment Directive 85/337/EEC</p> <p>Directive 2009/28/EC on the promotion of the use of energy from renewable sources</p>

UK	<p>Safeguarding our seas: A strategy for the conservation and sustainable development of our marine environment (Defra 2002)</p> <p>Water Resources Act 1991</p> <p>UK Marine and Coastal Access Act 2009 and Bills proposed by devolved administrations</p> <p>Our Seas – a shared resource. High level marine objectives (2009)</p> <p>Draft Marine Policy Statement</p> <p>Draft National Policy Statement for Ports (DfT, 2009)</p> <p>Draft Overarching National Policy Statement for Energy (EN-1) (DECC, 2009)</p> <p>Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (DECC, 2009)</p> <p>River Basin Management Plans for respective administrations, including those which are cross-border</p> <p>Defra's Charting Progress II (2010)</p> <p>Marine Strategy Framework Directive - putting in place the legal framework for implementation</p> <p>The Marine Strategy Regulations 2010</p>
Local	<p>A Strategy for the Long Term Sustainability of Scotland's Coasts and Seas (2007)</p> <p>An Integrated Coastal Zone Strategy for Northern Ireland 2006-2026</p> <p>Making the Most of Wales' Coast: Integrated Coastal Zone Management Strategy</p> <p>Cleaner Coasts Healthier Seas, Working for a better marine environment, Our strategy for 2005-2011 (Environment Agency, England and Wales)</p> <p>A strategy for promoting an integrated approach to the management of coastal areas in England (2008)</p> <p>The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003</p> <p>The Water Environment (Controlled Activities) (Scotland) Regulations 2005</p> <p>Water Environment and Water Services (Scotland) Act 2003</p> <p>Flooding in England: A National Assessment of Flood Risk</p> <p>Environment Agency Shoreline Management Plans (SMP2) (England and Wales)</p>

Key objectives and targets

MARPOL (already mentioned in relation to air quality) addresses pollution from ships and in part from oil production platforms arising from oil, noxious liquids carried in bulk, harmful substances in packaged form, sewage and garbage (Annexes I-V) and in subsequent amendments. MARPOL covers pollution events arising from both operational and accidental causes.

At a regional level, the OSPAR Convention for the protection of the marine environment of the North East Atlantic has the aim of preventing pollution and to protect the marine environment from detrimental effects of human activity. The OSPAR Convention defines pollution as the introduction by man, directly or indirectly, of substances or energy into the maritime area which results, or is likely to result, in hazards to human health, harm to living resources and marine ecosystems, damage to amenities or interference with other legitimate uses of the sea. The 16 parties to this convention (which includes the UK) are asked to observe the *precautionary principle* and the *polluter pays principle* to meet their obligations. In 1998 Annex V was adopted, specifically aimed at biodiversity and ecosystem protection to cover non-polluting human activities that can adversely affect the sea. OSPAR has several long-term strategies aimed at improving the marine environment with regard to certain topics, these include:

- Biological Diversity and Ecosystems Strategy – concerned with non-polluting human activity that can have adverse effects on the marine environment. A key element of this strategy is the establishment of a network of Marine Protected Areas.
- Eutrophication Strategy – sets the objective to combat eutrophication in the OSPAR maritime area, in order to achieve and maintain by 2010 a healthy marine environment where eutrophication does not occur.
- Hazardous Substances Strategy – sets the objective of preventing pollution of the maritime area by continuously reducing discharges, emissions and losses of hazardous substances, with the ultimate aim of achieving concentrations in the marine environment near background values for naturally occurring substances and

close to zero for man-made synthetic substances, with the target of the cessation of discharges, emissions and losses of hazardous substances by the year 2020.

- Offshore Oil and Gas Strategy – to prevent and eliminate pollution from offshore sources and to protect the OSPAR maritime area against the adverse effects of offshore activities so as to safeguard human health and conserve the marine ecosystems, and where practicable restore affected areas.
- Radioactive Substances Strategy – aims to reduce discharges, emissions and losses of material such that concentrations in the marine environment above historic levels are close to zero by 2020.

A number of information gathering and assessment initiatives which will provide significant information on the current state of the UK and neighbouring seas, and the activities which affect them culminated in 2010. These included the OSPAR Quality Status Reports (QSR) which evaluated the implementation of the OSPAR strategies and their effectiveness in improving the quality of the marine environment. Key aspects of the QSR cover biodiversity, eutrophication, hazardous substances, offshore oil and gas industry and radioactive substances (OSPAR 2010a). At a national level, Charting Progress 2 (Defra 2010a), a Defra initiative published in July 2010, provided an updated assessment of the state of UK seas since Charting Progress was published in 2005. Supporting technical reports on healthy and biologically diverse seas, ocean processes, clean and safe seas, and productive seas (Defra 2010b,c,d,e) provide relevant information on the current baseline and issues affecting the water environment.

A number of European level directives have been implemented nationally which aim to protect the terrestrial and marine environments, and these include the Urban Wastewater Treatment Directive, the Nitrates Directive, the Water Framework Directive (WFD) and Marine Strategy Framework Directive (MSFD). The WFD seeks to achieve “good ecological and chemical status/potential” for a range of terrestrial and transitional and coastal waters out to 1nm (or 3nm in Scottish waters) by 2015. As much marine pollution is generated from terrestrial activities, the control of certain substances entering coastal waters from riverine sources and other direct discharges is important in the control of marine pollution. The Nitrates Directive and Urban Wastewater Treatment Directive seek to protect the environment from the adverse effects of nitrogen from agricultural sources and sewage discharges respectively in this regard, and the most hazardous other chemicals are covered under the Priority Substances Directive.

In a similar approach to the WFD, the MSFD seeks to achieve “good environmental status” in Europe’s seas by 2020. The Directive, which is to be transposed into UK law by July 2010, requires an assessment of the state of UK seas, the establishment of what good environmental status means for those seas, and the implementation of programme to achieve and monitor progress towards 2020. Some of these items will be delivered through existing programmes, for instance the state of UK seas is covered by the Charting Progress II and OSPAR QSR 2010 reports. Consultation on the UK legal framework for implementation of the EU Marine Strategy Framework Directive (MSFD) (Defra 2009a) has progressed since OESEA. The *Marine Strategy Regulations 2010* transpose the Directive into UK law and require the development of the five elements of the marine strategy: (1) the assessment of marine waters; (2) the determination of the characteristics of good environmental status for those waters; (3) the establishment of environmental targets and indicators; (4) the establishment of a monitoring programme; (5) the publication of a programme of measures. Qualitative descriptors for determining good environmental status are listed in Annex I of the MSFD and those of relevance to the water environment include:

- Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
- Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.
- Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
- Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage (transposed through the *Environmental Damage (Prevention and Remediation) Regulations 2009* – separate regulations apply in the devolved administrations) is applicable to *inter alia* the aquatic environment covered by the WFD. The Directive, based on the polluter pays principle, establishes a framework to prevent and remedy environmental damage at a reasonable cost to society. The directive applies strict liability to those operators of inherently hazardous activities listed in Annex III of the Directive which includes those subject to IPPC, and fault based liability for other activities.

Work has also progressed on the Marine Policy Statement (MPS) which will underpin marine spatial planning as part of the UK *Marine and Coastal Access Act 2009*. Consultation on a draft MPS (UK Government 2010a) and associated Appraisal of Sustainability (UK Government 2010b) was due to close October 2010 with water quality and resources, and noise identified as high level considerations for marine plan authorities (e.g. Marine Management Organisation). The draft MPS also indicates that marine plan authorities must contribute to or align with delivery of the policies and objectives of relevant River Basin Management Plans and the Marine Strategy Framework Directive.

Climate change is likely to have a pervasive effect on all aspects of the coastal and marine environment including flooding, coastal erosion, water quality and resources. The Defra UKCIP initiative reflects current understanding of how the climate system operates, how it might change in the future, and allows a measure of the uncertainty in future climate projections to be included (see Appendix 3f). UKCP09 has significantly enhanced its consideration of marine and coastal environments from previous assessments and a specific marine and coastal projections report (co-authored by the Marine Climate Change Impacts Partnership (MCCIP)) includes projections of changes in air-temperature over the sea, projected future sea-level rise, sea temperature, salinity, stratification and circulation, as well as surges and waves (Lowe *et al.* 2009).

Implications for SEA

The SEA must consider the above international and national scale measures to reduce operational and accidental discharges at sea and from the terrestrial environment in relation to the possible impacts of the draft plan/programme (e.g. operational and accidental discharges from oil and gas exploration and production and transportation and storage of CO₂). Potential activities resulting from implementation of the draft plan/programme may have the potential to affect the attainment of good environmental status under the MSFD through altering hydrographical conditions (e.g. wave, tidal stream and range devices) and also introducing significant levels of noise (e.g. seismic survey and pile driving). However, existing controls and regulation should ensure that these activities do not significantly affect the status of marine waters. The SEA should have regard to the most recent monitoring and progress reports (e.g. Charting Progress 2, OSPAR QSR 2010 in its baseline compilation and assessment).

A4.6 Air quality

Air Quality	
International	<p>Marine Pollution Convention, MARPOL 73/78 (the International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978)</p> <p>Geneva Convention on Long Range Transboundary Air Pollution (1979)</p> <p>Vienna Convention for the protection of the ozone layer (1985)</p> <p>Montreal Protocol on substances that deplete the ozone layer (1987) and subsequent updates and adjustments</p> <p>Stockholm Convention on Persistent Organic Pollutants (2001)</p> <p>UNEP Global Mercury Partnership and Proposed Treaty</p> <p>2008 amendment of MARPOL on a revised Annex VI dealing with the reduction in the emission of sulphur from shipping, enacted in 2010</p>
Regional	<p>The Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR) 1998</p>
EU	<p>EU Sixth Environmental Action Plan (2002-2012)</p> <p>Air Quality Framework Directives (96/62/EC) and Daughter Directives (1999/30/EC), (2000/69/EC), (2002/3/EC), (2004/107/EC)</p> <p>National Emissions Ceiling Directive (2001/81/EC)</p> <p>Clean Air for Europe Programme: Towards a Thematic Strategy for Air Quality (2001)</p> <p>EU Thematic Strategy on Air Quality (2005)</p> <p>Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe</p> <p>Directive on Integrated Pollution Prevention and Control (96/61/EC)</p> <p>Ozone Depleting Substances Regulation 2037/2000/EC</p> <p>Directive 2005/33/EC of the European Parliament and of the Council of 6 July 2005 amending Directive 1999/32/EC as regards the sulphur content of marine fuels</p> <p>Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage</p> <p>The Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (Recast)</p>
UK	<p>The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)</p> <p>Consultations on the European Commission's proposed Directive on Industrial Emissions (Integrated Pollution Prevention and Control) (Recast)</p> <p>Air Pollution: Action in a Changing Climate (Defra 2010)</p>
Local	<p>Environment Strategy for Wales (2006)</p> <p>Scottish Environment Protection Agency Policy Priorities Relevant to the Scottish Environment Protection Agency (Paper 2004/13)</p> <p>Planning Policy Statement 1 Delivering Sustainable Development (England)</p> <p>Planning Policy Statement 23: Planning and Pollution Control (England)</p> <p>Air Quality Standards Regulations 2010</p> <p>Air Quality Standards (Scotland) Regulations 2010</p> <p>Air Quality Standards (Wales) Regulations 2010</p> <p>The Air Quality Standards Regulations (Northern Ireland) 2010</p> <p>The National Planning Framework for Scotland 2</p> <p>Planning Policy Wales (2010)</p>

Key objectives and targets

MARPOL addresses the prevention of marine pollution from ships and in part from oil rigs and production platforms. It includes six annexes covering pollution by oil, noxious liquids carried in bulk, harmful substances in packaged form, sewage, garbage and air pollution. In 2008, the Marine Environment Protection Committee of the International Maritime Organisation (IMO) agreed amendments to the Annex VI regulations of MARPOL to further reduce harmful emissions from ships, comprising a progressive reduction in sulphur oxide (SO_x) emissions. Progressive reductions in nitrogen oxide (NO_x) emissions were also agreed, with the most stringent controls being placed on those engines installed on ships constructed on or after 1st January 2016. Less specific to marine activities, the *Convention on Long-Range Transboundary Air Pollution 1979* considers

transboundary pollutants including persistent organic pollutants, heavy metals, sulphur, VOCs and nitrogen oxides.

Shipping emissions are becoming a greater concern both in relation to the environmental and health implications they pose, but also their contribution to climate change. The Marine Environment Protection Committee of the International Maritime Organization (IMO) agreed amendments to the Annex VI regulations of MARPOL to further reduce harmful emissions from ships, comprising a progressive reduction in sulphur oxide (SO_x) emissions. Progressive reductions in nitrogen oxide (NO_x) emissions were also agreed, with the most stringent controls being placed on those engines installed on ships constructed on or after 1st January 2016. On 1st July 2010, the amendments to MARPOL came into effect such that ships operating in the North Sea and English Channel will need to use fuel not exceeding 1% sulphur, reducing to 0.1% in 2015. Shipping emissions are also of concern in relation to climate change (see Appendix 3f), with the amount of CO₂ emitted from ships in the EU being greater than that for aviation (Entec UK Ltd. 2005). Gilbert *et al.* (2010) state that in the context of carbon reduction commitments in the UK, international shipping emissions should be accounted for despite their exclusion from national emission inventories or reduction targets in the Kyoto Protocol, and that unilateral action by the UK to adopt mitigation measures could potentially drive the shipping industry to adopt lower carbon intensive practices. The CCC (2008) state that there is significant uncertainty in trying to apportion the UK component of global shipping emissions and that a global emissions cap would be one way to overcome the issue, and the IMO are open to cap-and-trade methods. Emissions from ships are currently in the order of ~3% total global CO₂ (national and international shipping), projected to increase to ~15-30% in 2050.

The Government's revised Air Quality Strategy for England, Scotland, Wales and Northern Ireland has set national air quality standards with the objective of protecting human health, vegetation and ecosystems. In the longer term, these standards along with other strategies connected with climate change could significantly improve air quality and achieve meaningful reductions in CO₂ by 2050. Many of the standards set in the strategy are derived from EU obligations for the reduction or non-exceedance of a particular pollutant. The UK has an obligation to reduce or limit the emission of certain pollutants under the *Air Quality Framework Directive (1996/62/EC)* and "daughter" directives, given effect in the UK by the *Air Quality Standards Regulations 2007* (and those equivalent regulations of the devolved administrations). This is further taken forward by the UK Air Quality Strategy which sets out the air quality standards and objectives to be achieved, and policy measures that could help attain some of these. In June 2008, a new directive (the *Ambient Air Quality and Cleaner Air for Europe Directive (2008/50/EC)*) came into force and is required to be transposed to UK law by June 2010. The new directive does not alter existing air quality objectives set out previously, though has a number of other key elements:

- Existing legislation¹ has been merged into a single directive (with the exception of 2004/107/EC) with no changes to existing air quality objectives
- New objective for PM_{2.5} including a limit value and exposure related objectives
- The possibility to exclude natural sources of pollution in assessing compliance values where they can be reliably measured and where exceedances are due in whole or part to natural contributions
- Possible time extensions of three years for PM₁₀, or five years for NO₂ and benzene for compliance with limit values, based on conditions and assessment by the EC

¹ Framework Directive 96/62/EC, daughter Directives 1999/30/EC, 2000/69/EC, 2002/3/EC, and Decision on Exchange of Information 97/101/EC

This is further taken forward by the UK Air Quality Strategy which sets out the standards and objectives to be achieved, and policy measures that could help achieve some of these. *Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage* applies to a number of areas including damage caused by “airborne elements as far as they cause damage to water, land or protected species or natural habitats”. As an addendum to the Air Quality Strategy for England, Wales, Scotland and Northern Ireland (2007), Defra and the devolved administrations have published, *Air Pollution: Action in a Changing Climate* (Defra 2010), which outlines how further health benefits may be drawn from the integration of air quality and climate change policies. The core messages in this publication are:

- Activities which generate air pollution are often also those which create emissions of gases associated with climate change, and it would therefore be conducive to consider the linkages between climate change and air quality policy areas.
- Connected with the above point, the UK’s commitment to build a ‘Low Carbon Economy’ by 2050 will reduce air pollution, though by varying degrees depending on choices relating to achieving this goal (e.g. energy use and generation mix, and any carbon abatement technology). Optimising climate policy decisions to account for air pollution could yield economic benefits of approximately £24 billion by 2050 for instance through the improvement of life expectancy from the use of low carbon transport and energy technologies.
- The promotion of low-carbon vehicles and renewable sources of energy that do not involve combustion will contribute to both climate change and air quality targets. At the same time, actions that tackle climate change but damage air quality must be avoided.
- Action will be needed at international, EU, national, regional and local levels to ensure air quality and climate change policies are efficiently integrated and to ensure ambitious but realistic air quality targets are set for the future.

Defra (2010f) updates the current Air Quality Strategy based on the climate change policy and legislation which has developed since 2007 (e.g. the *Climate Change Act 2009*, The Low Carbon Transition Plan; see Appendix 3f). *Directive 2008/50/EC on ambient air quality and cleaner air for Europe* was discussed previously in the OESEA, though since then its transposition into UK law has taken place through the *Air Quality Standards Regulations 2010*, and those equivalent Regulations of the Devolved Administrations.

Implications for SEA

The draft plan/programme is set in the wider context of providing both a secure and diverse energy supply, and tackling emissions associated with anthropogenically augmented climate change (see below). Certain activities associated with the plan/programme, including the operation of maintenance and supply vessels and power generation, will contribute negatively to air quality in some areas. Port expansion, or the increase uptake of available port capacity, may have negative local consequences for air quality in these areas, perhaps contributing to the perpetuation of certain Air Quality Management Areas, which in turn may have health implications. Any offset in energy production from fossil fuel electricity generating stations by the renewable technologies covered by the plan/programme would further contribute to reducing air quality impacts, and in meeting UK targets for the reduction of certain atmospheric emissions.

A4.7 Climate & meteorology

Climate & Meteorology	
International	<p>The United Nations Framework Convention on Climate Change Kyoto Protocol to the UN Framework Convention on Climate Change The Copenhagen Accord Intergovernmental Panel on Climate Change Fifth Assessment Report (AR5)</p>
EU	<p>EU Sixth Environmental Action Plan (2002-2012) European Climate Change Programme (I and II) EU Green Paper 'adaptation to climate change in Europe – options for EU action' (2007) Directive 2003/87/EC on establishing a scheme for greenhouse gas emission allowance trading within the Community EU Emission Trading Scheme (linked to Directive 2003/87/EC) Communication on: 2020 by 2020 Europe's climate change opportunity. COM(2008)30 Directive 2009/28/EC on the promotion of the use of energy from renewable sources</p>
UK	<p>Climate Change – The UK Programme 2006: Tomorrow's Climate Today's Challenge UK Climate Change Act (2008) The Energy Act (2008) and the current Energy Bill (2009-10) Sustainable Development Strategy (2006) Stern Review of the Economics of Climate Change Energy White Paper: Meeting the Energy Challenge (2007) Health Effects of Climate Change in the UK 2008 – An update of the Department of Health Report 2001/2002 UK Low Carbon Transition Plan – National Strategy for Climate Change and Energy (2009) Framework for the Development of Clean Coal (FDCC) (2009) The Road to Copenhagen: The UK Government's Case for an Ambitious Agreement on Climate Change (2009) Committee on Climate Change: Building a Low-Carbon Economy - the UK's contribution to tackling climate change (2008), Meeting carbon budgets - ensuring a low-carbon recovery (2010) UK Climate Impacts Programme (UKCIP) update 2009 (UKCP09) The Energy Act 2010 The Climate Change Act 2008 (2020 Target, Credit Limit and Definitions) Order 2009</p>
Local	<p>Environment Strategy for Wales (2006) Wales Changing Climate: Challenging Choices: the Impact of Climate Changes in Wales 2020-2080 Changing Our Ways – Scotland's Climate Change Programme (2006) Preparing for Climate Change in Northern Ireland (2007) Planning Policy Statement 1 Delivering Sustainable Development (England) Planning and Climate Change: Supplement to Planning Policy Statement 1 (England) A Low Carbon Revolution: Wales' Energy Policy Statement (2010) Climate Change Strategy for Wales (2010) Climate Change Delivery Plan: Meeting Scotland's Statutory Climate Change Plans (2009) Climate Change (Scotland) Act 2009 Scotland's Climate Change Adaptation Framework (2009) Committee on Climate Change: Scotland's Path to a Low-Carbon Economy (2010) Scottish Planning Policy (2010) The Climate Change (Scotland) Act 2009 The National Planning Framework for Scotland 2 (2010) Adapting to Climate Change in England (2008) A Low Carbon Economic Strategy for Scotland (2010) Low Carbon Scotland: The Draft Report on Proposals and Policies (2010)</p>

Key objectives and targets

The *United Nations Framework Convention on Climate Change* entered into force in 1994, a precursor to the Kyoto Protocol which sets legally binding targets for the reduction of greenhouse gases which are associated with anthropogenically induced

climate change. 184 parties have ratified the Kyoto Protocol to date, including the UK. Most recently, the Copenhagen Accord recognises that countries must reduce emissions such that a 2°C rise in global temperature should not be exceeded such that the worst effects of climate change can be avoided. The Copenhagen Accord is not a legally binding document, but endorses the Kyoto Protocol and indicates that Annex I countries should further reduce their emissions reductions initiated under Kyoto.

In the UK, the *Energy Act 2008* aims to not only help maintain energy supply reliability, promote competitive markets and ensure affordable heating, but also contribute to the reduction in greenhouse gas emissions (most notably CO₂) which have been linked to anthropogenically augmented climate change. The *Energy Act 2010* implements some of the key measures of the UK Low Carbon Transition Plan including provisions for a new CCS incentive to support the creation of the four CCS demonstrators outlined in the plan, the introduction of mandatory social price support to tackle fuel poverty and a number of measures to ensure fairness in the energy markets.

The *Climate Change Act 2008* makes provisions for the reduction of CO₂ equivalent emissions (i.e. includes other notable greenhouse gases such as CH₄ and N₂O) through a number of measures, including the setting of a "carbon budget". The carbon budget set out in the Act in its original form targeted an 80% reduction in emissions on 1990 levels by 2050, with an interim reduction in emissions of 26% by 2020. The 2020 carbon budget has been subsequently altered under the *Climate Change Act 2008* (2020 Target, Credit Limit and Definitions) Order 2009 to 34% below 1990 levels. The Act aims to meet this target through a range of measures, but principally through the establishment and work of the Committee on Climate Change (see first and second annual reports: CCC 2008, 2010), a system of carbon budgeting and trading, activities that reduce or remove greenhouse gases from the atmosphere and promotion through financial incentive, the production of less waste and more recycling. The fourth and most recent carbon budget report of the CCC covers the period 2023-2027 and makes the recommendation that carbon equivalent emissions are reduced by 60% on 1990 levels by 2030 (to ~310MtCO₂e). Draft legislation for this budget is expected in spring 2011, after which this target will become legally binding. Moreover, the report advises that international aviation and shipping are included in the carbon budget, though it is accepted that further analysis is required to develop a suitable methodology for inclusion. A number of initiatives have stemmed from these reduction targets and other provisions of the Act, for instance the establishment of a National Adaptation Programme based on the Climate Change Risk Assessment (due in 2011), which forms part of Defra's Adapting to Climate Change in England .

Similarly, in Scotland the *Climate Change (Scotland) Act 2009* sets an interim 42% reduction target for greenhouse gases by 2020, increasing to 80% by 2050 on 1990 levels. Scottish ministers are to set annual targets through secondary legislation from 2010-2050. These targets will be set with advice from the CCC (as above) or by an equivalent Scottish body should one be set up, and duties are placed on ministers to report on progress to the Scottish Parliament. The Act sets out duties of public bodies in relation to climate change, and other climate provisions including adaptation (see Scotland's Climate Change Adaptation Framework), land use, energy efficiency and waste reduction.

In July 2009, the UK Government published the Low Carbon Transition Plan, which outlines how the challenges of reducing greenhouse gas emissions for each sector will be met while ensuring clean, affordable and secure energy supplies. These broad principles are in line with those of the 2007 Energy White Paper (also see *The Energy Act 2008* and *2010*). Another important element of this plan is the Framework for the Development of Clean Coal (FDCC) which initiates a programme of Carbon Capture and Storage (CCS)

demonstration with the ambition to see CCS ready for wider deployment from 2020. All new coal power stations built in the UK will have to be “CCS ready” and operators of any new and existing plants will have to retrofit CCS technology once it is considered ready for wider deployment.

CCS and renewables deployment could contribute to a significant reduction in carbon emissions during the currency of this SEA. At an international level, the UK has a legally binding target to generate 15% of energy from renewable sources by 2020, stemming from the EU Renewable Energy Directive. The UK Government Renewable Energy Strategy (2009) outlines scenarios for achieving this goal. Wales’ Energy Policy, A Low Carbon Revolution (2010), aims to (amongst other carbon reduction measures) produce twice as much electricity by 2025 as at present, and by 2050 to produce almost all energy (heat, electricity, transport) from low carbon sources.

The evidence base for climate change in the UK has been updated with the publication of UKCP09, which includes reports detailing recent trends and future changes for the terrestrial and marine environment (see Appendix 3f). At an international level, the IPCC are presently in the early stages of compiling their Fifth Assessment Report (AR5) which is due to be completed between 2013 and 2014, with the synthesis report being published in 2014.

At an international level, the IPCC provide information and evidence for climate change, its impacts, and how mitigation and adaptation might help alleviate its worst effects. The IPCC are presently in the process of refreshing their Assessment Report (AR5) which is due to be complete in 2013-2014. In the UK, the UK Climate Impacts Programme (UKCIP) provides medium- to long-term projections (to 2100) for climate change specific to the UK and UK marine area. These projections (e.g. for temperature, precipitation, wave height) are described Appendix 3f. The Marine Climate Change Impacts Partnership (MCCIP) has close ties with UKCIP, and these programmes help to provide climate change evidence and advice which may be used to inform policy and decision-makers, for example, a consideration of scenarios produced by UKCIP is recommended in the Climate Change Supplement to PPS1, and in PPS25: Development and Flood Risk.

Implications for SEA

Activities associated with the draft plan/programme should help to make a net contribution to the reduction of UK CO₂ emissions, as set out in the UK carbon budget (see above), albeit through carbon sequestration, or an increase in the proportion of UK energy generated by renewable technologies. As such, adoption of the plan/programme subject to any spatial considerations and recommendations arising from OESEA2 will also help to achieve the UK’s legally binding target of producing 15% of its energy from renewable sources by 2020 – equivalent to ~30% of electricity generation. The longer term UK Government aim, of which the current draft plan/programme is one aspect, is to achieve a sufficient reduction in greenhouse gases (i.e. all of those which contribute to *global warming*, not just CO₂) to prevent those extreme climate change scenarios (e.g. as projected by IPCC or in UKCP09) and associated social, environmental and economic costs (e.g. Stern 2006).

A4.8 Population & human health

Population & Human Health	
International	<p>World Summit on Sustainable Development, Johannesburg, 2002</p> <p>Aarhus Convention (Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters) (1998)</p> <p>Espoo Convention on Environmental impact Assessment in a Transboundary Context (1991)</p> <p>Commission on Social Determinants of Health (2008), 'Closing the gap in a generation: health equity through action on the social determinants of health.'</p>
Regional	<p>Children's Environment and Health Action Plan for Europe 2004</p>
EU	<p>Together for Health: A Strategic Approach for the EU 2008-2013</p> <p>The European Environment and Health Action Plan 2004-2010</p> <p>EU Sustainable Development Strategy (EU SDS) First issued 2001, Revised 2006</p>
UK	<p>UK Government Sustainable Development Strategy: Securing the Future (2005) and the UK's Shared Framework for Sustainable Development, One Future – Different Paths (2005)</p> <p>Saving Lives: Our Healthier Nation White Paper (July 1999)</p> <p>Tackling Health Inequalities: A programme for Action (2003)</p> <p>Securing Good Health for the Whole Population Report to the Treasury (Wanless, 2004)</p> <p>Choosing Health: Making Healthier Choices Easier (November 2004)</p> <p>Our Health, Our Care, Our Say White Paper (2006)</p> <p>Strong and Prosperous Communities Local Government White Paper (2006)</p> <p>Health Effects of Climate Change in the UK (2008)</p> <p>Strategy for Workplace Health and Safety in Great Britain to 2010 and Beyond</p> <p>UK High Level Marine Objectives relevant to population and human health</p> <p>Health & Safety Executive (HSE) regulations for CCS projects</p>
Local	<p>Sustainable Communities: Building for the Future (2003)</p> <p>People, Places, Futures: Wales Spatial Plan 2004 (updated in 2008)</p> <p>Wales: A Better Country. The Strategic Agenda of the Welsh Assembly Government (2003)</p> <p>Starting To Live Differently: The Sustainable Development Scheme of the National Assembly for Wales (2004-2007)</p> <p>Well Being in Wales (2002)</p> <p>Ministerial Interim Planning Policy Statement (Draft) – Planning, Health and Well Being (Wales)</p> <p>Choosing Our Future: Scotland's Sustainable Development Strategy (2005)</p> <p>Meeting the Needs... Priorities, Actions and Targets for Sustainable Development in Scotland (2002)</p> <p>Partnership for Care: Scotland's Health White Paper (2003)</p> <p>Scottish Executive (2003) Improving Health in Scotland: The Challenge</p> <p>The Northern Ireland Sustainable Development Strategy (2006)</p> <p>Planning Policy Statement 1: Delivering Sustainable Development (2005)</p> <p>Planning Policy Guidance 17: Planning for Open Space, Sport and Recreation (England)</p> <p>PPS 8: Open Space, Sport and Outdoor Recreation (Northern Ireland)</p> <p>One Wales, One Planet: A New Sustainable Development Strategy for Wales (2009)</p> <p>Investing in Health: A Public Health Strategy for Northern Ireland (2002). Reviewed in 2009.</p> <p>DECC: Meeting the Low Carbon Skills Challenge – Consultation (2010)</p> <p>Technical Advice Note 16: Sport, Recreation and Open Space (Wales)</p> <p>Scottish Planning Policy (2010)</p>

Implications for SEA

The SEA should consider the implications of the draft plan/programme on regional and UK initiatives designed to improve general health and reduce inequalities brought about by social and environmental deprivation. The SEA should consider how the plan/programme contributes to government targets in relation to environmental degradation (e.g. air quality, landscape quality) which has associated potential physical and mental health implications.

A4.9 Other users & material assets (infrastructure, other natural resources)

Other Users & Material Assets	
International	<p>United Nations Convention on the Law of the Sea (1982) The London Convention (1972) UN Fish Stocks Agreement (2001) FAO Code of Conduct for Responsible Fisheries Marine Pollution Convention, MARPOL 73/78 (the International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978) Basel Convention of the control of transboundary movements of hazardous waste and their disposal (1992) Convention on International Civil Aviation (Chicago Convention) 1944 Nairobi International Convention on the Removal of Wrecks 2007 IMO draft Convention for the Safe and Environmentally Sound Recycling of Ships (2009)</p>
Regional	<p>European Transport Policy for 2010: A Time to Decide (2001) Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) (1992) Convention on the Future Multilateral Cooperation in North-East Atlantic Fisheries (NEAFC) (1982) Freight logistics in Europe - the key to sustainable mobility (2006) OSPAR Decision 98/3 on the disposal of disused offshore installations OSPAR Guidance on Environmental Considerations for Offshore Wind Farm Development (2008)</p>
EU	<p>Sulphur Content of Marine Fuels Directive 2005/33/EC (2005) Directive on Waste (2006/12/EC) and Revised Directive on Waste 2008/98/EC (2008) EC Directive on Port Reception Facilities 2000/59/EC (2000) EU Integrated Maritime Policy (2007) EC Shellfish Waters Directive 2006/113/EC (2006) EC Roadmap on Maritime Spatial Planning: Achieving Common Principles in the EU A European Strategy for Sustainable, Competitive and Secure Energy. European Commission Green Paper, 2006. COM(2006)105 An Energy Policy for Europe. Communication from the Commission to the European Council and the European Parliament. COM(2007)1 EU Energy Security and Solidarity Action Plan: Second Strategic Energy Review - Securing our Energy Future Green Paper: Towards a Secure, Sustainable and Competitive European Energy Network. COM(2008)782 Communication on Offshore Wind Energy: Action needed to deliver on the Energy Policy Objectives for 2020 and beyond. COM(2008)768 Communication on the Directive 2004/67/EC concerning measures to safeguard security of natural gas supply. COM(2008)769 European Commission White Paper - European transport policy for 2010: time to decide (2001) Regulation (EC) No 1692/2006 of the European Parliament and of the Council of 24 October 2006 establishing the second Marco Polo programme for the granting of Community financial assistance to improve the environmental performance of the freight transport system (Marco Polo II) and repealing Regulation (EC) No 1382/2003 Decision No 884/2004/EC amending Decision No 1692/96/EC on community guidelines for the development of the trans-European transport network European Council Directive 91/689/EEC (the Hazardous Waste Directive as amended) Council Directive 2001/77/EC on the Promotion of Electricity from Renewable Energy Sources in the Internal Electricity Market (Renewables Directive) (2001) Commission Regulation (EC) No 1013/2006 on shipments of waste Commission Regulation (EC) No 1418/2007 concerning the export for recovery of certain waste listed in Annex III or IIIA to Regulation (EC) No 1013/2006 to certain countries to which the OECD Decision on the control of transboundary movements of wastes does not apply Commission Regulation (EC) No 669/2008 on completing Annex 1C of Regulation (EC) No 1013/2006 on shipments of waste Commission Regulation (EC) No 740/2008 amending Regulation (EC) No 1418/2007 as regards the procedures to be followed for export of waste to certain countries Council Directive 99/31/EC of April 1999 on the landfill of waste (as amended) ("Landfill" Directive)</p>

UK	<p>National Fisheries Policy: Fisheries 2027 (Defra 2007) British Shipping: Charting a new course. (DfT, 1998) A project appraisal framework for ports (DfT, 2002) Delivering a Sustainable Transport System (DfT, 2008) UK Ship Recycling Strategy (2007) The Energy White Paper: Meeting the Energy Challenge (2007) The Renewables Obligation (introduced 2002) Our Seas - A Shared Resource. High Level Marine Objectives (2009) The UK Low Carbon Transition Plan (2009) Framework for the Development of Clean Coal (FDCC) (2009) Marine and Coastal Access Act 2009 Draft National Policy Statement for Ports (DfT, 2009) Draft Overarching National Policy Statement for Energy (EN-1) and those for Fossil Fuels, Renewables, Gas Supply and Gas and Oil Pipelines, and Electricity Networks (EN 2-5) (2009) Marine Energy Action Plan (2010) Clean Coal Industrial Strategy (2010) Wreck Removal Convention Bill The Energy Act 2008 (Consequential Modifications) (Offshore Environmental Protection) Order 2010 The Renewable Energy Strategy (2009) The Sea Fishing (Illegal, Unreported and Unregulated Fishing) Order 2009</p>
Local	<p>Sea Fishery Committee bylaws (England & Wales) - these will transfer to the Inshore Fisheries and Conservation Authorities on 1st April 2011. Technical Advice Note 8: Renewable Energy (Wales) - does not cover offshore elements of a development, but makes mention of any associated infrastructure that takes place on land Coastal Tourism Strategy for Wales (2008) Strategic Framework for Inshore Fisheries in Scotland (2005) Technical Advice Note 13: Tourism (Wales) The Wales Freight Strategy (2008) The Wales Transport Strategy (2008) Wales Fisheries Strategy (2008) Draft framework for the development and deployment of renewables in Scotland (2008) Renewable Energy Route Map for Wales (2008) Waste Strategy for England (2007) The National Waste Strategy and the National Waste Plan 2003 (Scotland) Wise about Waste, The National Waste Strategy for Wales (2006)</p>

Key objectives and targets

The marine licensing regime for a number of activities is to undergo changes resulting from the *Marine and Coastal Access Act 2009*. The Act combines the regimes under FEPA, the *Coast Protection Act 1949* and *Telecommunications Act 1984* (Schedule 2 Electronic Communications Code). Activities (in England and Wales) will be regulated by the Marine Management Organisation (MMO) which will control the environmental, navigational, human health and other impacts of constructions, deposits and removals in the marine environment for matters that are not devolved; an exception being major (or nationally significant) infrastructure projects (e.g. offshore marine renewable energy projects of greater than 100MW capacity) for which decisions are considered separately as indicated in the *Planning Act 2008*. In Scotland, Marine Scotland has been established as the relevant authority with marine planning and policy responsibilities, and in Northern Ireland, the Northern Ireland Environment Agency (NIEA) will be the licensing and enforcement authority (as part of the Department of the Environment).

A significant fraction of renewable energy generation in the next 10 years will come from offshore wind and other marine renewables as they become technically and economically feasible, and the UK has a legally binding target to produce 15% of its energy from renewable sources by 2020. These will help deliver part of the government targets to reduce carbon dioxide equivalent emissions (34% on 1990 levels by 2020) and increase

renewable energy deployment (30% of electricity by 2020) as outlined in the UK Low Carbon Transition Plan and 2007 Energy White Paper. Devolved Governments have also released a number of documents outlining their commitment to the low carbon transition, such as the Welsh Assembly Government Energy Policy Statement, Scotland's Draft Framework for the Development and Deployment of Renewables, and the Northern Ireland Strategic Energy Framework. The UK Government Renewable Energy Strategy sets out what is required to achieve the desired (and legally binding) renewables targets, including both the role of Government, and Individuals and businesses. A commitment set out in the strategy was the development of a Marine Action Plan, which considers wave, tidal stream and tidal range technologies, the potential resource which may be utilised by these, the economic benefits of their development and the challenges faced in their deployment. The Action Plan also makes a comprehensive list of recommendations covering a range of economic, environmental and permitting aspects of marine renewables development. These are too numerous to list here but may be viewed on the DECC website.

The Framework for the Development of Clean Coal (FDCC) forms part of the wider plan to reduce carbon emissions connected with anthropogenically augmented climate change and other undesirable environmental effects including ocean acidification. The key elements of the FDCC are:

- all new coal-fired power stations must demonstrate CCS at commercial-scale (around 400MW of output)
- a programme of 4 commercial-scale demonstration projects on coal-fired power stations (funded by the proposed CCS incentive) and an expectation that these power stations will retrofit CCS to their full capacity by 2025
- a rolling review of progress in the development of CCS technology to culminate in a report, by 2018, that will consider the case for new regulatory and financial measures to drive the move to clean coal

Within the UK, sources of CO₂ are clustered around a relatively few centres of significant industrial activity; Thames Estuary, Humberside, Merseyside, the Firth of Forth and Teesside and Tyneside. It is possible that some of the capture projects within the demonstration programme will be co-located and share transport and/or storage infrastructure. This may represent a new, or modified, use of the coast and offshore environment. The Office of Carbon Capture and Storage (OCCS) has been formed within DECC and is responsible for helping to deliver the initial demonstration projects and for setting the longer term strategy for wider deployment to 2030 through its UK CCS roadmap, which is yet to be compiled. This office also holds responsibility for the regulatory framework for CCS in the UK which will include a consultation on implementing the EU Directive on the geological storage of CO₂. A consultation on proposals for transposing the EU Directive into the Environmental Permitting (England and Wales) Regulations 2010 is currently being conducted by Defra. The OCCS is also responsible for increasing awareness with regards to CCS, including access to finance such as the EU New Entrant Reserve (NER).

Since the accident involving the Deepwater Horizon semi-submersible in the Gulf of Mexico and subsequent problems in both stemming the flow of oil from the open well and adverse environmental and socio-economic impacts, the UK Government instigated a review to put into context the present regulatory and safety procedures which ensure that the UK oil and gas sector operates appropriately. A number of steps were initiated

including the recruitment of additional inspectors with a view to doubling the number of annual inspections on drilling rigs, a review of the indemnity insurance requirements of operating on the UKCS, and the establishment of an industry trade association (The Oil Spill Prevention and Response Advisory Group) by Oil and Gas UK to assess the strengths and weaknesses in how the UK would respond to such an incident in its waters. This body includes representatives from both industry and the regulators.

In order to implement the same environmental regulations which apply to the oil and gas industry to the storage and offloading of combustible gas, and the storage of CO₂ (i.e. those activities licensed under the *Energy Act 2008*), the *Energy Act (Consequential Modifications) (Offshore Environmental Protection) Order 2010* has been drafted. This instrument ensures that regulations including the *Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999* (as amended), the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended), the *Offshore Combustion Installations (Prevention and Control of Pollution) Regulations 2001* (as amended) and the *Offshore Marine Conservation (Natural Habitats, &c) (Amendment) Regulations 2010* apply to these new developments.

Shipping and port activity has expanded considerably in recent years, particularly since the introduction of the tonnage tax in 2000, and will remain the principal means by which the UK exchanges goods. Ships, though emitting less CO₂ per tonne of goods transported than other methods of bulk transport, represent a significant source of anthropogenic gaseous and particulate emissions (see Appendix 3e, Air Quality). These emissions are presently unregulated, though a cap and trade scheme may soon emerge from an international agreement.

UK fisheries have reduced in recent years in part due to declining fish stocks and resulting management techniques including catch and effort management. The UK National Fisheries Policy: Fisheries 2027 aims to help reach a balance between economic, social and environmental priorities and impacts, with a view to developing sustainable fisheries. The *Marine and Coastal Access Act* aims to strengthen fisheries and environmental management protection. Inshore fisheries management will be handled by new authorities, the Inshore Fisheries and Conservation Authorities (IFCAs), replacing the current Sea Fisheries Committees. IFCAs will be responsible for activities out to 6nm from the coast and in estuaries where they will be responsible for sea fisheries management. In Scotland, prior to the *Marine (Scotland) Act 2010*, Marine Scotland was set up to take control of a number of a number of functions from existing bodies such as the Scottish Government Marine Directorate, Fisheries Research Services and the Scottish Fisheries Protection Agency, as well as the core marine policy and regulatory functions of the Scottish Government.

Implications for SEA

The SEA should take into account the interaction of the plan/programme and its alternatives with the present (e.g. safety of navigation, recreation interests including sailing and surfing), and possible future use of the marine environment (e.g. use of areas for hydrocarbon gas and CO₂ storage and marine renewables) and the various management and regulatory regimes which control their activities. The SEA should also consider how the programme may contribute to government targets such as renewable energy generation, security of energy supply and reductions in greenhouse gases.

A4.10 Cultural heritage

Cultural Heritage	
International	<p>UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage 1972, the 'Valetta Convention'</p> <p>Convention on the Protection of Underwater Cultural Heritage (CPUCH)</p> <p>United Nations Convention on the Law of the Sea (UNCLOS)</p>
Europe	<p>Council of Europe, European Convention on the Protection of the Archaeological Heritage 1992</p> <p>Council of Europe, European Landscape Convention 2000</p>
UK	<p>Treasure Act 1996 (does not extend to Scotland)</p> <p>Protection of Wrecks Act 1973</p> <p>Protection of Military Remains Act 1986</p> <p>Ancient Monuments and Archaeological Areas Act 1979</p> <p>Planning (Listed Buildings and Conservation Areas) Act 1990</p> <p>Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997</p> <p>The Historic Monuments and Archaeological Objects (NI) Order 1995</p> <p>National Heritage Act 2002</p> <p>The Planning (NI) Order 1991</p> <p>Draft Heritage Protection Bill (2008) - currently on hold</p> <p>Marine and Coastal Access Act 2009</p> <p>Marine (Scotland) Act 2010</p> <p>Draft Northern Ireland Marine Bill</p> <p>Draft Marine Policy Statement</p> <p>Draft Overarching National Policy Statement for Energy (EN-1)</p> <p>Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)</p> <p>Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)</p> <p>The Protection of Military Remains Act 1986 (Designation of Vessels and Controlled Sites) Order 2009</p>
Local	<p>Scotland's Historic Environment Audit (2008)</p> <p>Planning Policy Statement 5: Planning for the Historic Environment (England)</p> <p>Planning Policy Statement 6: Planning, Archaeology and the Built Heritage (Northern Ireland)</p> <p>Planning Advice Note 42 (PAN42): Archaeology in the Planning Process and Scheduled Monument Procedures (Scotland)</p> <p>English Heritage: Climate Change and the Historic Environment (2008)</p> <p>English Heritage: Conservation Principles, Policies and Guidance for Sustainable Management of the Historic Environment (2008)</p> <p>English Heritage: Strategic Environmental Assessment, Sustainability Appraisal and The Historic Environment (2010)</p> <p>English Heritage National Heritage Protection Plan - Interim version (2010)</p> <p>HM Government's Statement on the Historic Environment for England (2010)</p> <p>Circular 07/09: Protection of World Heritage Sites (England) (2009)</p> <p>Scottish Natural Heritage: Natural Heritage Futures Update (2009)</p> <p>Scottish Historic Environment Policy (2009)</p> <p>Marine (Scotland) Act 2010</p> <p>The Historic Environment (Amendment) Scotland Bill</p> <p>Strategic Environmental Assessment (SEA) of Draft Plan for Offshore Wind Energy in Scottish Territorial Waters (2010)</p> <p>Planning Policy Statement 5: Planning for the Historic Environment (England) (2010)</p> <p>Scottish Planning Policy (2010)</p> <p>Offshore Wind and Marine Renewables Energy SEA Environmental Report (Northern Ireland) (2010)</p> <p>Conservation Principles, Policies and Guidance for the sustainable management of the historic environment in Wales: consultation draft (2009)</p>

Key objectives and targets

International protection of marine heritage features is provided by Articles 149 and 303 of UNCLOS, and more recently the CPUCH. Though the UK is not a signatory of the latter,

the convention received acceptance or ratification of the minimum number of 20 states on 2nd October 2008 and entered into force on 2nd January 2009. The CPUCH includes those archaeological, historical or cultural items which have been, 'partly or completely under water, periodically or continuously, for at least 100 years', which includes not only shipwrecks but buildings, artefacts, human remains, aircraft, cargo and prehistoric items.

At present, the only form of marine heritage protection in the UK is for that of shipwreck, provided by the *Protection of Wrecks Act (PWA) 1973* and the *Protection of Military Remains Act (1986)*. These seek to protect either wrecks or wreck sites that contribute to the understanding of the past on account of their historical, archaeological or artistic importance, or vessels or aircraft which appear to have become sunk or stranded while in military service.

The reform of heritage protection currently underway in the UK was summarised in OESEA, though a number of changes have taken place since its publication. The Draft Heritage Protection Bill of the previous Government was not taken forward in parliament in 2009 and its progress is now uncertain, though relevant agencies (e.g. English Heritage, DCMS) are still committed to implementing legislative reform when possible. Though a number of elements of heritage reform in England can be taken forward without this new primary legislation (e.g. Planning Policy Statement 5 and the World Heritage Site Planning Circular), a number of reforms cannot (see below) (English Heritage Website):

- The full transfer of responsibility for designation from the Department for Culture, Media and Sport (DCMS) to English Heritage
- To bring together in one simple list, the separate regimes for listing, scheduling, registration of parks, gardens, battlefields and protected wreck sites
- To introduce interim legal protection for heritage assets being considered for designation
- To give better protection for sites of early human activity which cannot currently be scheduled
- For owners to have a formal right to appeal against a designation decision.
- The unification of Listed Building and Scheduled Monument Consent into a single Historic Asset Consent
- Local authorities to grant Historic Asset Consent including archaeological cases currently handled by the DCMS
- For the pre-determination of Historic Asset Consent via Heritage Partnership Agreements
- To give Historic Environment Records statutory force
- For the merger of Conservation Area Consent with Planning Permission

The *Marine and Coastal Access Act* has a number of provisions in relation to the historic environment, including consideration of historic or archaeological sites within the grounds for designating Marine Conservation Zones (MCZs). The *Marine (Scotland) Act 2010* allows Scottish Ministers to designate Historic Marine Protected Areas in Scottish territorial waters (i.e. out to 12nm). These designations are to be used instead of the *Protection of Wrecks Act 1973* for wreck sites in Scottish waters from 2012 following the repeal of section 1 of the PWA under the *Marine (Scotland) Act*. Military remains will remain within the remit of the *Protection of Military Remains Act 1986*. Although Scottish territorial waters are not within the remit of this SEA, landfall locations and offshore developments may take place within close proximity to territorial limits. For the purposes of the *Marine (Scotland) Act* historic assets may include:

- A vessel, vehicle or aircraft (or a part of a vessel, vehicle or aircraft), or its remains
- An object contained in, or formerly contained in, a vessel, vehicle or aircraft

- A building or other structure (or a part of a building or structure)
- A cave or excavation
- A deposit or artefact (whether or not formerly part of a cargo of a ship) or any other thing which evidences, or groups of things which evidence, previous human activity

Under the recent reform of heritage protection, the Scottish Government released a policy document in 2008 which consolidates the Scottish Heritage Protection Policy (SHEP) series of reports. The consolidated SHEP document covers both statutory and non-statutory designations, and includes a number of annexes providing criteria and guidance on scheduling, listing and conservation areas, as well as information on listed building consent and associated planning permission process. Like the Heritage Protection Bill, the SHEP broadens the number of marine designation categories to include vessels, aircraft, built structures and archaeological sites.

English Heritage has recently produced (December 2010) an interim National Heritage Protection Plan due to be finalised by April 2011 which sets out the priorities for which English Heritage will dedicate resources to in the years 2011-2015, for all aspects of national heritage, spanning both the pre-historic and historic periods. The Action Plan embedded in this document sets out what is to be delivered, stating measures and activities to achieve this, with activities consisting of a number of linked projects undertaken by English Heritage. In the context of the marine environment, a number of relevant topics are assigned resources including: marine exploitation impacts, mineral extraction impacts, unknown marine assets and landscapes and submerged heritage assets and landscapes. Plan activities are due to be carried out in a comprehensive and clear manner, involving local communities and with results which are widely disseminated and accessible.

It should also be noted that English Heritage has commissioned the Centre for Maritime Archaeology at the University of Southampton to co-ordinate the development of a Maritime and Marine Historic Environment Research Framework, due for publication in spring 2011. The framework is intended to inform future management, policy and planning for the marine historic environment, and provide research priorities for which funding may be sought.

Implications for SEA

The SEA should consider the potential effects of draft plan/programme activities on coastal and marine heritage features, and highlight guidance and best practice in relation to the historic environment and marine energy developments. The SEA should also consider the likely implications of Heritage Protection Reform as far as possible on the draft plan/programme within the currency of the SEA (i.e. within the next ~5 years).

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APPENDIX 5 – REGULATORY CONTROLS

CONTENTS

A5.1 Introduction

A5.2 Offshore renewable developments

A5.3 Oil and gas, gas storage and carbon dioxide storage

A5.1 Introduction

There are numerous pieces of legislation² applicable to UK offshore energy activities, including recent additions to the regulatory and permitting regime to progress offshore gas and carbon dioxide storage. The summary below is not intended to be a comprehensive guide but a contextual overview of environmental controls in place.

A5.2 Offshore renewable developments

Under *The Crown Estate Act 1961*, The Crown Estate is landowner of the UK seabed and areas of foreshore (www.thecrownestate.co.uk). The Crown Estate's permission, in the form of a site option Agreement and Lease is required for the placement of structures or cables on the seabed, this includes offshore wind farms, tidal stream and range technologies and wave energy converters, and their ancillary cables and other marine facilities. During Rounds 1, 2 and 3 of UK offshore wind farm development, successful applicants were awarded an option for a Lease/Licence by The Crown Estate, with individual operators or consortia proposing sites for development within strategic zones in Rounds 2 and 3. When all necessary statutory consents are obtained by the developer, The Crown Estate may grant a site lease for a development.

The Marine and Coastal Access Act 2009 has made a number of alterations to the marine licensing regime which includes that for offshore renewables in territorial and offshore waters, the implementation of which is due in early 2011. In advance of this, the existing system is described below, followed by those changes due to be implemented in 2011.

Potential offshore wind farm developers require statutory consents from a number of Government departments before development can take place e.g. a FEPA³ consent for the placement of structures in the sea or in the seabed; a Section 36 Consent⁴ for the construction and operation of an offshore power station with a nominal capacity in excess of 1MW (within the territorial sea) or 50MW (beyond the territorial sea); a CPA⁵ consent for any works which are likely to obstruct or cause a danger to navigation, and which involve a construction or improvement of any works or the deposit of any materials below the level of mean high water spring tide, and in some cases planning permission for associated onshore works⁶. A developer may also choose to apply for a section 36A declaration⁷ to extinguish the common law public right of navigation and fishing on the site of a renewable energy

² UK legislation can be accessed via www.legislation.gov.uk/.

³ Food and Environment Protection Act 1985

⁴ Section 36 of the Electricity Act 1989

⁵ Section 34 of the Coast Protection Act 1949

⁶ Sections 57 or 90(2) of the Town and Country Planning Act 1990

⁷ Section 36A of the Electricity Act 1989 as inserted by the Energy Act 2004 Section 99(1)

installation. The key consents typically have strict monitoring requirements attached to them.

The Energy Act 2004 put in place legal framework for offshore renewable energy projects beyond the UK's territorial waters. The Act established a Renewable Energy Zone (REZ), adjacent to the UK's territorial waters from 12nm (nautical miles) out to 200nm, within which renewable energy installations can be established. The Act enables The Crown Estate to award licenses for wind farm sites in the REZ on much the same basis as it currently leases sites within territorial waters. The Act also gave Government the additional powers it requires to regulate renewable energy projects in the REZ, principally by extending the requirement for consent under section 36 of *The Electricity Act 1989*.

Since April 2010, the MMO has taken over responsibility from the Marine and Fisheries Agency (MFA) for processing offshore renewable energy generating station applications under section 36 of *The Electricity Act 1989* (and associated safety zone applications) for developments >1MW but below 100MW in English and Welsh territorial waters and the UK Renewable Energy Zone. (In the Scottish Renewable Energy Zone, Scottish Ministers are responsible for *Electricity Act 1989* consent decisions (similarly FEPA licences, CPA consents and any required planning permissions are a matter for the equivalent Scottish authorities, where renewable energy is concerned). The MMO is responsible for CPA consents between 12 and 200nm in Scottish offshore waters.)

As a result of the adoption of *The Marine and Coastal Access Act 2009*, the major legislative change in the new licensing system is the consolidation and modernisation of the navigation and environment protection measures previously under the remit of *The Coast Protection Act 1949* (CPA) and *Food and Environment Protection Act 1985* (FEPA). From spring 2011, a single Marine Licence will now be required for activities formerly covered by these Acts.

For offshore wind, Round 1 full term leases are for 22 years (plus 1 year for removal and decommissioning). For the largest Round 2 projects, the full term lease is for 50 years, including decommissioning. For Round 3, The Crown Estate proposed that development would be undertaken within nine exclusive Zones for which operators have now been selected.

The Energy Act 2008, *The Planning Act 2008* and the *Marine and Coastal Access Act 2009* together with the *Marine (Scotland) Act 2010* (and any Bill proposed by the Northern Ireland administration) provides a revised framework for the consenting and decommissioning of offshore marine renewables.

The Planning Act 2008 created a new system of development consent for Nationally Significant Infrastructure projects. Under Part 3 of the Act, offshore⁸ energy generating stations with a capacity of more than 100MW are considered Nationally Significant Infrastructure Projects, to be considered by the Infrastructure Planning Commission (IPC)⁹ which will, on advice from the MMO and with regard of the Marine Policy Statement (MPS), issue consent, and also a Marine Licence in English territorial and offshore waters.

⁸ That is wind farms in the territorial waters of England and Wales or in a Renewable Energy Zone, except any part of a Renewable Energy Zone in relation to which the Scottish Ministers have functions

⁹ Legislation may be progressed in 2011/12 which will replace the IPC with a Major Infrastructure Planning Unit which will form part of the Planning Inspectorate.

Environmental Impact Assessment

The EIA Directive (85/337/EEC as amended by 97/11/EC) has been transposed into UK law through a number of regulations (e.g. the *Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000* relating to a Section 36 consent and the *Harbour Works (Environmental Impact Assessment) Regulations 1999* in relation to the CPA).

The regulations require developers of offshore renewables arrays likely to have a significant effect on the environment to undertake an environmental impact assessment (EIA) to consider both the positive and negative environmental impact of a development from the construction stage through to decommissioning. The process should cover direct and indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects. The results of these assessments are brought together in an Environmental Statement and submitted with the various licence/consent applications.

The consenting authorities are normally content for a developer to provide a single document covering each of the consents applied for, provided that its scope is sufficient to embrace the range of environmental issues which each can be expected to consider. As part of the EIA process, impacts on other users and landscape and seascape issues are considered.

Habitats & species protection

Regulations make provision for implementing the Birds Directive (2009/147/EC) and the Habitats Directive (92/43/EEC) in the UK and marine areas where the UK has jurisdiction and require Habitat Regulations Assessment to be undertaken before any determination of a consent application can be made dependent on the potential of the activity to have a significant effect on a Natura 2000 site. DEFRA have produced a guidance note on the implications of the EC Wild Birds and Habitats Directives for developers undertaking offshore wind farm developments "Nature Conservation Guidance on Offshore Windfarm Development". 2010 Regulations make provisions for, *inter alia*, reference to the consolidated Birds Directive (2009/47/EC), which entered into force in February 2010, reference to the *Planning Act 2008* and *Marine and Coastal Access Act 2009* into the list of enactments for which the duty on competent authorities applies, and provisions for Scottish Ministers to carry out certain functions in their offshore waters.

European Protected Species (EPS) are listed on the Annex IV of the Habitats Directive. Where offshore activities may result in impacts on European Protected Species an assessment has to be carried out, by the developer or person carrying out the activity, to determine the likelihood of committing a disturbance offence. In order to assess the risk, the characteristics of the proposed activity and the associated potential disturbance factors need to be taken into account, in addition to species related information. A wildlife disturbance licence may be required.

Safety zones

Section 95 of and Schedule 16 to the *Energy Act 2004* set out the basic requirements for applying to the Secretary of State for a safety zone to be placed around or adjacent to an offshore renewable energy installation. Following public consultation the *Electricity (Offshore Generating Stations) (Safety Zones) (Applications Procedures and Control of Access) Regulations 2007*, which set out the process to be followed in more detail, were introduced in August 2007.

Decommissioning

The *Energy Act 2004* introduced a statutory decommissioning scheme for offshore wind and marine energy installations, see *Guidance: Decommissioning of offshore renewable energy installations under the Energy Act 2004*. The *Energy Act 2008* further strengthens provisions relating to the decommissioning of offshore renewable installations.

A5.3 Oil and gas, gas storage and carbon dioxide storage

Licensing/leasing

The Competent Authority for the issuance and regulation of licences is DECC. The prospective Operator/Developer must demonstrate before award that they have the necessary finances, operating, technical and environmental competency to carry out the agreed work programme. Model clauses and conditions are attached to the Licence. Licences typically contain environmental and other conditions. Before Licences are awarded, where relevant DECC undertakes Habitat Regulations Assessment (HRA) in relation to the potential for effects on European sites.

Oil and gas

The Petroleum Act 1998 (as amended) provides the basis for granting licences to explore for and produce oil and gas. Exploration Licences are non-exclusive & permit the holder to conduct non-intrusive surveys, such as seismic or gravity and magnetic data acquisition, over any part of the UKCS not held under a Production Licence. Traditional Production licences grant exclusive rights to the holders to “search and bore for, and get, petroleum” in specific blocks. Under the terms of a Production Licence, licence holders require the consent of the Secretary of State before installing facilities, producing hydrocarbons and other activities.

Gas storage

The *Energy Act 2008* made provision for the designation of Gas Importation and Storage Zones (GISZ) and created a licensing framework for the underground storage of combustible gas offshore. *The Offshore Gas Storage and Unloading (Licensing) Regulations 2009* lay down, in particular, model clauses for a licence granted under *The Energy Act 2008*. The Act makes it an offence to carry any of the activities below except in accordance with a licence and with prior consent:

- use of a controlled place for the unloading of gas to an installation or pipeline
- use of a controlled place for the storage of gas
- conversion of any natural feature in a controlled place for the purpose of storing gas
- recovery of gas stored in a controlled place
- exploration of a controlled place with a view to gas storage
- establishment or maintenance in a controlled place of an installation for the purposes of activities within this subsection

Licensed activities under a Gas Storage Licence are:

- the storage and recovery of gas
- the conversion of a natural feature for the purpose of storage
- exploration with a view to, or in connection with, the carrying on of such activities
- the establishment or maintenance of installations for those purposes

Where a developer wishes to progress a gas storage development they will need to apply for a Gas Storage Licence, and in some cases also for a Petroleum Licence (see below).

Developers also need to apply for a Crown lease covering the relevant area.

This Act also made provision with respect to the interaction between activities regulated under the *Petroleum Act* and gas storage activities. In some cases the storage of gas will also require a petroleum licence, under section 3 of the *Petroleum Act 1998*, as well as a licence under section 4 of the *Energy Act 2008*. This is because the geological feature in which the gas is stored (for instance, a depleted hydrocarbon field) may itself contain indigenous hydrocarbons. As a result, indigenous hydrocarbons will be “produced” when it mixes with stored gas. In the case of other geological features, the amounts of hydrocarbons present may be negligible. If the Secretary of State is satisfied that the amount of hydrocarbons present is insignificant a direction may be given which makes it clear that there is no requirement for a petroleum licence.

Carbon dioxide storage

The Energy Act 2008 established a licensing regime for the storage of carbon dioxide in areas within UK territorial waters, and in areas beyond those waters which have been designated as a Gas Importation and Storage Zone (GISZ). The Act prohibits the storage of carbon dioxide (with a view to its permanent disposal) except in accordance with a licence granted under the Act.

In order to explore for, drill for or use a geological feature for the long term storage of carbon dioxide in the UK offshore area, an operator must hold:

- A Licence issued by the Secretary of State for Energy and Climate Change under Section 18 of the *Energy Act 2008*, except in respect of activities in the UK territorial sea (12 miles from the baseline) adjacent to Scotland, for which Scottish Ministers are the Licensing Authority.
- A Lease from The Crown Estate for storage activities for all offshore areas, (including the territorial sea adjacent to Scotland) as the right to store gas (including carbon dioxide) in the offshore area is vested in the Crown by virtue of Section 1 of the *Energy Act 2008*.

The Storage of Carbon Dioxide (Licensing etc.) Regulations 2010 (SI 2010/2221) provide more detail of the licensing regime for which the Secretary of State is the licensing authority.

The leasing and licensing process is expected to be approached broadly in parallel by DECC and The Crown Estate.

Consenting etc

A number of statutory consents are required for offshore activities associated with oil and gas, gas storage and carbon dioxide storage, which variously involve the exploration of prospective basins, production and storage, eventual decommissioning and ancillary developments.

The Energy Act (Consequential Modifications) (Offshore Environmental Protection) Order 2010 which came into force in July 2010, broadened the scope of environmental legislation which was developed for the offshore oil and gas industry (and which underpins many of the controls set out below) such that it covers the storage and unloading of combustible gas and the storage of carbon dioxide. Through amendment, the Order applies the following legislation to gas and carbon dioxide storage activities: the *Offshore Petroleum Production*

and Pipelines (Assessment of Environmental Effects) Regulations 1999 (as amended), the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended), the Offshore Combustion Installations (Prevention and Control of Pollution) Regulations 2001 (as amended) and the Offshore Marine Conservation (Natural Habitats, &c) Regulations 2007 (as amended).

Requirement for Environmental Management Systems

All Operators controlling the operation of offshore installations on the UKCS are required to have in place an independently verified Environmental Management System designed to achieve: the environmental goals of the prevention and elimination of pollution from offshore sources and of the protection and conservation of the maritime area against other adverse effects of offshore activities; continual improvement in environmental performance; and, to achieve the objectives of the OSPAR Recommendation 2003/5. OSPAR recognises the ISO 14001: 2004 & EMAS international standards as containing the necessary elements.

Consent to conduct a geophysical survey

Geophysical surveys, pipeline route, site, 2D, 3D, 4D shallow seismic, vertical seismic profiling (VSP) check shots, shallow borehole, all require consent or notification under *The Offshore Petroleum Activities (Conservation of Habitats) Regulations, 2001 (as amended 2007)*. The application format is the PON14A "Consent need for Application for Consent and/or Notification of Intention to Carry Out Surveys and Shallow Drilling", submitted to DECC. Applications for consent in acoustically sensitive areas must be accompanied by narrative environmental assessment with modelling of sound propagation and consideration of impact on sensitive receptors, unless this has previously been included in an Environmental Statement. Consideration is given to the requirement for an Appropriate Assessment under the Habitats Directive in relation to the potential for effects on SACs. The PON14A is subject to a wider notification process involving fishermen and others who may have interests in the area. Application of JNCC guidelines for minimising acoustic disturbance to marine mammals from seismic surveys is mandatory (see also section on habitats and species protection below). A report of the survey and marine mammal observations is submitted to the JNCC. Shallow gas (rig site) surveys are also subject to the consenting requirements for geophysical surveys, as is the testing of equipment to be used in offshore seismic and geophysical such surveys.

For VSP and check shots details may be included in the PON15B submission submitted in support of the application for well consent, whichever is the most appropriate.

It is a condition of consent that the JNCC Guidelines for minimising acoustic disturbance to marine mammals from seismic surveys be followed and that a report is submitted to the JNCC for each individual survey detailing how the JNCC Guidelines were implemented, the marine mammals sighted, the methods used to detect them and any problems encountered.

Environmental Impact Assessment

Approval for development programmes and consent for wells, extended well tests, incremental projects and production consents are contingent on complying with the requirements of the *Offshore Petroleum Production and Pipe-lines (Assessment of Environmental Effects) Regulations 1999 (as amended)*. An Environmental Statement (ES) is mandatory for certain projects including new and incremental developments with expected production >500 tonnes of oil/day or 500,000 cubic metres of gas/day and new pipelines with expected production >40km in length and 800mm in diameter. A number of projects (including the drilling of wells) may not need an ES to be prepared if a preliminary

assessment demonstrates to the satisfaction of the Secretary of State that the project is unlikely to cause a significant adverse environmental impact. In such circumstances a direction from the Secretary of State may be sought that an ES is not required using the appropriate Petroleum Operations Notice (PON15). The PON15 must, as far as possible, be a standalone document and contain sufficient information about the proposed project, its expected location and an environmental assessment to provide a basis for a determination to be made. (See also section on habitats and species protection below.)

Habitats & species protection

Regulations implement European Directives for the protection of habitats and species namely, Council Directive 92/43 on the conservation of natural habitats and of wild fauna and flora and Council Directive 2009/47/EC (the codified version of 79/409/EEC) on the conservation of wild birds in relation to oil and gas (and now also gas storage and carbon dioxide storage) activities carried out in whole or in part on the UKCS. The Competent Authority, will, if considered that an activity completed under a project consent may have a significant effect on a Special Area of Conservation (SAC) or Special Protection Area (SPA), conduct a Habitat Regulations Assessment prior to granting the consent.

European Protected Species (EPS) are listed on the Annex IV of the Habitats Directive. Where offshore activities may result in impacts on European Protected Species an assessment has to be carried out, by the developer or person carrying out the activity, to determine the likelihood of committing a disturbance offence. In order to assess the risk, the characteristics of the proposed activity and the associated potential disturbance factors need to be taken into account, in addition to species related information. A wildlife disturbance licence may be required.

Consent to locate facilities

The Marine and Coastal Access Act 2009 introduced navigational controls previously under the remit of the CPA to the *Energy Act 2008*, and provides that where obstruction or danger to navigation is caused or is likely to result as a result of certain operations, the prior written consent of the Secretary of State for DECC is required.

Offshore installations, whether temporary or permanent, may be located only with prior written consent from the Secretary of State. The Act is the statutory means of controlling the location and marking of such works to avoid danger or obstruction to navigation. In practice, this means that a "consent to locate" must be obtained from DECC for siting mobile drilling rigs and for offshore production facilities. The application process includes risk assessment and consultation. The consent, however, does not give exclusive rights to the area applied for, or prevent other individuals or organisations from applying for consent in the same location. Nor does it relinquish rights of navigation in a given area.

Safety zones

When surface structures (fixed and floating installations) become operational, safety zones with a radius of 500m are automatically created under the *Petroleum Act 1987*. In the case of subsea facilities, application must be made to the Secretary of State requesting that a safety zone be established

Use and discharge of chemicals

A permit is required in advance for the use of chemicals offshore including drilling, well workover, production and pipeline chemicals (*Offshore Chemicals Regulations 2002 as amended*). Permit application (PON15) includes mandatory risk assessment and variation in

use from the permit must have prior approval. Amending regulations (*The Offshore Chemicals (Amendment) Regulations 2010* and *The Offshore Petroleum Activities (Oil Pollution Prevention and Control) (Amendment) Regulations 2010*), are set to be introduced to make unlawful, unintentional release of chemicals or oil that arise through accidents/non-operational discharges so as to differentiate between intentional discharges, and to create a new offence in respect of releases, or allowing a release to continue. Chemical use and discharge must be reported at the end of the activity. Chemicals are ranked by hazard, based on a PEC:PNEC (Predicted Effect Concentration : Predicted No Effect Concentration) approach.

No organic phase drilling fluids may be used without prior authorisation (normally through the PON 15/Environmental Statement process), and discharge of cuttings to sea with a concentration >1% by weight of oil on dry cuttings is prohibited. (OSPAR Decision 2000/3 on the Use of Organic-Phase Drilling Fluids (OPF) and the Discharge of OPF-Contaminated Cuttings). Such OPF cuttings are reinjected to deep rock strata or shipped to shore for treatment/oil recovery and disposal at licensed sites.

Consent for produced water discharges containing reservoir fluids

OSPAR Recommendation 2001/1 for the Management of Produced Water from Offshore Installations provides for a reduction in the discharge of oil in produced water by 15% over a five year period and a lowering of the discharge concentration from each installation to 30mg/l over the same period. The recommendation also includes a presumption against the discharge to sea of produced water from new developments.

The *Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations* came into force during 2005 and have updated and largely superseded the *Prevention of Oil Pollution Act 1971* (POPA). A system of permits for oil discharges has been introduced to replace the POPA exemptions and more wide-ranging powers have been given to inspectors. Operators are required to regularly make reports of actual oil discharge. A Permit is required for any discharge of reservoir oil. The regulations are a mechanism to continue implementation on the UKCS of OSPAR Recommendation 2001/1 and make provision for the introduction of the dispersed oil in produced water trading scheme. These Regulations apply to discharges containing reservoir hydrocarbon and although they have been amended to apply to carbon storage it is not yet clear whether they will apply to aquifer discharges.

Waste

The Merchant Shipping (Prevention of Pollution by Sewage and Garbage from Ships) Regulations 2008 (as amended) implement the revised Annex IV of MARPOL 73/78 (Regulations for the Prevention of Pollution by Sewage from Ships) and Annex V of MARPOL 73/78 (Regulations for the Prevention of Pollution by Garbage from Ships). These regulations apply to all fixed and floating offshore installations (including rigs) and their support vessels operating on the UKCS. Annex IV of MARPOL 73/78 (not previously implemented in UK legislation) is an optional annex and contains requirements to control pollution of the sea by sewage. The annex applies to ships engaged in international travel that are of 400 gross tonnage and above or below 400 gross tonnage and certified to carry more than 15 persons. Schedule 2 of the Merchant Shipping Notice 1807 provides recommendations on standards for the rate of discharge of untreated sewage from ships, permissible outside of 12nm from land.

Annex V of MARPOL, implemented in the above regulations and those previously implemented in 1998, are applicable to every ship of 400 gross tonnage and above and any

ship with more than 15 passengers, which must have a Garbage Management Plan in accordance with IMO guidelines and those set out in Schedule 3 of Merchant Shipping Notice 1807. A Garbage Record Book or equivalent must also be kept by all ships (within the thresholds set out already) engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to Annex V of MARPOL.

Under the *Environmental Protection Act 1990*, operators must ensure that offshore waste is managed onshore in accordance with the Duty of Care introduced by the Act and other onshore legislation such as Regulations applying to Special (Hazardous Waste in England and Wales) Waste and that relating to the management and licensing of waste sites.

Authorisation to install and operate a pipeline

A Pipeline¹⁰ Works Authorisation is required from DECC under Part 3 of the *Petroleum Act 1998* for the construction and/or use of a submarine pipeline in territorial waters and on the continental shelf. Additional consent that was previously required under the *Coast Protection Act (CPA) 1949* Part II has been repealed under the *Marine and Coastal Access Act 2009*, i.e. the carrying out of activities which, "causes, or is likely to result in, obstruction or danger to navigation (whether while the operation is being carried out or subsequently)". The Act inserts similar provisions of Part II of the CPA into a new Part 4A, "Works Detrimental to Navigation", in the *Energy Act 2008*. This is applicable to activities not licensable under Part 4 of the *Marine and Coastal Access Act*, which includes certain oil and gas activities (see section 77 of the Act).

The authorisation may include conditions for the design, route, construction and subsequent operation of the pipeline and requires an extensive consultation process.

Deposits

The deposit of stabilisation or protection materials, such as jack-up rig stabilisation / anti-scour deposits, or pipeline protection / free-span correction deposits, must be the subject of a direction under the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (As Amended). Some of these deposits were previously authorised under the Food and Environment Protection Act (FEPA) 1985, Part II Deposits in the Sea¹¹. Licences are required for injection of produced water or drill cuttings away from the site of production.

Machinery space drainage

The Merchant Shipping (Prevention of Oil Pollution) Regulations 1996 (as amended) give effect to Annex I of MARPOL 73/78 (prevention of oil pollution) in UK waters. They address oily drainage from machinery spaces on vessels and installations. The North Sea is designated a "Special Area", within which the limit for oil in discharged water from these sources is 15ppm. For mobile drilling units, discharges of processed bilge water from machinery spaces should only be undertaken when there is a positive water movement past the rig, i.e. at times of the day when the tidal flow is at its greatest, and provided there is no visible sheen. Vessels and installations are required to hold a valid UKOPP (UK Oil Pollution Prevention) or IOPP (International Oil Pollution Prevention Certificate). Vessels and drilling rigs are also required to hold a current, approved Shipboard Oil Pollution

¹⁰ Pipeline defined in the *Petroleum Act 1998*, and modified in the *Energy Act 2008* as, "a pipe or system of pipes (excluding a drain or sewer) for the conveyance of any thing, together with all apparatus, works and services associated with the operation of such a pipe or system".

¹¹ Part II of FEPA still applies in the Scottish inshore region for reserved oil and gas activities

Emergency Plan (SOPEP) which is in accordance with guidelines issued by the Marine Environment Protection Committee of the International Maritime Organisation.

The *Merchant Shipping (Implementation of Ship-Source Pollution Directive) Regulations 2009* implemented EU Directive 2005/35/EC on ship-source pollution and introduced penalties for infringements and make various amendments to the above regulations with respect to defences.

Consent to flare or vent any gas

A consent from the Secretary of State is required to flare gas or vent gas (*Energy Act 1976*, petroleum licences granted under the *Petroleum (Production) Act 1934* and the *Petroleum Act 1998*). DECC is committed to eliminating all unnecessary or wasteful flaring and venting of gas. Guidance to operators states that they should seek to minimise flaring and venting “by implementing best practice at an early stage in the design of the development and by continuing to improve on this during the subsequent operational phase. The operator should consider carefully all operational activities in accordance with good oil field practices taking into consideration plant uptime, efficient processing, handling, uses and transportation of gas.”

Combustion emissions from power generation etc

The *Offshore Combustion Installations (Prevention and Control of Pollution) Regulations, 2001* (as amended 2007) introduced Integrated Pollution Prevention and Control (IPPC) to offshore oil and gas combustion installations (power generation, turbines, fired heaters etc) with a combined total rated thermal input exceeding 50 MW. IPPC Permit conditions include provisions based on best available techniques, emission limits, and monitoring requirements.

Emissions trading

Under the *Greenhouse Gas Emissions Trading Scheme Regulations 2005* (as amended), combustion installations >20 MW(th) input require a permit to discharge CO₂. The National Allocation Plan sets out caps for all UK installations in the Scheme based on CO₂ from turbines, diesels and fired heaters and flaring.

Ozone depleting substances

Ozone depleting substances are regulated under the UK *Environmental Protection (Controls on Ozone Depleting Substances) Regulation 2007* (implementing EU Regulation 2037/2000), and the UK *Persistent Organic Pollutants (POPs) Regulations 2007* (implementing *EU Regulation 850/2004 on ozone depleting substances*). Both regulations limit the use of ozone depleting substances and coordinate their phase-out offshore.

Radioactive substances

A registration certificate is required to keep and use radioactive sources and a strict record keeping regime applies.

Onshore and offshore storage and disposal of naturally occurring radioactive materials (NORM) is regulated under the *Radioactive Substances Act 1993* and operators are required to hold, for each relevant installation, an authorisation to store and dispose of radioactive waste such as low specific activity (LSA) material deposited in vessels and pipework or discharged in produced water. The Authorisation specifies the route and method of disposal and records of disposals are required. The use, storage and disposal of radioactive sources are regulated under the same legislation.

Spill contingency planning

Operators are required to report all oil and chemical spills, regardless of size to the Coastguard, DECC and other relevant authorities (PON1). Every reasonable attempt should be made to recover other items lost overboard (PON2).

An Approved Oil Pollution Emergency Plan (OPEP) is required to cover all offshore installations and oil handling facilities (e.g. pipelines). The plan must be submitted for approval at least two months in advance of operations. It must include an assessment of spill risk, response arrangements, and details of actions, interfaces, training and exercises as required by the *Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) Regulations, 1998*, and the *Offshore Installations (Emergency Pollution Control) Regulations 2002*.

Vessels and drilling rigs are required to hold a current, approved Shipboard Oil Pollution Emergency Plan (SOPEP) in accordance with guidelines issued by the Marine Environment Protection Committee of the International Maritime Organisation.

REACH (REACH Enforcement Regulations 2008)

REACH is an EU Regulation (EC 1907/2006) which entered into force in June 2007 and deals with the **R**egistration, **E**valuation, **A**uthorisation and **R**estriction of **C**hemical Substances. This introduces new registration requirement covering all substances supplied above 1 tonne per year and new authorization requirement covering substances of high concern. It transfers the responsibility for gathering data and carrying out initial risk assessments to the industry. Although most of the provisions of REACH cover manufacturers and importers of chemicals, downstream users (e.g. oil and gas operators) are obliged to implement risk reduction measures recommended by their chemical suppliers and under certain circumstances they may be obliged to conduct a risk assessment covering their particular use(s) of a chemical.

The *REACH Enforcement Regulations 2008* enact the EU REACH Regulations in the UK, including on all offshore installations (not including ships) in UK territorial waters and the Continental Shelf.

Air pollution from ships

The Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2008 (as amended 2010) implement the 1997 Protocol for the establishment of International Regulations for the Prevention of Air Pollution from Ships which resulted in the addition of Annex VI (with revisions adopted in October 2008) to MARPOL 73/78. Annex VI comprises 19 Regulations and includes a Technical Code on the Control of Emissions of Nitrogen Oxides from Marine Diesel Engines (NO_x Technical Code). The North Sea was designated a SO_x Emission Control Area (SECAS) in 2005 where the sulphur content of fuel oil used onboard ships must not exceed 1.5% m/m; or ships must fit an exhaust gas cleaning system or use other technological methods to limit SO_x emissions. These regulations are applicable to relevant ships (over 400 gross tonnage) and fixed and floating platforms and drilling rigs. Platforms are subject to the survey and certification requirements of Annex VI, the scope of which is set out in Schedule 8 of Merchant Shipping Notice 1819.

Decommissioning

Under the *Petroleum Act 1998 (as amended)*, operators proposing to decommission an installation must submit a Decommissioning Programme including an Environmental Impact

Statement to DECC for approval prior to any works being commenced. Consultation and monitoring is also required. DECC guidance indicates a presumption that offshore installations will be re-used, recycled or disposed of on land and that any exceptions to that general rule will be assessed individually in accordance with the provisions of OSPAR Decision 98/3. The *Energy Act 2008* amends the *Petroleum Act 1998* to ensure that the provisions of which relate to the decommissioning of offshore installations including for example, obligations to remove the facilities completely after the permanent cessation of operations apply to all installations used for the offshore storage and offloading of combustible gas and those used for carbon dioxide storage.