Report prepared by:

Scottish Government
Riaghaltas na h-Alba
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Sectoral Marine Plan for Offshore Wind Encompassing Deep Water Options

Strategic Environmental Assessment

Screening and Scoping Report

June 2018

marinescotland

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1 Introduction

1.1 Background

1.1.1 The Scottish Government is committed to ensuring secure, reliable, and affordable energy supplies within the context of the long term decarbonisation of energy generation. Continued growth of the renewable energy sector in Scotland is an essential feature of the future energy system and offshore wind has the potential to play a pivotal role in Scotland's energy system over the coming decades. In support of this, Marine Scotland is currently identifying potential areas of search suitable for the continued development of offshore wind energy in Scotland, including the consideration of deep water options.

1.1.2 The process of identifying areas of search will include a review of the Plan Options for offshore wind development previously contained in the Draft Sectoral Plan for Offshore Wind Energy in Scottish Waters published in 2013. Together, these outputs will form the basis of a new Draft Sectoral Marine Plan for Offshore Wind Encompassing Deep Water Options (the 'Draft Plan') which will provide a strategic framework for the large scale deployment of both conventional and deep water wind technologies in Scottish waters. Emerging technologies such as floating wind foundations, which offer scope for development in deeper water, have significant potential to contribute to offshore wind energy supply and may feature among the technologies that are eventually deployed.

1.1.3 The Draft Plan falls under Section 5(4) of the Environmental Assessment (Scotland) Act 2005 ('the 2005 Act') and is considered likely to give rise to significant environmental effects. In accordance with the requirements of the Act, a joint Screening and Scoping Report has been prepared to give preliminary consideration to the types of environmental effects that could arise from the identification of the areas of search.

1.1.4 Although the areas of search represent the first stage in the development of the Draft Plan, the present Screening/Scoping Report will refer to them as 'the Draft Plan' for ease of reading and to ensure consistency in the terminology used throughout all stages of the assessment.

1.2 Strategic Environmental Assessment

1.2.1 The 2005 Act requires that public plans, programmes, and strategies (PPS) be assessed for their potential effects on the environment[1]. Undertaking a Strategic Environmental Assessment (SEA) provides a means of identifying potentially significant environmental impacts at an early stage in the development of the PPS. SEA also considers how identified impacts can be

[1] Environmental Assessment (Scotland) Act 2005, asp 15 [online] Available at: https://www.legislation.gov.uk/asp/2005/15/introduction (accessed 04/09/2017)

avoided or minimised through appropriate mitigation measures and provides for engagement with stakeholders through public consultation on both the PPS as well as the findings of the assessment. This feedback is used to inform the final iteration of the plan, as summarised by the Post-Adoption Statement.

SEA and the wider assessment process

1.2.2 This SEA forms part of a wider Sustainability Appraisal (SA) of the Draft Plan that will be undertaken, in line with the requirements of the EC Habitats[2], Birds[3], and Public Participation Directives[4] as well as the Marine and Coastal Access Act 2009[5]. Specifically, this joint Screening and Scoping Report has been produced as part of a suite of documents that have been made available for early comment. These include:

- a consultation document setting out the context for developing an offshore wind plan encompassing deep waters around Scotland ('context report');
- a report detailing the proposed scope of the socio-economic assessment work to be carried out; and
- a report setting out initial work on the information that will be used to inform the Habitats Regulations Appraisal (HRA)[6].

1.2.3 Following this initial consultation, Marine Scotland intends to deliver an overarching SA through four key, complementary initiatives: the SEA; an HRA; a socio-economic impact assessment; and public consultation on the Draft Plan.

1.3 Purpose of this Screening and Scoping Report

1.3.1 This report sets out information on the following:

- the proposed scope and level of detail of the assessment;
- a description of the potential methodology that may be used in the assessment;
- a summary of the information that is likely to underlie the compilation of the environmental baseline; and
- the prospective period of consultation on the Draft Plan and draft Environmental Report.

[2] European Commission (1992) The Habitats Directive [online] Available at: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm (accessed 29/03/2017)

[3] European Commission (2009) The Birds Directive [online] Available at: http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm (accessed 29/03/2017)

[4] European Commission (2017) The Aarhus Convention [online] Available at: http://ec.europa.eu/environment/aarhus/legislation.htm (accessed 12/03/2018)

[5] Marine and Coastal Access Act 2009, 2009/Chapter 23 [online] Available at: https://www.legislation.gov.uk/ukpga/2009/23/introduction (accessed 07/12/2017)

[6] Scottish Government (2017) Habitats Regulations Appraisal [online] Available at: http://www.gov.scot/Topics/Built-Environment/planning/Roles/Scottish-Government/Enviromental-Assessment/HRA (accessed 29/11/2017)

Information to support the screening exercise is provided in Appendix A.

1.3.2 There is potential for the Draft Plan to give rise to transboundary impacts. As such, this SEA has been undertaken in accordance with both the requirements of the 2005 Act and the 2004 Regulations[7].

1.3.3 The views of the Consultation Authorities (Scottish Environment Protection Agency (SEPA), Historic Environment Scotland (HES), and Scottish Natural Heritage (SNH)), the UK consultation bodies[8] (the Environment Agency, Historic England, and Natural England), Member States of relevance, and members of the public on this combined report are now being sought.

1.4 Report structure

1.4.1 This Screening and Scoping Report is set out as follows:

- Section 1 introduces the Draft Plan and the SEA process.
- Section 2 provides background information on the development of the offshore wind energy sector in Scotland, including the previous site identification process.
- Section 3 summaries a range of offshore wind energy technologies and their associated environmental impacts.
- Section 4 sets out the proposed approach to the assessment, including potential methodology and how issues of mitigation, monitoring, reasonable alternatives, and cumulative effects are likely to be addressed.
- Section 5 presents the broader legislative and policy context for the Draft Plan, in addition to an outline of the proposed environmental baseline to inform the subsequent assessment.
- Section 6 provides details of the next steps in the preparation of the Draft Plan and the SEA process, including proposed consultation timescales.
- Appendix A includes the environmental Screening Report

[7] The Environmental Assessment of Plans and Programmes Regulations 2004, SI 2004/1663 [online] Available at: http://www.legislation.gov.uk/uksi/2004/1633/introduction/made (accessed 29/11/2017)

[8] UK Government (2015) Guidance - Strategic environmental assessment and sustainability appraisal [online] Available at: https://www.gov.uk/guidance/strategic-environmental-assessment-and-sustainability-appraisal (accessed 29/11/2017)

2 Offshore wind energy and deep waters around Scotland

2.1 Background

2.1.1 Offshore wind accounts for a small but rapidly growing proportion of Scotland's renewable energy portfolio. As of the end of 2017, Scotland had an installed operational capacity of 211 megawatts (MW) (excluding Beatrice demonstration). As 2020 targets for renewable energy generation near[9], and Scotland pursues more ambitious reductions in its greenhouse gas emissions, the focus has broadened to consider the potential to expand offshore wind energy into deep waters. The term 'deep waters' in this context typically refers to depths between 80-120m but could also include both shallower and deeper waters.

2.1.2 It is estimated that over 80% of Europe's wind energy passes over waters deeper than 60m in depth, with a potential yield of 4000 gigawatts (GW)[10]. Deep waters are particularly common in the Atlantic Ocean and areas of the North Sea[11] and it is estimated that the energy that could be derived from deep water turbines in the North Sea alone could exceed the EU's electricity requirements four times over[12]. Scotland possesses approximately 25% of Europe's total offshore wind resource[13] and as such, deep waters around Scotland may hold considerable potential for offshore wind energy development.

2.1.3 Scotland has an abundance of deep water resources located close to land[14], particularly off the west coast where the shelf edge drops off fairly near to shore[15]. Sea depths off the west coast vary considerably but generally fall between 10-320m with an average depth of roughly 60m[16]. Waters off the east coast tend to be shallower and more uniform in depth, with a gradual downward slope towards the North Sea, but also include localised trenches and deeper

[9] Amongst other targets, Scottish Ministers have committed to generating 100% of Scotland's gross annual electricity demand from renewable sources by 2020.

[10] WindEurope (2017) Floating Offshore Wind Vision Statement – June 2017 [online] Available at: https://windeurope.org/wp-content/uploads/files/about-wind/reports/Floating-offshore-statement.pdf (accessed 16/10/2017)

[11] European Wind Energy Association (2013) Deep water – The next step for offshore wind energy [online] Available at: http://www.ewea.org/fileadmin/files/library/publications/reports/Deep_Water.pdf (accessed 07/12/2017)

[12] ibid

[13] Scottish Government (2015) Scotland's National Marine Plan – 11. Offshore Wind and Marine Renewable Energy [online] Available at: http://www.gov.scot/Publications/2015/03/6517/12 (accessed 01/11/2017)

[14] Carbon Trust (2015) Floating Offshore Wind: Market and Technology Review [online] Available at: https://www.carbontrust.com/media/670664/floating-offshore-wind-market-technology-review.pdf (accessed 23/11/2017)

[15] Scottish Government (2012) Draft Regional Locational Guidance – Offshore Wind in Scottish Waters [online] Available at: http://www.gov.scot/Resource/0039/00398506.pdf (accessed 23/11/2017)

[16] Scottish Government (2012) Draft Regional Locational Guidance – Offshore Wind in Scottish Waters [online] Available at: http://www.gov.scot/Resource/0039/00398506.pdf (accessed 23/11/2017)

areas of up to 200m depth such as the southeast Moray Firth[17]. Towards the northern reaches of the east coast, average depths tend to increase and past the Shetland Islands, depths of around 110m are found inshore of the shelf edge[18].

2.1.4 Sea areas outside Scottish Territorial Waters (i.e. past 12 nautical miles [nm]) are generally deeper than territorial waters, with large expanses of water at depths of 80-120m[19]. Such areas are particularly extensive in the Scottish portion of the North Sea. Additional areas of water of 120-300m depth are found in regions like the Fladen Ground in the North Sea[20]. The shelf edge west of Scotland presents very considerable challenges to development[21] and installation of developments in this area may benefit from more mature technology and experience from projects tested in other areas.

2.1.5 Waters past the territorial boundary have the potential to possess lower levels of constraint due to fewer competing environmental, commercial, and heritage interests. For example, at greater distances from shore, noise and visual impacts may be reduced[22]. In some instances, this can make such areas particularly suited to accommodating deep water wind energy technologies. In addition, wind resources tend to be stronger and less variable further offshore[23] where deep water is likely to be found, enabling turbines to be more consistently in operation and reducing turbulence.

2.2 Blue Seas Green Energy – A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters

2.2.1 In 2009, the Crown Estate Commissioners (CEC) undertook the first stage of lease bidding and awarded Exclusivity Agreement awards (the first step towards securing a commercial lease) for 10 sites in Scottish Territorial Waters:

- Solway Firth
- Wigtown Bay
- Kintyre
- Islay
- Argyll Array
- Beatrice

[17] Scottish Government (2012) Draft Regional Locational Guidance – Offshore Wind in Scottish Waters [online] Available at: http://www.gov.scot/Resource/0039/00398506.pdf (accessed 23/11/2017)

[18] ibid

[19] Scottish Government (2011) Scottish Marine and Freshwater Science Report Volume 2 Number 13: Scoping Study for Offshore Wind Farm Development in Scottish Waters [online] Available at: http://www.gov.scot/Resource/Doc/363758/0123511.pdf (17/11/2017)

[20] ibid

[21] ibid

[22] WindEurope (2017) Floating Offshore Wind Vision Statement – June 2017 [online] Available at: https://windeurope.org/wp-content/uploads/files/about-wind/reports/Floating-offshore-statement.pdf (accessed 16/10/2017)

[23] ibid

- Inch Cape
- Neart na Gaoithe
- Forth Array, and
- Bell Rock

2.2.2 In response to the CEC leasing round and to support the sustainable delivery of the potential for offshore wind around Scotland, the Scottish Government made a commitment to produce a SEA of the potential for offshore wind development in Scottish Territorial Waters, to include the 10 site options. A draft Plan was developed to accompany the SEA Environment Report, and thereby ensure that those reviewing the assessment findings during statutory consultation were clear about the emerging proposals.

2.2.3 In addition to the short term sites identified by CEC, the Scottish Government commissioned a further constraint and opportunity mapping exercise in order to identify additional medium term options, within which there could be further potential for development beyond 2020. The marine spatial planning model, Marine Resource System (MaRS), was used to identify options by mapping environmental and technical constraints as well as resource opportunities. This model identified 30 medium term options (areas of search). The 30 medium term options were then subject to environmental assessment, using the strategic environmental objectives developed with the Consultation Authorities. This resulted in 5 options being ruled out, including South West Option 2 (SW2), due to its proximity to the Beaufort's Dyke munitions dump. As a result, 25 medium term options (areas of search) were taken forward in the Sectoral Marine Plan.

2.2.4 Further to SEA, a HRA for the site and medium term options as well as a Socio-economic Assessment for the regional implications of the site options were commissioned. A consultation analysis report of all the consultation responses received for the SEA and Plan development process was produced.

2.2.5 In March 2011 Scottish Ministers, following consideration of the key findings from the SEA, HRA, Socio-economic Assessment and consultation analysis, decided that 6 short term sites would be progressed.

- Islay
- Argyll Array
- Beatrice
- Inch Cape
- Neart na Gaoithe
- Forth Array

2.2.6 In addition, Scottish Ministers' recognised the 25 medium term options within the Plan as the starting point for the next strategic planning exercise to support offshore wind energy around Scotland

2.3 Draft Sectoral Marine Plan for Offshore Wind Energy in Scottish Waters

2.3.1 As per its commitment to a two-year review, Blue Seas – Green Energy was reviewed in 2013 alongside the Sectoral Marine Plans for Wave and Tidal Renewables[24]. The review included a re-evaluation of the previous selection of medium term development areas and broadened the geographic scope of consideration to include non-territorial waters (i.e. out to 200nm). The latter involved identifying both additional medium term areas of search as well as areas of deeper water that could become suitable as turbine structure technologies progress and become commercially deliverable at greater depths.

2.3.2 To help refine the potential areas of search, Regional Locational Guidance (RLG) was prepared which gave consideration to detailed environmental, technical, socio-economic and planning issues in relation to the offshore renewable energy regions of Scotland[25]. This led to the development of an Initial Plan Framework comprised of draft Plan Options which are intended to guide developers towards suitable areas when planning projects to go through a marine licensing process[26]. This Initial Plan Framework was subject to an iterative series of assessments including SEA, an HRA, and a socio-economic assessment, which informed a public consultation on the Draft Plan for Offshore Wind Energy 2013. This Plan contained 10 draft Plan Options which were subsequently reflected in the publication of Scotland's National Marine Plan in 2015.

2.3.3 However, due to the challenges faced by the offshore wind industry during this period, resulting from the change in subsidy mechanism from ROCs (renewables obligations certificates) to Contract for Difference, the Draft Plan was never formally adopted by Scottish Ministers'.

2.4 Draft Sectoral Marine Plan for Offshore Wind Energy - 2019

2.4.1 As a result of significant cost reductions in the offshore wind sector in recent years, together with the emergence of floating technology for offshore wind sub-structures, Crown Estate Scotland announced their intention to run a new leasing round for commercial scale offshore wind technologies in Scottish Waters. As a result, Marine Scotland, as planning authority for Scotland's Seas, will undertake a new strategic planning exercise to inform the spatial development of any future leasing round.

[24] Scottish Government (2013) Draft Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters – Strategic Environmental Assessment: Environmental Report and Appendix A [online] Available at: http://www.gov.scot/Publications/2013/07/2403/0 (accessed 24/11/2017)

[25] Scottish Government (2012) Offshore Wind – Regional Locational Guidance – Part 2 – Introduction – Scottish Overview [online] Available at: http://www.gov.scot/Topics/marine/marineenergy/Planning/windrlg (accessed 24/11/2017)

[26] Scottish Government (2013) Offshore Wind Energy in Scottish Waters – Initial Plan Framework (Draft Plan Options) [online] Available at: http://www.gov.scot/Resource/0042/00423948.pdf (accessed 24/11/2017)

2.4.2 The forthcoming Draft Plan will look to establish similar areas of search suitable for wind energy generation in Scotland. Such areas of search may include deep water sites. The previous Plan Options presently remain as live drafts and will be reviewed within the context of the development of the 2019 Draft Plan. The timeline and process of identifying areas for offshore wind energy development in Scottish waters to date, including where the present Plan options feature in relation to previous work, is illustrated by Figure 1. Figure 2 depicts the new proposed areas of search.

Figure 1 Timeline and process of identifying sites for offshore wind energy development in Scottish waters to date

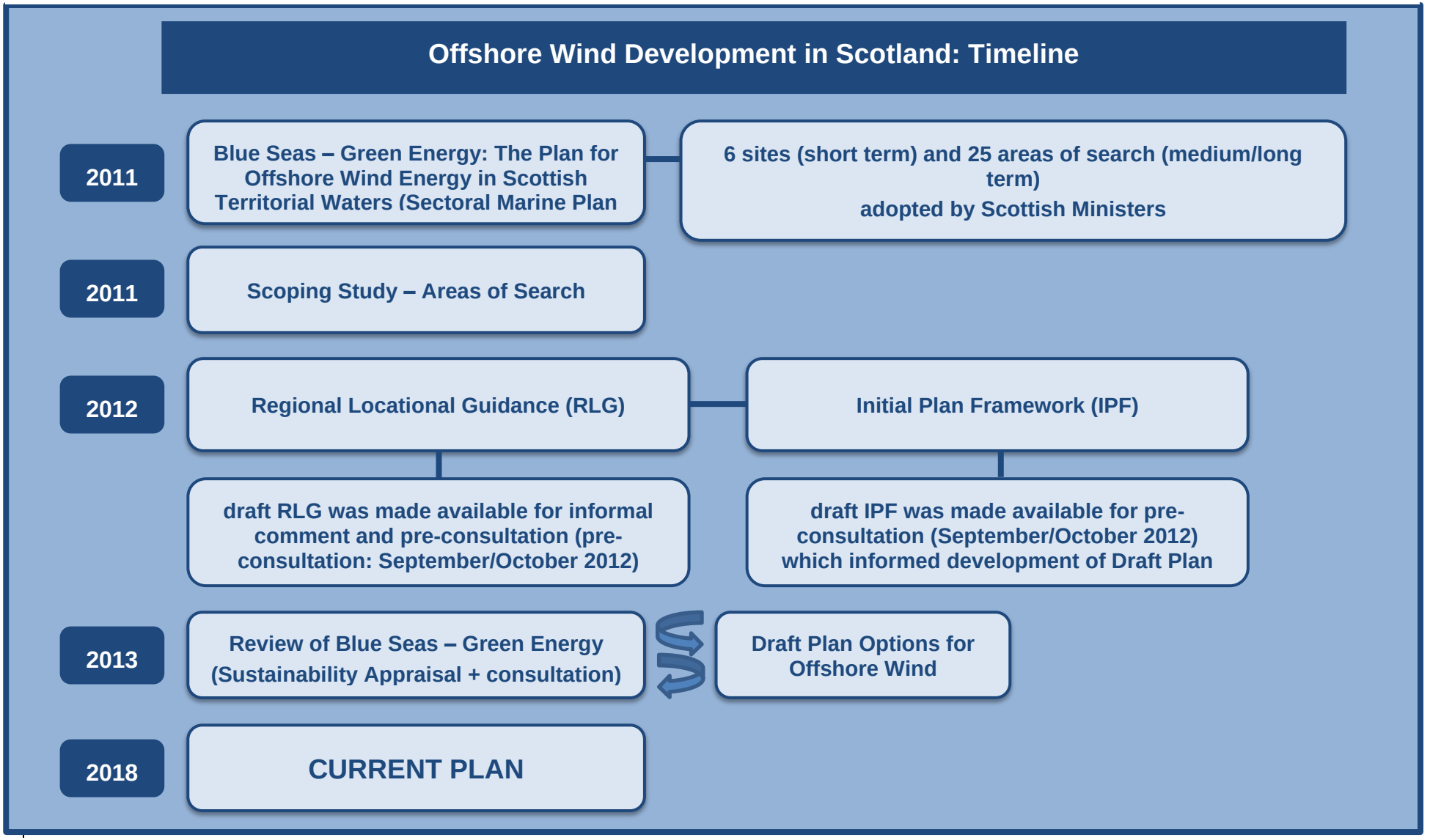
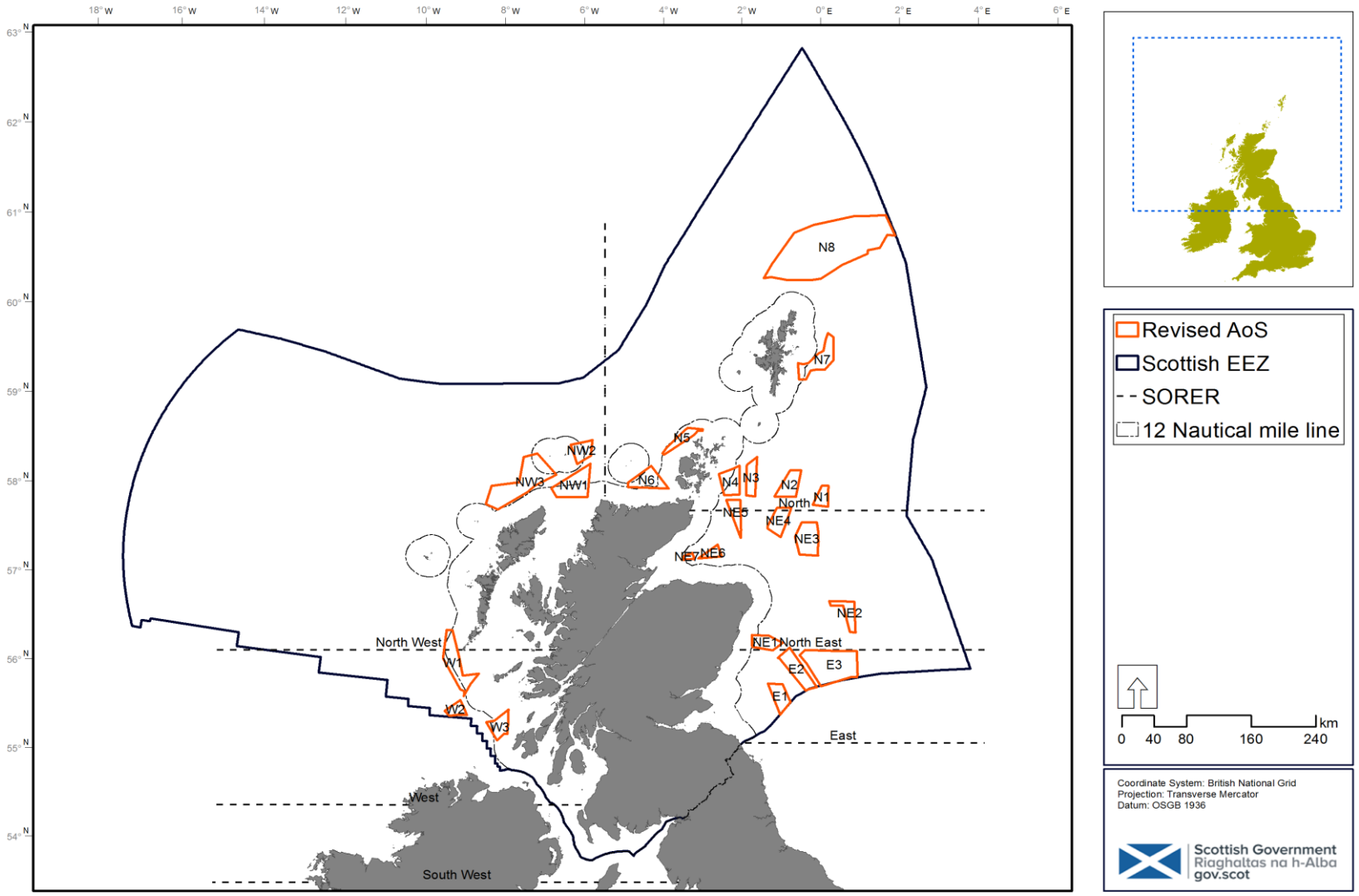


Figure 2. Proposed Areas of Search



2.5 Other Offshore Wind Planning/Developments in Scotland

2.5.1 In addition to the strategic planning exercises administered by Scottish Ministers', two additional development zones in Scottish waters were identified by Crown Estate Round 3 in 2010 and have received consent: Moray Firth Eastern Development[27] and Seagreen Alpha and Bravo[28]. The Moray Firth site has since progressed further and obtained a contract to build.

2.5.2 Furthermore, a number of demonstration projects have been developed or are in the process of development within Scottish Waters. The first of these, Beatrice Demonstration, served as an industry trial of deep water bottom-fixed foundations[29]. The Levenmouth Demonstration Turbine[30] provided research opportunities to help drive cost reduction in offshore wind, whilst the Forthwind project[31] will allow 2B Energy to test turbine technology. In addition, Dounreay Trì[32], Hywind Scotland Pilot Park (later opened as Hywind Scotland), and Kincardine[33] were designated as Scottish Floating Demonstrations to further test and refine floating technologies. Also, it is understood that the European Offshore Wind Deployment Centre will be an offshore deployment centre allowing offshore wind developers and supply chain companies to demonstrate technologies in a representative environment before commercial deployment[34].

2.5.3 One of the initial demonstration offshore wind projects, Robin Rigg[35], was developed in Solway Firth and has been operational for around a decade. Table 1 provides a list of all consented offshore wind installations in Scotland.

2.5.4 The sites and options that have come forward from these processes will be considered, where necessary, for the purpose of cumulative assessments within the forthcoming planning process.

[27] Moray Offshore Renewable Power (2018) Moray East – The Project [online] Available at: http://www.morayoffshore.com/moray-east/the-project/ (accessed 12/03/2018)

[28] Seagreen Wind Energy Limited (2018) Home page [online] Available at: http://www.seagreenwindenergy.com/home.asp (accessed 12/03/2018)

[29] Highlands & Islands Enterprise (2016) Talisman Beatrice Project [online] Available at: http://www.hi-energy.org.uk/HI-energy-Explore/talisman-beatrice-project.htm (accessed 23/11/2017)

[30] Levenmouth Demonstration Turbine (2018) [online] Available at https://ore.catapult.org.uk/testing-validation/facilities/demonstration/levenmouth (accessed 21/03/2018)

[31] 2B Energy Forthwind Project [online] Available at http://22benergy.com/application_methil (accessed 21/03/2018)

[32] Hexicon AB (2017) Dounreay Trì [online] Available at: http://www.hexicon.eu/dounreay-tri/ (accessed 24/11/2017)

[33] 4C Offshore (2017) Kincardine Offshore Windfarm Project Offshore Wind Farm [online] Available at: http://www.4coffshore.com/windfarms/windfarms.aspx?windfarmId=UK2H (accessed 24/11/2017)

[34] Vattenfall (2016) European Offshore Wind Deployment Centre [online] Available at: https://corporate.vattenfall.co.uk/projects/wind-energy-projects/european-offshore-wind-deployment-centre/ (accessed 28/11/2017)

[35] e-on (2017) Robin Rigg East and West [online] Available at: https://www.eonenergy.com/about-eon/our-company/generation/our-current-portfolio/wind/offshore/robin-rigg (accessed 24/11/2017)

Table 1. Consented offshore wind installations in Scottish waters

Site	Location	Round or Development Category	Project Capacity	Status
European Offshore Wind Deployment Centre	Scotland, Grampion – North Sea	Demonstration	100MW	Consented
Beatrice	Scotland, Highland – North Sea	Scottish Territorial Waters	588MW	Consented
Beatrice Demonstration	Scotland, Highland – North Sea	Deepwater Demonstration	10MW	Operational; decommissioning announced in May 2017
Dounreay Trì	Scotland, Highland – Scottish Continental Shelf (Fair Isle)	Scottish Floating Demonstration	12MW	Consented
Seagreen Alpha and Bravo	Scotland, Tayside – North Sea	Crown Estate Round 3, DECC SEA 2	1050MW	Consented
Hywind Scotland	Scotland, Grampion – North Sea	Scottish Floating Demonstration	30MW	Operational
Inch Cape	Scotland, Tayside – North Sea	Scottish Territorial Waters	784MW	Consented
Kincardine Offshore Wind Farm	Scotland, Aberdeenshire – North Sea	Scottish Floating Demonstration	50MW	Consented

Moray Firth Eastern Development	Scotland, Highland – North Sea	Crown Estate Round 3, DECC SEA 2	950MW	Consented; contract to build
Neart na Gaoithe	Scotland, Lothian - North Sea	Scottish Territorial Waters	448MW	Consented
Robin Rigg	Scotland, Dumfries & Galloway – Irish Sea	Crown Estate Round 1	174MW	Operational
Forthwind	Scotland, Fife – North Sea	Demonstration	18MW	Consented
Levenmouth Demonstration Turbine	Scotland, Fife – North Sea	Demonstration	7MW	Operational

3 Renewable wind technologies and the potential for environmental effects

3.1 Introduction

3.1.1 To help inform the assessment, the following paragraphs set out an overview of possible technologies that could be deployed alongside a summary of the environmental effects that could arise as a result of their implementation. This overview is based on current technologies that have reached, or are anticipated to reach, technological and commercial readiness in time for the expected implementation of the Draft Plan.

3.1.2 The following paragraphs should not be viewed as an exhaustive list of renewable wind technologies but rather as an indicative summary. Beyond the technologies discussed below, it is possible that other designs could emerge and reach technological and commercial readiness in time for deployment. It should also be noted that it is not within the remit of the Draft Plan and the accompanying SEA to determine the specific technologies that will be installed in the sites arising from the areas of search.

3.1.3 The basic components of an offshore wind installation are[36]:

- wind turbine(s);
- turbine foundation(s), including both bottom-fixed and floating;
- cables, including export cables, array cables, and any associated cable protection;
- offshore substation; and,
- onshore substation.

3.1.4 The potential for impacts can differ depending on the stage of development. The following sections set out to capture effects over each potential stage, such as those that may arise during construction, operation, and decommissioning[37].

3.2 Bottom-fixed technologies

3.2.1 Bottom-fixed foundations are likely to continue to remain viable options for deployment. The most common types are monopile, gravity-based, and space frame (jacket and tripod) foundations[38].

[36] The Crown Estate (2010) A Guide to an Offshore Wind Farm [online] Available at: https://www.thecrownestate.co.uk/media/5408/ei-km-in-sc-supply-012010-a-guide-to-an-offshore-wind-farm.pdf (accessed 23/11/2017)

[37] OSPAR (undated) Offshore Renewables [online] Available at: https://www.ospar.org/work-areas/eiha/offshore-renewables (accessed 22/11/2017)

[38] European Wind Energy Association (2013) Deep water – The next step for offshore wind energy [online] Available at: http://www.ewea.org/fileadmin/files/library/publications/reports/Deep_Water.pdf (accessed 23/11/2017)

3.2.2 Monopile foundations are commonly used within the offshore wind industry due to their straightforward design and ease of installation[39]. They comprise a cylindrical steel tube that is either driven directly into the seabed or inserted into drilled sockets and grouted into place, depending on local conditions[40]. Monopiles can also be adhered to the seabed via suction caissons[41]. To date, monopiles have typically been deployed in waters between 0-30m in depth[42].

3.2.3 Gravity-based foundations have been most successful in shallow waters and in areas where environmental conditions are less harsh[43]. Their generalised design consists of a concrete structure that may be fringed with steel or concrete skirts and is ballasted by either sand, iron ore, or rock poured into the base[44].

3.2.4 Jacket structure foundations are particularly suited to deep waters of up to 50m and for supporting larger turbines[45]. The Beatrice Demonstration, off the coast of Caithness, is the world's deepest installation of a jacket foundation to date, with two turbines installed at depths of 45m[46]. Although there are many variants on their design, the concept centres around a three or four-legged steel jacket/lattice structure with corner piles interconnected with bracings. Similarly, tripod foundations are lightweight three-legged steel structures, with piles driven into the seabed at each leg end to secure the foundation[47]. As with jacket structures, tripod foundations can be installed in deeper waters[48].

Potential environmental effects

3.2.5 One of the primary impacts associated with bottom-fixed offshore wind foundations is underwater noise and vibration generated by seismic surveying and pile driving activities. For example, loud underwater noises within a certain

[39] 4C Offshore (2013) Monopiles Support Structures [online] Available at: http://www.4coffshore.com/windfarms/monopiles-support-structures-aid4.html (accessed 23/11/2017)

[40] The Crown Estate (2010) A Guide to an Offshore Wind Farm [online] Available at: https://www.thecrownestate.co.uk/media/5408/ei-km-in-sc-supply-012010-a-guide-to-an-offshore-wind-farm.pdf (accessed 23/11/2017)

[41] 4C Offshore (2016) Suction Bucket or Caisson Foundations [online] Available at: http://www.4coffshore.com/windfarms/suction-bucket-or-caisson-foundations-aid11.html (accessed 24/11/2017)

[42] 4C Offshore (2013) Monopiles Support Structures [online] Available at: http://www.4coffshore.com/windfarms/monopiles-support-structures-aid4.html (accessed 23/11/2017)

[43] The Crown Estate (2010) A Guide to an Offshore Wind Farm [online] Available at: https://www.thecrownestate.co.uk/media/5408/ei-km-in-sc-supply-012010-a-guide-to-an-offshore-wind-farm.pdf (accessed 23/11/2017)

[44] 4C Offshore (2013) Gravity Based Support Structures [online] Available at: http://www.4coffshore.com/windfarms/gravity-based-support-structures-aid8.html (accessed 23/11/2017)

[45] 4C Offshore (2013) Jacket or Lattice Structures [online] Available at: http://www.4coffshore.com/windfarms/jacket-or-lattice-structures-aid5.html (accessed 23/11/2017)

[46] Highlands & Islands Enterprise (2016) Talisman Beatrice Project [online] Available at: http://www.hi-energy.org.uk/HI-energy-Explore/talisman-beatrice-project.htm (accessed 23/11/2017)

[47] van der Tempel, J. et al. (Department of Offshore Engineering, Delft University of Technology, The Netherlands) (2010) Chapter 17: Design of support structures for offshore wind turbines [online] Available at: https://www.witpress.com/Secure/elibrary/papers/9781845642051/9781845642051017FU1.pdf (accessed 23/11/2017)

[48] Danish Wind Industry Association (undated) Offshore Wind Energy [online] Available at: https://www.boem.gov/Offshore-Wind-Energy/ (accessed 23/11/2017)

range can induce temporary or permanent hearing loss in marine mammals such as the harbor porpoise (*Phoecoena phocoena*)[49] and have been observed to cause disturbance and long term displacement among some species[50]. These impacts could extend to both migratory and resident fish as well as invertebrates. Impacts such as disturbance may be limited to the construction phase and in some cases, species such as marine mammals could return to the area in greater numbers during the operational phase due to greater levels of food and restrictions on fishing activity[51].

3.2.6 The potential impacts of offshore wind energy on bird populations include the risk of collision with turbines[52] and the introduction of barrier effects[53] that can impinge on migration routes and access to sites for foraging and reproduction[54]. The risk of collision could also be relevant to bat populations[55]. Habitat loss through both direct destruction of habitat as well as through displacement[56] can also arise. Cumulative impacts from interactions with other sea activities could further impact on habitat availability and exacerbate displacement from breeding and feeding areas both within wind arrays as well as within neighbouring sites[57].

3.2.7 Bottom-fixed foundations have the potential to give rise to positive impacts on biodiversity. For example, fish species and benthic communities could benefit from the introduction of fishing and trawling prohibitions within the vicinity of wind installations. Bottom-fixed foundations can also provide hard substrate for colonising organisms[58] and result in the creation of artificial reefs. This can

[49] SEAMARCO (2015) Effect of exposure duration to pile driving sounds on temporary hearing threshold shift in harbor porpoises (*Phocoena phocoena*) [online] Available at: https://tethys.pnnl.gov/sites/default/files/publications/Kastelein-et-al-2015.pdf (accessed 22/11/2017)

[50] Teilmann, J. and Carstensen, J. (2012) Negative long term effects on harbour porpoises from a large scale offshore wind farm in the Baltic – evidence of slow recovery – in *Environmental Research Letters* [online] Available at: http://iopscience.iop.org/article/10.1088/1748-9326/7/4/045101/meta (accessed 22/11/2017)

[51] Scheidat, M. et al. (2011) Harbour porpoises (*Phocoena phocoena*) and wind farms: a case study in the Dutch North Sea – in *Environmental Research Letters* [online] Available at: http://iopscience.iop.org/article/10.1088/1748-9326/6/2/025102/meta (accessed 22/11/2017)

[52] JNCC (2015) JNCC Report No: 568 – Seabird Displacement Impacts from Offshore Wind Farms: report of the MROG Workshop, 6-7th May 2015 [online] Available at: http://jncc.defra.gov.uk/pdf/568_web.pdf (accessed 22/11/2017)

[53] ibid

[54] OSPAR (2004) Problems and Benefits Associated with the Development of Offshore Wind-Farms [online] Available at: https://www.ospar.org/about/publications?q=offshore+wind&a=&y=2004&s [online] (accessed 24/11/2017)

[55] IMARES Wageningen UR (2015) A first approach to deal with cumulative effects on birds and bats of offshore wind farms and other human activities in the Southern North Sea [online] Available at: http://library.wur.nl/WebQuery/wurpubs/fulltext/329714 (accessed 22/11/2017)

[56] JNCC (2015) JNCC Report No: 551 – Developing a Habitat Loss Method for Assessing Displacement Impacts from Offshore Wind Farms [online] Available at: http://jncc.defra.gov.uk/pdf/Report%20551_web2.pdf (accessed 22/11/2017)

[57] NERC (2016) Environmental and Consenting Barriers to Developing Floating Wind Farms Including Innovative Solutions [online] Available at: https://s3-eu-west-1.amazonaws.com/media.ore.catapult/wp-content/uploads/2017/03/17113725/Floating-Wind-Farms-Workshop-Dec-2016.pdf (accessed 21/11/2017)

[58] Lindeboom, H.J. et. al. (2011) Short-term ecological effects of an offshore wind farm in the Dutch coastal zone; a compilation – in *Environmental Research Letters* [online] Available at: http://iopscience.iop.org/article/10.1088/1748-9326/6/3/035101/meta (accessed 22/11/2017)

induce a ‘reef effect’ whereby higher trophic levels also increase in number in response to greater food availability, including epibenthic and demersal fauna as well as bentho-pelagic fish[59]. However, there is also a risk of invasive species becoming established[60].

3.2.8 Offshore wind foundations can also function as Fish Aggregating Devices[61], which may have mixed impacts on biodiversity. For example, positive impacts can arise by providing ‘safe zones’ for young fish. However, this could also increase catch volumes in areas where fishing activity is not excluded, leading to potentially negative impacts on fish populations. The latter impact will be dependent upon the level of fishing activity that is permitted within these zones.

3.2.9 The spatial footprint of cabling for offshore wind installations can be extensive. Additionally, cables can emit heat, warming surrounding waters and leading to changes in the benthic environment. This heat can also attract organisms to the area, increasing their exposure to electro-magnetic field (EMF) radiation[62]. Cable landfall and the construction of an onshore substation and associated infrastructure can also lead to coastal effects and other onshore impacts such as alterations to the setting of historic features and disturbance to habitats.

3.2.10 The installation and decommissioning of offshore wind structures may influence oceanographic processes, such as downstream turbulence, surface wave energy, local scour, inflowing currents, and surface upwelling[63], with the magnitude of impacts largely dependent on the size of the arrays. Alterations in hydrodynamics can in turn lead to altered patterns of suspended sediment dispersion and deposition patterns[64]. In addition, disturbance of sediments could compromise local water quality, with associated impacts on marine species but benthic organisms in particular (e.g. filter feeders[65] and fish eggs[66]).

[59] Aurore et al. (2017) Benthic and fish aggregation inside an offshore wind farm: Which effects on the trophic web functioning? – in *Ecological Indicators* [online] Available at: http://archimer.ifremer.fr/doc/00347/45843/46723.pdf (accessed 22/11/2017)

[60] IUCN (2010) Greening blue energy [online] Available at: https://www.iucn.org/content/greening-blue-energy-0 (accessed 22/11/2017)

[61] European Wind Energy Association (2013) Deep Water – The next step for offshore wind energy [online] Available at: http://www.ewea.org/fileadmin/files/library/publications/reports/Deep_Water.pdf (accessed 18/10/2017)

[62] UN Chapter 22. Other Marine-Based Energy Industries [online] Available at: http://www.un.org/depts/los/global_reporting/WOA_RPROC/Chapter_22.pdf (accessed 22/11/2017)

[63] Clark, S., Schroeder, F., and Baschek, B. (2014) The influence of large offshore wind farms on the North Sea and Baltic Sea – comprehensive literature review [online] Available at: https://www.hzg.de/imperia/md/content/hzg/zentrale_einrichtungen/bibliothek/berichte/hzg_reports_2014/hzg_report_2014_6.pdf (accessed 22/11/2017)

[64] COWRIE (2009) Coastal Process Modelling for Offshore Wind Farm Environmental Impact Assessment: Best Practice Guidance [online] Available at: https://www.thecrownestate.co.uk/media/5903/ei-km-ex-pc-physical-092009-coastal-processes-modelling-for-offshore-wind-farm-environmental-impact-assessment-best-practice-guide.pdf (accessed 22/11/2017)

[65] Scottish Government (2013) Draft Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters – Environmental Report Appendix C: Assessment of Technologies [online] Available at: http://www.gov.scot/Publications/2013/07/9591/0 (accessed 24/11/2017)

[66] OSPAR (2004) Problems and Benefits Associated with the Development of Offshore Wind-Farms [online] Available at: https://www.ospar.org/about/publications?q=offshore+wind&a=&y=2004&s [online] (accessed 24/11/2017)

Changes in coastal morphology could also result from cable landfall installation and maintenance as well as altered wave energy regimes[67].

3.2.11 Underwater cultural heritage can be disturbed, destroyed, or buried through surveying and installation procedures[68]. Visual impacts on the landscape, coastline, and seascape can also arise though intrusion, obstruction, changes in the content and focus of views, changes in the reactions and experiences (i.e. attitudes and behaviours) of viewers, and overall changes in visual amenity[69]. Such impacts can extend to coastal monuments and to the setting of historic landscapes and seascapes[70].

3.2.12 Offshore wind energy installations can pose navigational hazards, with the danger of collisions between vessels and turbines. Static structures may also pose an obstacle to maritime emergency operations[71]. It is also possible for wind turbines to lead to visual impacts such as shadow flicker[72], although such effects may not be significant in the context of offshore wind due to their distance from human settlements[73].

3.3 Floating technologies

3.3.1 At present, three floating offshore wind installations have received consent in Scotland: Hywind Scotland, Dounreay Trì, and Kincardine Offshore Floating Windfarm. Of these three, Hywind was officially opened and began delivering electricity to the Scottish grid on 18 October 2017[74].

3.3.2 Floating wind technologies are relatively recent innovations, and as such, are still undergoing a process of technological development. The Technology Readiness Level (TRL) index places a technology along a development spectrum from preliminary research (TRL 1) to comprehensive system

[67] OSPAR (2004) Problems and Benefits Associated with the Development of Offshore Wind-Farms [online] Available at: https://www.ospar.org/about/publications?q=offshore+wind&a=&y=2004&s [online] (accessed 24/11/2017)

[68] UNESCO (2017) Developing the seabed: resource extraction and energy development at sea [online] Available at: http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/protection/threats/developing-the-seabed/ (accessed 23/11/2017)

[69] Department of Trade and Industry (2005) Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report [online] Available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.berr.gov.uk/files/file22852.pdf (accessed 22/11/2017)

[70] UNESCO (2017) Developing the seabed: resource extraction and energy development at sea [online] Available at: http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/protection/threats/developing-the-seabed/ (accessed 23/11/2017)

[71] OSPAR (2004) Problems and Benefits Associated with the Development of Offshore Wind-Farms [online] Available at: https://www.ospar.org/about/publications?q=offshore+wind&a=&y=2004&s [online] (accessed 07/12/2017)

[72] Karydis, M. (2013) Public Attitudes and Environmental Impacts of Wind Farms: A Review [online] Available at: https://journal.gnest.org/sites/default/files/Submissions/932/932_published.pdf (accessed 28/11/2017)

[73] IFC (2015) Environmental, Health, and Safety Guidelines for Wind Energy [online] Available at: https://www.ifc.org/wps/wcm/connect/2c410700497a7933b04cf1ef20a40540/FINAL_Aug+2015_Wind+Energy_EHS+Guideline.pdf?MOD=AJPERES (accessed 29/11/2017)

[74] Statoil (2017) World's first floating wind farm has started production [online] Available at: https://www.statoil.com/en/news/worlds-first-floating-wind-farm-started-production.html (accessed 14/11/2017)

demonstration (TRL 9)[75]. Based on this metric, three floating foundation designs are classified as technologically mature and could therefore be considered as possible candidates for deployment in deep waters around Scotland: the spar buoy, tension leg platform, and semi-submersible. Variants on these also exist, including multi-turbine foundations[76].

3.3.3 The spar buoy design consists of a large cylindrical body that relies on ballast to remain upright and stable[77]. Stability is achieved by situating the centre of gravity lower in the water than the centre of buoyancy, with heavier components to the bottom of the structure and lighter elements nearer to or above the surface[78]. The recently opened Hywind Scotland uses a spar buoy concept developed by Statoil[79].

3.3.4 The tension leg platform involves tethering a highly buoyant platform to the seabed using tensioned tendons attached to a central column and arms[80]. The tendons are kept in place by suction or piled anchors[81]. The downward force of the tendons offsets the excessive buoyancy of the platform, keeping the installation steady in the water[82].

3.3.5 The semi-submersible platform merges elements of the preceding two concepts by combining a structure made up of columns linked by connecting bracings and submerged pontoons with catenary or taut spread mooring lines and drag anchors[83].

[75] CATAPULT (2015) Floating wind: technology assessment – Interim findings [online] Available at: https://ore.catapult.org.uk/wp-content/uploads/2016/05/Floating-wind-technology-assessment-June-2015.pdf (accessed 18/10/2017)

[76] International Renewable Energy Association (2016) Floating Foundations: A Game Changer for Offshore Wind Power [online] Available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_Offshore_Wind_Floating_Foundations_2016.pdf (accessed 19/10/2017)

[77] European Wind Energy Association (2013) Deep water – The next step for offshore wind energy [online] Available at: http://www.ewea.org/fileadmin/files/library/publications/reports/Deep_Water.pdf (accessed 18/10/2017)

[78] Carbon Trust (2015) Floating Offshore Wind: Market and Technology Review [online] Available at: https://www.carbontrust.com/media/670664/floating-offshore-wind-market-technology-review.pdf (accessed 14/11/2017)

[79] 4C Offshore (2017) Hywind Scotland Pilot Park Offshore Wind Farm [online] Available at: http://www.4coffshore.com/windfarms/hywind-scotland-pilot-park-united-kingdom-uk76.html (accessed 24/11/2017)

[80] ibid

[81] International Renewable Energy Agency (2016) Floating Foundations: A Game Changer for Offshore Wind Power [online] Available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_Offshore_Wind_Floating_Foundations_2016.pdf (accessed 19/10/2017)

[82] Muelhner, E. (2017) Tension Leg Platform (TLP) – Encyclopedia of Maritime and Offshore Engineering [online] Available at: http://onlinelibrary.wiley.com/doi/10.1002/9781118476406.emoe400/abstract;jsessionid=D3E0027CCB57F4D0137AAB67FE0AB443.f03t02?userIsAuthenticated=false&deniedAccessCustomisedMessage= (accessed 14/11/2017)

[83] International Renewable Energy Agency (2016) Floating Foundations: A Game Changer for Offshore Wind Power [online] Available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_Offshore_Wind_Floating_Foundations_2016.pdf (accessed 24/11/2017)

3.3.6 All three types of foundation are 'turbine agnostic', which means that theoretically they can accommodate any type of turbine[84]. However, research is currently being undertaken to determine if outfitting floating foundations with bespoke turbines could help optimise performance and reduce costs[85].

3.3.7 Although these represent the most mature designs, it is possible that less advanced designs may achieve technological and commercial readiness in time for deployment. For example, by 2020, it is projected that three to five additional floating foundation designs will have undergone full-scale demonstration at 2MW or more generating capacity[86]. Similarly, new concepts may emerge and evolve to become candidates for deployment.

Potential environmental effects

3.3.8 Many of the potential environmental effects associated with bottom-fixed foundations (and discussed above) remain relevant to floating technologies, particularly those relating to the presence and operation of turbines. It is anticipated that floating technologies will be capable of accommodating even larger turbines than onshore or shallow installations[87], which could increase the risk of impacts associated with their installation and operation (e.g. bird strike).

3.3.9 Both bottom-fixed and floating offshore wind installations can lead to habitat loss, change, or fragmentation. These impacts can be both direct (e.g. destruction of benthic and intertidal habitats due to anchor installation and cable laying) or indirect (e.g. by prompting avoidance behaviour among marine organisms)[88], as well as temporary or permanent.

3.3.10 The primary difference between bottom-fixed and floating wind technologies is that the latter require less invasive installation procedures[89]. However, benthic impacts could still arise from the placement and installation of cables and anchors.

3.3.11 In the case of floating wind technologies, impacts arising from noise from pile driving activities are removed due to the lack of a bottom-fixed foundation[90].

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[84] Carbon Trust (2015) Floating Offshore Wind Market Technology Review [online] Available at: https://www.carbontrust.com/media/670664/floating-offshore-wind-market-technology-review.pdf (accessed 24/11/2017)

[85] ibid

[86] International Renewable Energy Association (2016) Floating Foundations: A Game Changer for Offshore Wind Power [online] Available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_Offshore_Wind_Floating_Foundations_2016.pdf (accessed 19/10/2017)

[87] European Wind Energy Association (2013) Deep water – The next step for offshore wind energy [online] Available at: http://www.ewea.org/fileadmin/files/library/publications/reports/Deep_Water.pdf (accessed 18/10/2017)

[88] OSPAR (2008) Assessment of the environmental impact of offshore wind farms [online] Available at: https://www.ospar.org/documents?v=7114 (accessed 22/11/2017)

[89] International Renewable Energy Agency (2016) Floating Foundations: A Game Changer for Offshore Wind Power [online] Available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_Offshore_Wind_Floating_Foundations_2016.pdf (accessed 24/11/2017)

[90] NERC (2016) Environmental and Consenting Barriers to Developing Floating Wind Farms Including Innovative Solutions [online] Available at: https://s3-eu-west-1.amazonaws.com/media.ore.catapult/wp-content/uploads/2017/03/17113725/Floating-Wind-Farms-Workshop-Dec-2016.pdf (accessed 21/11/2017)

However, acoustic effects could still occur as a result of cable laying and other activities. In addition, novel sounds could be introduced such as mooring lines generating snapping or vibrating noises below water[91]. There is also potential for entanglement risk to marine animals from mooring lines.

3.3.12 Floating technologies require some cables to be suspended within the water column. This could induce EMF in surrounding waters which could impact upon electrosensitive species such as Atlantic salmon, sea trout, and European eel[92], as well as cetaceans which use geomagnetic fields to navigate[93].

3.3.13 There is comparatively little information on deep seas around Scotland[94] and as a result, the presence and spatial extent of sensitive habitats may either be poorly documented or largely unknown. As such, the risk of impacting upon sensitive habitats may be heightened if appropriate surveying activities are not carried out prior to siting and installing floating wind arrays[95].

[91] NERC (2016) Environmental and Consenting Barriers to Developing Floating Wind Farms Including Innovative Solutions [online] Available at: https://s3-eu-west-1.amazonaws.com/media.ore.catapult/wp-content/uploads/2017/03/17113725/Floating-Wind-Farms-Workshop-Dec-2016.pdf (accessed 21/11/2017)

[92] SNH (2010) Literature review on the potential effects of electromagnetic fields and subsea noise from marine renewable energy developments on Atlantic salmon, sea trout and European eel [online] Available at: http://www.snh.org.uk/pdfs/publications/commissioned_reports/401.pdf (accessed 22/11/2017)

[93] COWRIE (2003) A Baseline Assessment of Electromagnetic Fields Generated by Offshore Windfarm Cables [online] Available at: https://www.thecrownestate.co.uk/media/5859/km-ex-pc-emf-072003-a-baseline-assessment-of-electromagnetic-fields-generated-by-offshore-windfarm-cables.pdf (accessed 22/11/2017)

[94] Scottish Government (2011) Scotland's Marine Atlas: Information for the National Marine Plan – Chapter 02 Physical Characteristics [online] Available at: http://www.gov.scot/Publications/2011/03/16182005/23 (accessed 23/11/2017)

[95] ibid

4 The approach to the assessment

4.1 Purpose and scope of the assessment

4.1.1 The purpose of this section of the report is to determine the likelihood, nature, and significance of any environmental effects that may arise in the areas of search identified as part of the development of a new Draft Sectoral Marine Plan for Offshore Wind Encompassing Deep Water Options ('the Draft Plan').

4.1.2 As discussed earlier, this joint Screening/Scoping Report represents one component of a wider assessment process that will also involve the gathering of socio-economic information, the production of a HRA, and a round of public consultation.

Relationship between this SEA and previous assessments

4.1.3 A considerable amount of work has already been undertaken to explore the environmental effects of a range of activities within the UK and Scottish marine environment. Of particular relevance are the SEAs that were previously undertaken on both the 2011 Sectoral Marine Plan for Offshore Wind[96] and its 2013 review[97]. It is expected that this SEA will build upon, rather than duplicate, the information and findings of the respective Environmental Reports that were produced as part of these assessments.

4.1.4 It is also proposed that the assessment methodology build upon that which underpinned these previous assessments. Taking this approach should to help ensure a consistency in the assessment of offshore wind energy development in Scotland.

Scope of the assessment

4.1.5 Following a review of these previous SEAs, as well as relevant academic and grey literature, it is proposed that the scope of the present SEA assessment should include:

- Biodiversity, Flora, and Fauna;
- Population and Human Health;
- Soil (namely, Marine Geology and Coastal Processes);
- Water Quality;
- Climatic Factors;
- Cultural Heritage; and
- Landscape, Seascape, and Visual Amenity.

[96] Scottish Government (2010) Strategic Environmental Assessment (SEA) of Draft Plan for Offshore Wind Energy in Scottish Territorial Waters: Volume 1: Environmental Report [online] Available at: http://www.gov.scot/Resource/Doc/312161/0098588.pdf (accessed 21/11/2017)

[97] Scottish Government (2013) Planning Scotland's Seas: SEA of Plans for Wind, Wave and Tidal Power in Scottish Marine Waters Environmental Report [online] Available at: http://www.gov.scot/Resource/0042/00428212.pdf (accessed 21/11/2017)

Further, the assessment should be comprehensive and include consideration of the likely significant effects on the marine, coastal, and terrestrial environments.

4.1.6 At this stage, it is considered that significant environmental effects on 'Air Quality' are unlikely to arise through the implementation of the Draft Plan. As such, it is it is proposed that this topic be scoped out of the assessment.

4.1.7 The SEA topic of 'Material Assets' encompasses a broad range of subtopics that include both built and natural assets and it is proposed that relevant issues be assessed under corresponding SEA topic areas. For example, it is proposed that potential impacts as they relate to nursery and spawning grounds be covered under the topic of 'Biodiversity, Flora, and Fauna'. Similarly, it is felt that infrastructure could be given consideration under the topic of 'Climatic Factors' with regard to the promotion of a diverse and decarbonised energy sector. As such, it is proposed that 'Material Assets' be scoped out of the assessment. This mirrors the approach taken in the previous assessment work[98].

4.1.8 The effects on other marine users, such as the potential displacement of fishing activity, recreational boating, and tourism, will be adequately considered by the accompanying socio-economic assessment. Issues of navigational safety and collision risk for vessels will be covered, as far as possible, within the topic of 'Population and Human Health'.

4.1.9 A summary of this proposed scope is presented in Table 2.

4.1.10 The views of the Consultation Authorities, consultation bodies, Member States, and members of the public on the proposed scope are now being sought.

[98] Scottish Government (2013) Planning Scotland's Seas: SEA of Plans for Wind, Wave and Tidal Power in Scottish Marine Waters Environmental Report [online] Available at: http://www.gov.scot/Resource/0042/00428212.pdf (accessed 21/11/2017)

Table 2. Scoping in/out of SEA Topics

SEA Topic	Scoped In/Out	Potential Effects
Biodiversity, Flora, and Fauna	In	- loss of and/or damage to marine and coastal habitats, including benthic and intertidal habitats (for example, due to smoothing of benthic habitats and substratum loss) - effects on species, including disturbance, noise impacts, EMF exposure, collision risk, habitat exclusion, and barriers to wildlife movement - positive effects arising from habitat enhancement, such as the creation of artificial reefs - effects of pollution releases on both species and habitats
Population and Human Health	In	- impacts arising from noise, vibration, and shadow flicker effects - impacts on residential amenity stemming from construction/installation/operational activities - issues of navigational safety and collision risk - effects on marine and coastal recreation and access (note: recreation and tourism are also likely to be considered as part of the complementary socio-economic assessment work)
Soil (Marine Geology and Coastal Processes)	In	- effects on subsea geology, sediments, and coastal processes arising from changes in hydrodynamics and the existing wave regime
Water Quality	In	- effects on ecological status - effects on water quality (for example, due to increases in suspended sediment loads and turbidity as well as an increase in pollution incidents) - effects of the presence of structures on local currents, wave regimes, and water column mixing, as well as secondary effects on sedimentation and erosion beyond the sites
Climatic Factors	In	- contribution to supporting a diverse and decarbonised energy sector - coastal facilities may be at risk from climate change
Cultural Heritage	In	- loss of and/or damage to historic environment features and their settings, including coastal and marine archaeology
Landscape, Seascape, and Visual Amenity	In	- both temporary and longer term effects on landscape, seascape, and visual amenity arising from the presence of structures

4.2 Proposed approach to the assessment

Assessment methodology

4.2.1 The SEA will be undertaken as a high level assessment, reflecting the national level perspective the Draft Plan will take. Specifically, it is proposed that the SEA take the form of a baseline-led assessment which will compare the potential impacts of the Draft Plan against the current receiving environment in order to assess the significance of any environmental effects that could arise.

4.2.2 The assessment is likely to include the use of:

- SEA objectives;
- spatial information, such as that gathered using Scottish Government's Geographic Information System (GIS); and,
- available relevant research regarding known environmental impacts arising from offshore wind. This will include making reference to emerging monitoring information from existing installations across Scotland.

4.2.3 It is proposed that the SEA objectives developed for previous assessment work[99] set a sound basis for taking forward this SEA. As such, these have been 'brought forward' and updated as necessary to reflect the environmental protection objectives and key environmental issues relevant to taking forward this assessment.

4.2.4 The proposed SEA objectives are set out below in Table 3.

Table 3. Proposed SEA Objectives

SEA Topics	Proposed SEA Objective
Biodiversity, Flora, and Fauna	• to safeguard marine and coastal ecosystems, including species, habitats, and their interactions • to avoid adverse effects on both designated and non-designated habitats and species (note: this work will be developed in parallel with the HRA work)
Population and Human Health	• to maintain the accessibility of natural areas for recreation • to minimise or prevent the discharge of pollutants into the natural environment • to avoid adverse effects on human health and safety
Water Quality	• to avoid pollution of the coastal and marine water environment • to maintain or work towards achieving good ecological status
Soil (Marine Geology and Coastal Processes)	• to avoid exacerbating coastal erosion and maintain the integrity of coastal processes • to maintain and protect the character and integrity of the seabed, including avoiding the pollution of seabed strata/bottom sediments

[99] See Table 4.2 ('Proposed SEA Objectives)' in 'Scotland's 2nd Sectoral Marine Plan for Offshore Wind Energy – Strategic Environmental Assessment Screening and Scoping Report (August 2012)': http://www.gov.scot/Topics/Environment/environmental-assessment/sea/SEAG

Climatic Factors	• to contribute to a diverse and decarbonised energy sector • to ensure that adaptation to predicted climate change impacts are taken into account (for example, through consideration of resilience and changing environmental sensitivity) • to preserve marine carbon stocks and carbon sequestration potential (note: this objective is closely linked to the SEA topic of 'Biodiversity, Flora, and Fauna')
Cultural Heritage	• to protect and, where appropriate, enhance, the historic marine environment • to avoid damage to known and unknown coastal and marine archaeology • to avoid adverse effects on the character and setting of historic sites and buildings
Landscape, Seascape, and Visual Amenity	• to avoid or minimise adverse effects on landscape, seascape, and visual amenity • to promote the protection of seascape and coastal landscapes • to avoid or minimise adverse visual effects

4.3 Identifying mitigation and monitoring proposals

4.3.1 Mitigation measures will be identified as an integral part of the development of the proposed areas of search. In addition, mitigation may also be identified through the assessment process.

4.3.2 Monitoring proposals are likely to focus on the significant environmental effects that are identified during the course of the work undertaken to identify the areas of search, as a result of the SEA, as well as following implementation of mitigation measures where appropriate. Where possible, existing data sources and indicators will be linked with relevant indicators to minimise resourcing requirements for additional data collection.

4.4 Consideration of reasonable alternatives

4.4.1 The development of the final Plan will be an iterative process that will give regular consideration to reasonable alternatives, based in part on assessment findings and input from consultees.

4.4.2 Initially, the development process will seek to identify prospective areas of search in which wind energy could be pursued. The prospective areas of search themselves constitute reasonable alternatives as they represent different options for fulfilling the objectives of the Draft Plan, based on varying levels of constraint and opportunity.

4.4.3 The areas of search will be refined into a number of potential plan options from which a set of Draft Plan Options will be derived. Within each Draft Plan Option, micrositing will allow additional opportunities to compile and select from reasonable alternatives.

4.5 Cumulative effects

4.5.1 The SEA will assess the cumulative effects that could arise from the designation of the areas of search at a regional scale. In-combination impacts arising from the fulfillment of the Draft Plan in conjunction with other forms of marine development, such as the sites adopted as part of the Blue Seas – Green Energy work, will also be considered.

4.6 Assessment framework

4.6.1 The results of the assessment are likely to be presented as a summarised narrative supported by detailed assessment matrices. The narrative is likely to include information such as:

- the baseline characteristics of the areas likely to be affected;
- the results of the environmental assessment; and
- proposed mitigation.

5 Policy context and environmental baseline

5.1 Purpose of this section

5.1.1 The 2005 Act and 2004 Regulations require Responsible Authorities to identify the broader policy context and environmental protection objectives relevant to the plan, programme, or strategy (PPS) that is being assessed. The immediate policy context for the development of the Draft Plan was set out in Section 2. The following paragraphs set out the broader policy environment in terms of relationships and interactions that could emerge between the Draft Plan and other PPS.

5.1.2 It is also a requirement of the 2005 Act and 2004 Regulations that Responsible Authorities provide details of the character of the environment which may be affected, including any existing pressures and the likely evolution of the environment in the absence of the PPS. The baseline information is intended to help demonstrate how the receiving environment may be impacted by the implementation of the Draft Plan.

5.2 Policy context for marine planning and offshore wind energy in Scotland

5.2.1 The following paragraphs set out the broader policy context relevant to the development of the Draft Plan. This policy context is reiterated within Figure 3.

Marine policy

5.2.2 At an international level, the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic integrated and updated the 1972 Oslo and 1974 Paris Conventions on land-generated sources of marine pollution[100]. Specifically, it added an annex covering the protection and conservation of marine ecosystems and biodiversity[101].

5.2.3 The EU Marine Strategy Framework Directive obligates Member States to develop adaptive management strategies to bring their marine environments to Good Environmental Status by 2020 as well as to safeguard the marine resources that underlie key economic and social activities[102]. It allocates responsibility for the marine environment via a regional approach that in the case of the UK, makes use of the existing cooperative framework of the

[100] OSPAR Commission (2017) OSPAR Convention [online] Available at: https://www.ospar.org/convention (accessed 31/08/2017)

[101] ibid

[102] European Commission (2017) Our Oceans, Seas and Coasts [online] Available at: http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm (accessed 31/08/2017)

OSPAR Convention[103]. The Directive is implemented within the UK via a three-part Marine Strategy[104].

5.2.4 European Directive 2014/89/EU serves as a common framework for maritime spatial planning across Europe[105]. It recognises that a comprehensive and consistent approach to maritime planning can prevent conflicts between sectors, increase cross-border cooperation, and protect the environment by identifying potential impacts early and pursuing opportunities for multiple uses of space[106]. Within Scotland, the principles of the Directive are enacted through the National Marine Plan.

5.2.5 The UK Marine Policy Statement provides a vision of 'clean, healthy, safe, productive, and biologically diverse oceans and seas' that is shared by all UK countries and used to guide their respective marine management strategies[107].

5.2.6 The Marine (Scotland) Act 2010 strives to help balance competing demands on Scotland's inshore seas[108]. It introduced a duty to protect and enhance the marine natural and historic environment while at the same time streamlining the marine planning and licensing system[109]. It also contains measures intended to boost growth in areas such as marine renewables[110].

5.2.7 The Marine and Coastal Access Act 2009 devolved new marine planning and conservation powers to Scottish Ministers in the offshore region (12-200nm), in addition to providing a framework for cooperative management of the marine environment between Scottish Ministers and UK Government[111].

5.2.8 Scotland's National Marine Plan fulfils joint requirements under the Marine (Scotland) Act 2010 and Marine and Coastal Access Act 2009 to prepare marine plans, providing a cohesive approach to the management of both inshore and offshore waters[112] in accordance with EU Directive 2014/89/EU[113]

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[103] JNCC (2013) The Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention) [online] Available at: http://jncc.defra.gov.uk/page-1370 (accessed 31/08/2017)

[104] JNCC (2016) EU Marine Strategy Framework Directive [online] Available at: http://jncc.defra.gov.uk/page-5193 (accessed 25/01/2017)

[105] European Commission (2014) Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning [online] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.257.01.0135.01.ENG%20 (accessed 01/09/2017)

[106] European Commission (2017) Maritime spatial planning [online] Available at: https://ec.europa.eu/maritimeaffairs/policy/maritime_spatial_planning_en (accessed 07/12/2017)

[107] Scottish Government (2015) UK Marine Policy Statement [online] Available at: http://www.gov.scot/Topics/marine/seamanagement/international/MPS (accessed 01/09/2017)

[108] Scottish Government (2017) Marine (Scotland) Act [online] Available at: http://www.gov.scot/Topics/marine/seamanagement/marineact (accessed 01/09/2017)

[109] ibid

[110] ibid

[111] Marine and Coastal Access Act 2009, 2009/Chapter 23 [online] Available at: https://www.legislation.gov.uk/ukpga/2009/23/introduction (accessed 07/12/2017)

[112] Scottish Government (2014) Scotland's National Marine Plan – A Single Framework for Managing Our Seas [online] Available at: http://www.gov.scot/Resource/0047/00475466.pdf (accessed 01/09/2017)

[113] European Commission (2014) Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning [online] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.257.01.0135.01.ENG%20 (accessed 01/09/2017)

on maritime spatial planning. It seeks to promote development in a way that is compatible with the protection and enhancement of the marine environment[114].

5.2.9 In the context of offshore wind and marine renewable energy, the National Marine Plan lists several objectives and policies to serve as considerations in marine planning and decision making[115]. Among these are the sustainable development of offshore wind in the most suitable locations and the sustainable development and expansion of test and demonstration facilities for offshore wind and marine renewable devices[116].

Offshore wind and renewables policy

5.2.10 The EU Renewable Energy Directive 2009/28/EC states that 20% of Europe's energy usage must derive from renewable sources by 2020. The 20% figure is an aggregate total made up of individual Member State targets that differ according to each State's starting point and capacity to pursue additional renewable energy generation[117]. Mechanisms and timelines for meeting these targets are detailed in each country's national renewable energy action plan. In November 2016, proposals for a framework of new targets including a 2030 target of at least 27% of energy supplied by renewables, was introduced[118].

5.2.11 Scotland initially committed to obtaining 20% of its energy needs from renewables by 2020[119], surpassing the 15% target set for the UK as a whole. This target was later increased from 20% to at least 30% by the 2020 Routemap for Renewable Energy[120] in light of a complementary increase in the 2020 target for renewable electricity[121].

5.2.12 The Scottish Energy Strategy[122], published in December 2017, set a target of securing 50% of total energy usage[123] from renewable sources as well as a

[114] Scottish Government (2014) Scotland's National Marine Plan – A Single Framework for Managing Our Seas [online] Available at: http://www.gov.scot/Resource/0047/00475466.pdf (accessed 01/09/2017)

[115] Scottish Government (2015) Scotland's National Marine Plan – 11. Offshore Wind and Marine Renewable Energy [online] Available at: http://www.gov.scot/Publications/2015/03/6517/12 (accessed 01/11/2017)

[116] ibid

[117] European Commission (2009) Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC [online] Available at: http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0028 (accessed 02/11/2017)

[118] European Commission (2014) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A policy framework for climate and energy in the period from 2020 to 2030 [online] Available at: http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52014DC0015 (accessed 02/11/2017)

[119] Scottish Government (2009) Renewables Action Plan [online] Available at: http://www.gov.scot/Publications/2009/07/06095830/0 (accessed 24/11/2017)

[120] Scottish Government (2011) 2020 Routemap for Renewable Energy [online] Available at: http://www.gov.scot/Publications/2011/08/04110353/0 (accessed 29/11/2017)

[121] Scottish Government (2013) Electricity Generation Policy Statement – 2013 [online] Available at: http://www.gov.scot/Publications/2013/06/5757 (accessed 29/11/2017)

[122] Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: http://www.gov.scot/Resource/0052/00529523.pdf (accessed 29/11/2017)

[123] This encompasses energy used for heat, transport, and electricity.

30% increase in the productivity of energy use across the Scottish economy by 2030. The Strategy lists renewables and low carbon solutions as a strategic priority, including exploring new opportunities for floating offshore wind.

5.2.13 Licenses for offshore wind energy developments are covered by the Marine (Scotland) Act 2010 for those components located within territorial sea limits (i.e. to 12nm from shore)[124] and by the Marine and Coastal Access Act 2009 for those lying outside the territorial boundary (i.e. beyond 12nm from shore)[125]. Onshore aspects such as cable connections are regulated by the Town and Country Planning (Scotland) Act 1997, with applications administered by the relevant planning authority[126].

5.2.14 Section 36 of the Electricity Act 1989 mandates that the construction, extension, and operation of any offshore wind and water driven developments with a generating capacity of at least 1MW in UK territorial waters must receive Ministerial approval[127].

5.3 Environmental protection objectives

5.3.1 The following paragraphs present an overview of existing environmental protection objectives of relevance to the Draft Plan.

Biodiversity, Flora, and Fauna policy

5.3.2 At the European level, the Natura 2000[128] network is the primary vehicle for meeting the collective aims of the Habitats (92/43/EEC)[129] and Birds (2009/147/EC)[130] Directives. These focus on the maintenance and enhancement of biodiversity, with an emphasis on protecting rare and endangered wild species and natural habitats of European significance. The Natura 2000 network comprises terrestrial and marine Special Areas of Conservation and Special Protection Areas. Many of the terrestrial sites are also underpinned by Sites of Special Scientific Interest[131].

[124] Scottish Government (2017) Marine (Scotland) Act [online] Available at: http://www.gov.scot/Topics/marine/seamanagement/marineact (accessed 01/09/2017)

[125] Marine and Coastal Access Act 2009, 2009/Chapter 23 [online] Available at: https://www.legislation.gov.uk/ukpga/2009/23/introduction (accessed 07/12/2017)

[126] Town and Country Planning (Scotland) Act 1997, 1997/Chapter 8 [online] Available at: https://www.legislation.gov.uk/ukpga/1997/8 (accessed 29/11/2017)

[127] Scottish Government (2006) A Strategic Framework for Scotland's Marine Environment – Annex 3 – Marine Development Consents [online] Available at: http://www.gov.scot/Publications/2004/04/19253/35971 (accessed 29/11/2017)

[128] Scottish Government (2016) Natura 2000 [online] Available at: http://www.gov.scot/Topics/Environment/Wildlife-Habitats/protectedareas/NATURA (accessed 29/03/2017)

[129] European Commission (1992) The Habitats Directive [online] Available at: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm (accessed 29/03/2017)

[130] European Commission (2009) The Birds Directive [online] Available at: http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm (accessed 29/03/2017)

[131] Scottish Natural Heritage (2016) Sites of Special Scientific Interest [online] Available at: http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/sssis/ (accessed 29/03/2017)

5.3.3 International policies provide a framework for the conservation, protection, and sustainable use of biodiversity, flora, and fauna. In relation to the marine and coastal environment, this includes planning for sustainable fisheries and mariculture, the protection of migratory species including birds and fish stocks as well as marine and coastal habitats, and the management of non-native invasive species. These are often set out within the context of taking an ecosystem approach to the management and restoration of marine and coastal environments. European and Scottish policy reflect the objectives of an ecosystem approach and action for priority species and habitats, with particular reference to the protection of seals and sustainable management of fish stocks. Building resilience to climate change is also a cross-cutting theme.

5.3.4 The 2020 Challenge for Scotland's Biodiversity[132] is Scotland's response to the UN Aichi Targets for 2020[133] and the EU Biodiversity Strategy to 2020[134]. The 2020 Challenge supplements the 2004 Scottish Biodiversity Strategy[135] and lends further support to the development of a Scottish Marine Plan and a network of Marine Protected Areas. It also seeks to preserve and restore the health of Scotland's ecosystems at a catchment-scale and promote climate change resilience.

Population and Human Health policy

5.3.5 Directive 2012/18/EU (the Seveso III Directive) strengthens preceding legislation aimed at reducing the incidence of major industrial accidents as well as preemptively mitigating their environmental effects, with an emphasis on limiting consequences to human health[136]. The Directive is implemented in the UK through the Control of Major Accident Hazards Regulations 2015[137].

5.3.6 The Bathing Water Directive 2006/7/EC safeguards public health by imposing minimum water quality standards on both terrestrial and maritime bathing waters[138]. Member States have a responsibility to monitor concentrations of

[132] Scottish Government (2013) 2020 Challenge for Scotland's Biodiversity: A Strategy for the conservation and enhancement of biodiversity in Scotland [online] Available at: http://www.gov.scot/Resource/0042/00425276.pdf (accessed 29/03/2017)

[133] Convention on Biological Diversity (2010) Aichi Biodiversity Targets [online] Available at: https://www.cbd.int/sp/targets/default.shtml (accessed 29/03/2017)

[134] European Commission (2011) European Biodiversity Strategy to 2020 [online] Available at: http://ec.europa.eu/environment/nature/info/pubs/docs/brochures/2020%20Biod%20brochure%20final%20lowres.pdf (accessed 29/03/2017)

[135] Scottish Government (2004) Scotland's Biodiversity Strategy: It's in Your Hands – A strategy for the conservation and enhancement of biodiversity in Scotland [online] Available at: http://www.scotland.gov.uk/Publications/2004/05/19366/37239 (accessed 26/10/2015)

[136] European Commission (2012) Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC [online] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0018 (accessed 29/11/2017)

[137] The Control of Major Accident Hazards Regulations 2015, SI 2015/483 [online] Available at: http://www.legislation.gov.uk/uksi/2015/483/introduction/made (accessed 29/11/2017)

[138] European Commission (2006) Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC [online] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006L0007 (accessed 24/11/2017)

certain bacteria and to inform the public about water quality and beach management.

5.3.7 The Land Reform (Scotland) Act 2003 introduced a new right of responsible access covering Scottish onshore, inland water, and coastal environments[139]. The Land Reform (Scotland) Act 2016 received royal assent on 22 April 2016, making minor amendments to the previous Act.

5.3.8 There are also measures in place to protect against human exposure to noise pollution and disturbance from vibration. These are entrenched in both the Environmental Noise Directive (2002/49/EC)[140] at the European level and the Environmental Protection Act 1990[141] and Environmental Noise (Scotland) Regulations 2006[142] at the UK and national levels, respectively.

Soil (Marine Geology and Coastal Processes) policy

5.3.9 EU Directive 2014/89/EU (the Maritime Spatial Planning Directive) consolidated and expanded upon the fundamental aspects of the Council Recommendation on Integrated Coastal Zone Management of 2002 and the Protocol to the Barcelona Convention on Integrated Coastal Zone Management of 2010[143], obligating Member States to develop coastal management strategies. It aims to coordinate the development and delivery of policies across a wide spectrum of both marine and terrestrial activities, including offshore wind energy, in a way that is mindful of the natural limits of the coastal environment[144].

5.3.10 In Scotland, Integrated Coastal Zone Management is achieved via the work of seven Local Coastal Partnerships[145]. In addition, Marine Scotland Science is responsible for monitoring, research, and regulation of certain coastal activities.

5.3.11 At present, there is no legislative or policy tool developed specifically for the protection of soil[146]. However, designations and their associated management agreements and operations often extend protection to soil as a means of enhancing the biodiversity, geodiversity, landform value, and cultural resources

[139] Land Reform (Scotland) Act 2003, 2003 asp 2 [online] Available at: https://www.legislation.gov.uk/asp/2003/2/introduction (accessed 29/11/2017)

[140] European Commission (2002) Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise – Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise [online] Available at: http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32002L0049 (accessed 29/11/2017)

[141] Environmental Protection Act 1990, 1990/Chapter 43 [online] Available at: http://www.legislation.gov.uk/ukpga/1990/43/introduction (accessed 29/11/2017)

[142] The Environmental Noise (Scotland) Regulations 2006, 2006 SSI No. 465 [online] Available at: http://www.legislation.gov.uk/ssi/2006/465/introduction/made (accessed 29/11/2017)

[143] European Commission (2016) Integrated Coastal Management [online] Available at: http://ec.europa.eu/environment/iczm/index_en.htm (accessed 21/11/2017)

[144] European Commission (2014) Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning [online] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0089

[145] Scottish Government (2014) Managing Scotland's Coastline [online] Available at: http://www.gov.scot/Topics/marine/marine-environment/coast (accessed 28/11/2017)

[146] Scottish Government (2009) The Scottish Soil Framework [online] Available at: http://www.gov.scot/Publications/2009/05/20145602/0 (accessed 21/11/2017)

of the site[147]. For example, marine geology forms part of the basis for the designation of MPAs within Scottish waters[148]. Specifically, MPAs strive to protect rare and representative marine species, habitats, and geodiversity, the latter defined as the variety of landforms and natural processes that underpin the marine landscape.

5.3.12 The Scottish Soil Framework places the sustainable management of soils within the context of the economic, social, and environmental needs of Scotland[149]. The Framework identifies 13 key soil outcomes such as protecting soil biodiversity, reducing and remediating soil erosion, and tackling GHG emissions. The Framework also notes the impacts that rising sea levels and associated seasonal incursion by seawater could have on coastal soils.

Water Quality policy

5.3.13 The International Convention for the Prevention of Pollution from Ships (MARPOL) regulates accidental and operational releases of pollutants into the marine environment by the shipping industry, including oil and other chemicals[150].

5.3.14 The EU's Water Framework Directive (2000/60/EC) (WFD) was introduced as a more comprehensive approach to managing and protecting Europe's water bodies including rivers, lochs, transitional waters, coastal waters, and groundwater resources[151]. The WFD sets out a requirement for an assessment of both chemical and ecological status and has a goal of bringing all European waters to 'Good' status. The Marine Strategy Framework Directive extends the requirements of the WFD into seas beyond 1nm.

5.3.15 Scotland fulfils its water protection obligations under the WFD primarily through the Water Environment and Water Services (Scotland) Act 2003[152], which defines the establishment of River Basin Management Plans[153], and the Water Environment (Controlled Activities) (Scotland) Regulations 2011[154]. Other relevant legislation includes the Pollution Prevention and Control (Scotland)

[147] Scottish Government (2009) The Scottish Soil Framework [online] Available at: http://www.gov.scot/Publications/2009/05/20145602/0 (accessed 21/11/2017)

[148] Scottish Government (2016) Nature Conservation MPAs [online] Available at: http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/ncmpas (accessed 23/11/2017)

[149] Scottish Government (2009) The Scottish Soil Framework [online] Available at: http://www.gov.scot/Publications/2009/05/20145602/0 (accessed 21/11/2017)

[150] MARPOL (2017) International Convention for the Prevention of Pollution from Ships (MARPOL) [online] Available at: http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx (accessed 29/11/2017)

[151] European Commission (2000) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy [online] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060 (accessed 27/11/2017)

[152] Water Environment and Water Services (Scotland) Act 2003, asp 3 [online] Available at: http://www.legislation.gov.uk/asp/2003/3/pdfs/asp_20030003_en.pdf (accessed 21/11/2017)

[153] SEPA (2016) River Basin Management Planning [online] Available at: http://www.sepa.org.uk/environment/water/river-basin-management-planning/ (accessed 21/11/2017)

[154] The Water Environment (Controlled Activities) (Scotland) Regulations 2011, SSI No. 206 [online] Available at: http://www.legislation.gov.uk/ssi/2011/209/pdfs/ssi_20110209_en.pdf (accessed 21/11/2017)

Regulations 2012, which applies specifically to pollution originating from industry discharges[155].

5.3.16 The EU Floods Directive (2007/60/EC)[156] is implemented at the national level through the Flood Risk Management (Scotland) Act 2009[157]. The Directive mandates the creation of flood risk management plans for all inland and coastal areas at risk of flooding, integrating their development and deployment with existing River Basin Management Plans. Flood risk management plans are designed to minimise negative impacts due to flooding on a range of receptors, including human health, the environment, and cultural heritage.

Climatic Factors policy

5.3.17 In November 2016, the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement came into force[158]. The Paris Agreement is the first legally binding global climate deal and sets out aims to limit global warming to well below 2°C as well as pursue further efforts to limit it to 1.5°C [159]. A further long term goal is to achieve net-zero levels of global greenhouse gas (GHG) emissions by the second half of this century. The Agreement also covers a range of other issues such as mitigation through reducing emissions, adaptation, and loss and damage[160].

5.3.18 The Climate Change (Scotland) Act 2009 creates the statutory framework for GHG emissions reductions in Scotland. It sets a target for a reduction in emissions of the basket of Kyoto Protocol GHGs[161] of 80% by 2050 as compared to the 1990/1995 baseline levels, alongside an interim target of a 42% reduction by 2020. These targets are currently being revisited through proposals for a new Climate Change Bill which recently underwent both SEA and public consultation[162]. Proposals include increasing the ambition of the 2050 target to a 90% GHG emissions reduction from baseline and an interim 2040 target of at least a 78% reduction in GHG emissions from baseline levels.

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[155] The Pollution Prevention and Control (Scotland) Regulations 2012, SSI No. 306 [online] Available at: http://www.legislation.gov.uk/ssi/2012/360/introduction/made (accessed 21/11/2017)

[156] European Commission (2007) The EU Floods Directive [online] Available at: http://ec.europa.eu/environment/water/flood_risk/ (accessed 21/06/2017)

[157] Flood Risk Management (Scotland) Act 2009, asp 6 [online] Available at: http://www.legislation.gov.uk/asp/2009/6/pdfs/asp_20090006_en.pdf (accessed 21/06/2017)

[158] UNFCC (2016) The Paris Agreement [online] Available at: http://unfccc.int/paris_agreement/items/9485.php (accessed 22/06/2017)

[159] European Commission (2016) Paris Agreement [online] Available at: http://ec.europa.eu/clima/policies/international/negotiations/paris/index_en.htm (accessed 22/06/2017)

[160] European Commission (2016) Paris Agreement [online] Available at: http://ec.europa.eu/clima/policies/international/negotiations/paris/index_en.htm (accessed 22/06/2017)

[161] The basket of Kyoto Protocol greenhouse gases comprises carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), for which the baseline is 1990; and hydrofluorocarbons (HFCs; C_nH_xF), perfluorocarbons (PFCs; C_xF_y), and sulphur hexafluoride (SF_6), for which the baseline is 1995. Nitrogen triflouride (NF_3) has subsequently been added and applies to the second commitment period of 2013-20.

[162] Scottish Government (2017) Climate Change Bill – Consultation Paper [online] Available at: http://www.gov.scot/Publications/2017/06/8208/0 (accessed 02/11/2017)

5.3.19 The Marine (Scotland) Act 2010 specifies a duty for Ministers and the public sector to manage and progress actions within the marine environment in a way 'best calculated to mitigate, and adapt to, climate change so far as is consistent with the proper exercise of that function'[163]. Scotland's National Marine Plan[164] considers climate change in terms of how actions undertaken within the Plan can help to mitigate GHG emissions, in addition to how these actions also need to be adapted to take into account the effects of climate change. The Plan also stipulates that the development and use of the marine environment should not have a significant impact on the national status of Priority Marine Features, several of which are known for their role in carbon sequestration.

5.3.20 Scotland's Climate Change Adaptation Framework, alongside the 12 Sector Action Plans, set out the potential impacts of climate change on individual sectors and the ways in which these sectors will need to respond to address these impacts. In the case of the marine sector, this includes the need to safeguard critical marine carbon sinks such as tidal salt marshes, seagrass meadows, and kelp forests[165]. Additionally, Scotland's Climate Change Adaption Programme[166] lists actions such as conserving marine carbon stores in addition to highlighting the need to better understand the role of blue carbon ecosystems in carbon sequestration[167]. The role of marine planning and Marine Protected Areas in protecting these ecosystems is also noted[168].

Cultural Heritage policy

5.3.21 The UNESCO Convention on the Protection of the Underwater Cultural Heritage obligates signatories to take steps to preserve their underwater heritage both within territorial waters and as well as throughout their Exclusive Economic Zone[169]. Article 5 refers to activities that could incidentally affect underwater cultural heritage, such as offshore wind energy generation.

5.3.22 The Joint Nautical Archaeology Policy Committee Code of Practice for Seabed Developers is a voluntary code of practice[170]. It provides a framework that seabed developers can follow to ensure their activities are sympathetic to

[163] Marine (Scotland) Act 2010, asp 5 [online] Available at: http://www.legislation.gov.uk/asp/2010/5/pdfs/asp_20100005_en.pdf (accessed 04/09/2017)

[164] Scottish Government (2015) Scotland's National Marine Plan [online] Available at: http://www.gov.scot/Publications/2015/03/6517 (accessed 22/06/2017)

[165] Scottish Government (2011) Sector Action Plans – Marine - Actions for Sector [online] Available at: http://www.gov.scot/Topics/Environment/climatechange/scotlands-action/adaptation/AdaptationFramework/SAP/MarineandFisheries/Actions (accessed 01/09/2017)

[166] Scottish Government (2014) Climate Ready Scotland Scottish Climate Change Adaptation Programme – Part 2 – The Adaptation Programme [online] Available at: http://www.gov.scot/Publications/2014/05/4669/4 (accessed 01/09/2017)

[167] ibid

[168] ibid

[169] UNESCO (2001) Text of the 2001 Convention on the Protection of the Underwater Cultural Heritage [online] Available at: http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/2001-convention/official-text/ (accessed 28/11/2017)

[170] The Crown Estate (2006) Maritime Cultural Heritage & Seabed Development - JNAPC Code of Practice for Seabed Development – Joint Nautical Archaeology Policy Committee [online] Available at: http://www.jnapc.org.uk/jnapc_brochure_may_2006.pdf (accessed 29/11/2017)

archaeological resources. Further sources of guidance include those that set out protocols to deal with the marine historic environment developed specifically for the offshore renewable energy sector[171].

5.3.23 The Marine (Scotland) Act 2010 included an article on the establishment of historic Marine Protected Areas to safeguard a wide range of heritage assets at the coast edge, on the foreshore, and out to sea, including the remains of ships and aircraft lost at sea; harbours, lighthouses, and other structures relating to transport and trade by sea; and the remains of human settlements at the coastal fringe. They extend and replace the protection previously afforded to underwater heritage by the Protection of Wrecks Act 1973[172].

5.3.24 The Ancient Monuments and Archaeological Areas Act 1979 provides for the protection of archaeological heritage, including the scheduling of 'monuments'[173]. The Act is primarily intended for terrestrial locations but includes provision to designate submarine sites. The 1979 Act was modified by the Historic Environment (Amendment) Scotland Act 2011[174].

5.3.25 Our Place in Time – The Historic Environment Strategy for Scotland, published in 2014, lays out a 10 year vision for Scotland's historic environment[175]. The vision is founded upon the fundamental aims of understanding, protecting, and valuing our historic environment, ensuring it continues to benefit Scotland's wellbeing through its cultural, social, environmental, and economic contributions.

5.3.26 The Strategy and the Historic Environment Scotland Policy Statement[176] set out an overarching framework for historic environment policy in Scotland. Other relevant policies include the National Planning Framework[177] and Scottish Planning Policy[178].

[171] COWRIE (2007) Historic Environment Guidance for the Offshore Renewable Energy Sector [online] Available at: https://www.thecrownestate.co.uk/media/5876/km-ex-pc-historic-012007-historic-environment-guidance-for-the-offshore-renewable-energy-sector.pdf (accessed 29/11/2017)

[172] Protection of Wrecks Act 1973, 1973/Chapter 33 [online] Available at: https://www.legislation.gov.uk/ukpga/1973/33 (accessed 29/11/2017)

[173] Ancient Monuments and Archaeological Areas Act 1979, 1979/Chapter 46 [online] Available at: https://www.legislation.gov.uk/ukpga/1979/46 (accessed 29/11/2017)

[174] Historic Environment (Amendment) (Scotland) Act (2011), asp 3 [online] Available at: http://www.legislation.gov.uk/asp/2011/3 (accessed 29/03/2017)

[175] Scottish Government (2014) Our Place in Time – The Historic Environment Strategy for Scotland [online] Available at: http://www.gov.scot/Publications/2014/03/8522/0 (accessed 03/07/2017)

[176] Historic Environment Scotland (2016) Historic Environment Scotland Policy Statement June 2016 [online] Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=f413711b-bb7b-4a8d-a3e8-a619008ca8b5 (accessed 03/07/2017)

[177] Scottish Government (2014) National Planning Framework 3: A Plan for Scotland: Ambition, Opportunity, Place and Scottish Planning Policy [online] Available at: http://www.gov.scot/Publications/2014/06/3539 (accessed 03/07/2017)

[178] Scottish Government (2014) Scottish Planning Policy [online] Available at: http://www.gov.scot/Publications/2014/06/5823 (accessed 03/07/2017)

Landscape, Seascape, and Visual Amenity policy

5.3.27 The European Landscape Convention strives to promote landscape protection, management, and planning as well as achieve a more concerted approach to addressing landscape issues at the European scale[179]. The Convention presents a highly inclusive definition of landscape, specifying that protection and enhancement activities should apply equally to both 'outstanding' as well as less remarkable or degraded landscapes. This definition encompasses natural, rural, urban, and peri-urban landscapes across land, marine, and inland water environments.

5.3.28 At a national level, the role of Scotland's natural heritage and landscapes in informing land use planning is set out in Scottish Planning Policy[180]. Additionally, National Planning Framework 3 acknowledges the multiple benefits we derive from landscapes, such as improved human health and wellbeing as well as contributions to our quality of life[181]. The vulnerability of landscapes to climate change is also noted.

5.3.29 SNH's Landscape Policy Framework strives to 'safeguard and enhance the distinct identity, the diverse character, and the special qualities of Scotland's landscapes as a whole'[182]. Both Scottish Planning Policy and National Planning Framework 3 give significant protection to wild land areas [183]. The National Marine Plan also sets out the consideration of wild land in addition to largely undeveloped coasts, noting that development should be considered in line with Scottish Planning Policy when planning for and taking decisions which may impact on such areas.

5.3.30 SNH has also produced guidance on 'Siting and Designing Wind Farms in the Landscape' that includes a section on coastal landscapes and the potential impact offshore wind farms may have on inland and offshore land and

[179] European Landscape Convention (2000) Text of the ELC [online] Available at: https://rm.coe.int/1680080621 (accessed 21/11/2017)

[180] Scottish Government (2014) Scottish Planning Policy [online] Available at: http://www.gov.scot/Publications/2014/06/5823 (accessed 03/07/2017)

[181] Scottish Government (2014) National Planning Framework 3: A Plan for Scotland: Ambition, Opportunity, Place and Scottish Planning Policy [online] Available at: http://www.gov.scot/Publications/2014/06/3539 (accessed 03/07/2017)

[182] SNH (2005) Statement: SNH's Landscape Policy Framework [online] Available at: http://www.snh.org.uk/pdfs/polstat/Landscapepolicy.pdf (accessed 21/11/2017)

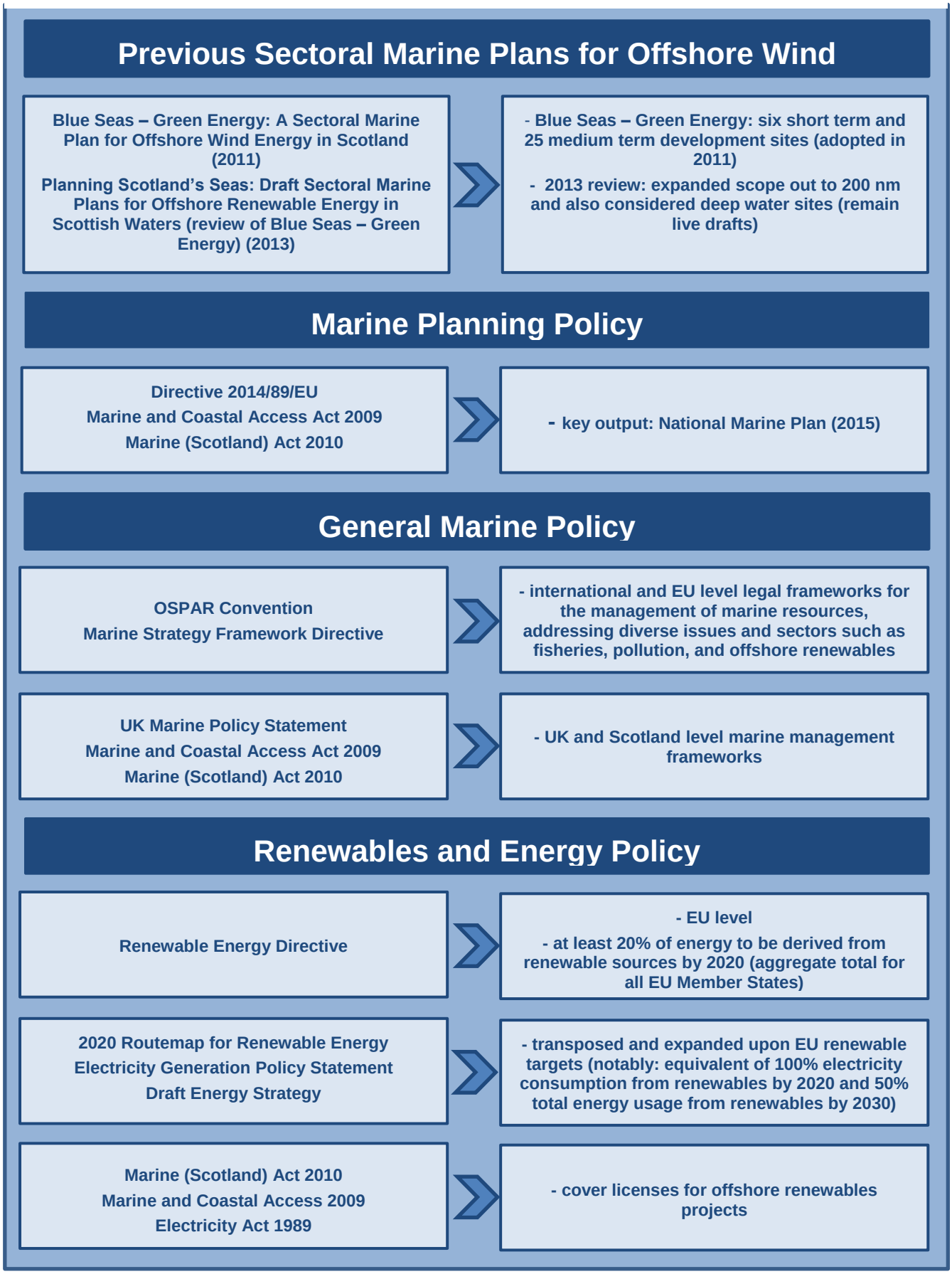
[183] SNH (2012) Landscape policy: wild land [online] Available at: https://www.snh.scot/professional-advice/landscape-change/landscape-policy-and-guidance/landscape-policy-wild-land (accessed 21/11/2017)

seascape character and views, including views from boats and ferries[184]. It also states that existing landmarks like historical or navigational features (such as lighthouses), distinctive coastal landforms, coastal settlements, and areas valued for recreation should be avoided when selecting locations for wind energy development. Additional advice is provided by their 'Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape' publication[185].

[184] SNH (2014) Siting and Designing Wind Farms in the Landscape – Version 2 [online] Available at: http://www.snh.org.uk/pdfs/strategy/renewables/Guidance_Siting_Designing_wind_farms.pdf (accessed 22/11/2017)

[185] SNH (2012) Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape [online] Available at: https://www.snh.scot/sites/default/files/2017-07/A702206%20-Offshore%20Renewables%20-%20guidance%20on%20assessing%20the%20impact%20on%20coastal%20landscape%20and%20seascpae%20-%20Guidance%20for%20scoping%20an%20Environmental%20Statement%20-%2013%20March%202012.pdf (accessed 07/12/2017)

Figure 3 Broader policy context of the development of the Draft Plan



5.4 Initial environmental baseline

5.4.1 The following paragraphs provide an indication of the content and level of detail likely to be included in the environmental baseline that will inform the assessment of the Draft Plan. The topics covered by the baseline information will reflect the proposed scope of the assessment, as previously discussed.

5.4.2 Under each SEA topic, current trends and pressures will be explored, alongside an indication of how the baseline may evolve in the absence of the Draft Plan. Information to support the baseline will be drawn from a range of sources such as:

- Scotland's Marine Atlas, published in March 2011 and supplemented by updated information provided by NMPi;
- the suite of SEA studies undertaken by the Scottish Government, including on-going work;
- environmental research studies undertaken by Marine Scotland and hosted on Marine Scotland Information; and,
- Scotland's Environment Web and other Scottish Government environmental sources.

5.4.3 If applicable, baseline maps are likely to be included alongside narrative summaries of the environmental baseline.

Biodiversity, Flora, and Fauna

5.4.4 Baseline information may include an overview of:

- Natura sites (Special Areas of Conservation and Special Protection Areas) (this will include, but not be limited to, inshore and offshore designations extended in 2009 to protect their adjacent marine habitats)
- Ramsar sites
- Sites of Special Scientific Interest with marine features
- European Protected Species, e.g. cetaceans and other marine mammals such as seals
- UK Biodiversity Action Plan species and habitats
- Priority Marine Features
- habitat types
- the ecological status of water bodies
- the impacts of climate change on the carbon sequestration potential of Scotland's marine environments
- the location of key nursery and spawning grounds for commercially important fish species

5.4.5 Habitats will include marine, coastal, intertidal, benthic, and terrestrial habitats as appropriate. Links with the HRA will be developed further as the SEA progresses.

Population and Human Health

5.4.6 Baseline information may include an overview of:

- bathing water quality
- types and levels of industrial and recreational activity in Scottish waters, including access routes

Soil (Marine Geology and Coastal Processes)

5.4.7 Baseline information may include an overview of:

- coastal Sites of Special Scientific Interest designated for their geological and/or geomorphological interest
- areas of coastline sensitive to changes in erosion/accretion patterns (where such information is available)
- marine sediment classifications (e.g. British Geological Survey) and seabed characteristics
- benthic habitat type and spatial extent (e.g. as illustrated by Mapping European Seabed Habitats - MESH)

Water

5.4.8 Baseline information may include an overview of:

- water quality indicators as determined by the WFD
- offshore and coastal water circulation patterns and tidal ranges
- potential pollution sources

5.4.9 The water baseline will encompass inshore, coastal, intertidal, and marine waters.

Climatic Factors

5.4.10 Baseline information may include an overview of:

- UKCP09 climate change projections and scenarios (e.g. increase in water temperatures, sea level rise, changes to the coastline, wave heights, etc.)
- information to highlight the links between climate change and other topic areas

Cultural Heritage

5.4.11 Baseline information may include an overview of:

- World Heritage Sites
- key historic environment features, such as Historic Marine Protected Areas, scheduled ancient monuments, and Gardens and Designed Landscapes
- known shipwrecks
- information on marine archaeology (where such information is available)

Landscape, Seascape, and Visual Amenity

5.4.12 Baseline information may include an overview of:

- location and defining characteristics of designated areas, such as National Scenic Areas and Local Landscape Designations
- an overview of existing pressures to landscape, seascape, and visual amenity in Scotland

6 Consultation and next steps

6.1.1 This joint Screening and Scoping Report has been provided to the statutory Consultation Authorities/consultation bodies for comment, in addition to being made available to relevant Member States and members of the public.

6.1.2 Following the close of this consultation, the responses will be analysed and used to inform the development of the Draft Plan and Environmental Report that will be made available for public consultation.

6.1.3 Table 4 sets out this indicative timeline.

Table 4. Indicative timeline for the development of an offshore wind plan for deep waters around Scotland

Indicative timeline	Development of offshore wind plan for deep waters around Scotland	Stage of SEA
June 2018	Initial public consultation on: • 'Suite' of consultation documents including the context report, early HRA work, socio-economic work, and joint SEA Screening/Scoping Report	Screening/Scoping
Spring 2019	Statutory Consultation on: • the Sectoral Marine Plan for Offshore Wind Encompassing Deep Water Options (the 'Draft Plan') • SEA Environmental Report • Integrated Sustainability Appraisal (SA) including SEA Environmental Report	Environmental Report
Summer 2019	Publication of Consultation Analysis Report	N/A
Autumn/Winter 2019	Publication of finalised Plan and accompanying Post-Adoption Statement	Post-Adoption Statement

6.1.4 We are inviting responses to this consultation by **18 July 2018**

6.1.5 Please respond to this consultation using the Scottish Government's consultation platform, Citizen Space. You view and respond to this consultation online at https://consult.gov.scot/marine-scotland/offshore-wind-scoping. You can save and return to your responses while the consultation is still open. Please ensure that consultation responses are submitted before the closing date of **18 July 2018**

6.1.6 If you are unable to respond online, please complete the Respondent Information Form (see "Handling your Response" below) to: SectoralMarinePlanning@gov.scot

6.1.7 Or by post to:

Offshore Wind Sectoral Marine Plan Scoping Consultation
Marine Scotland Planning and Policy (1A South)
Scottish Government, Victoria Quay
Edinburgh
EH6 6QQ

Handling your response

6.1.8 If you respond using Citizen Space (http://consult.scotland.gov.uk/), you will be directed to the Respondent Information Form. Please indicate how you wish your response to be handled and, in particular, whether you are happy for your response to published.

6.1.9 If you are unable to respond via Citizen Space, please complete and return the Respondent Information Form attached included in this document. If you ask for your response not to be published, we will regard it as confidential, and we will treat it accordingly.

6.1.10 All respondents should be aware that the Scottish Government is subject to the provisions of the Freedom of Information (Scotland) Act 2002 and would therefore have to consider any request made to it under the Act for information relating to responses made to this consultation exercise

Next Steps in the Process

6.1.11 Where respondents have given permission for their response to be made public, and after we have checked that they contain no potentially defamatory material, responses will be made available to the public at http://consult.scotland.gov.uk. If you use Citizen Space to respond, you will receive a copy of your response via email.

6.1.12 Following the closing date, all responses will be analysed and considered along with any other available evidence to help us. Responses will be published where we have been given permission to do so.

Comments and Complaints

6.1.13 If you have any comments about how this consultation exercise has been conducted, please send them SectoralMarinePlanning@gov.scot

Scottish Government consultation process

6.1.14 Consultation is an essential part of the policy-making process. It gives us the opportunity to consider your opinion and expertise on a proposed area of work.

6.1.15 You can find all our consultations online: http://consult.scotland.gov.uk. Each consultation details the issues under consideration, as well as a way for you to give us your views, either online, by email or by post.

6.1.16 Consultations may involve seeking views in a number of different ways, such as public meetings, focus groups, or other online methods such as Dialogue (https://www.ideas.gov.scot).

6.1.17 Responses will be analysed and used as part of the decision making process, along with a range of other available information and evidence. We will publish a report of this analysis for every consultation. Depending on the nature of the consultation exercise the responses received may:

- indicate the need for policy development or review
- inform the development of a particular policy
- help decisions to be made between alternative policy proposals
- be used to finalise legislation before it is implemented

6.1.18 While details of particular circumstances described in a response to a consultation exercise may usefully inform the policy process, consultation exercises cannot address individual concerns and comments, which should be directed to the relevant public body.

RESPONDENT INFORMATION FORM

Sectoral Marine Plan for Offshore Wind Energy Encompassing Deep Water Options – Strategic Environmental Assessment Screening and Scoping report

Please Note this form **must** be completed and returned with your response.

Are you responding as an individual or an organisation?

☐ Individual

☐ Organisation

Full name or organisation's name

Phone number

Address

Postcode

Email

The Scottish Government would like your permission to publish your consultation response. Please indicate your publishing preference:

☐ Publish response with name

☐ Publish response only (without name)

☐ Do not publish response

Information for organisations:

The option 'Publish response only (without name)' is available for individual respondents only. If this option is selected, the organisation name will still be published.

If you choose the option 'Do not publish response', your organisation name may still be listed as having responded to the consultation in, for example, the analysis report.

We will share your response internally with other Scottish Government policy teams who may be addressing the issues you discuss. They may wish to contact you again in the future, but we require your permission to do so. Are you content for Scottish Government to contact you again in relation to this consultation exercise?

☐ Yes

☐ No

Consultation Questions

Consultees may find the following questions helpful to provide a focus for their responses on the joint Screening and Scoping Report. Please note that responses do not need to be confined to these questions, and more general comments on this report are also invited.

1. Are you content with the proposed scope and assessment methodology, including how reasonable alternatives to the Draft Plan will be assessed, set out in this joint Screening and Scoping Report (Section 4)?
2. The proposed evidence included in this joint Screening and Scoping Report will be used to inform the assessment process (Baseline information Section 5). What are your views on this and is there further information you feel should be considered?.
3. What are your views on the early work set out in the report to consider the likely environmental impacts of the Draft Plan (Section 3)? Are there additional environmental issues that should be considered?

Appendix A SEA Screening Report

1.0 Introduction

1.1 It is considered that the Sectoral Marine Plan for Offshore Wind Encompassing Deep Water Options (the 'Draft Plan') falls under Section 5(4) of the Environmental Assessment (Scotland) Act 2005 ('the 2005 Act'). Given the potential scope of the plan's geographical impacts, this joint Screening and Scoping report has also been undertaken in accordance with The Environmental Assessment of Plans and Programmes Regulations 2004 (the '2004 Regulations').

2.0 Screening

2.1 This Screening Report gives a preliminary indication of the type of environmental effects that may arise from the implementation of offshore wind installations in deep waters around Scotland.

Table A1. Likely significance of identified environmental effects on environment

Criteria for determining the likely significance of the effects on the environment	Likely to have significant environmental effects?	Summary of significant environmental effects (negative and positive)
1(a) the degree to which the PPS sets a framework for projects and other activities, either with regard to the location, nature, size and operating conditions or by allocating resources	Yes	The Draft Plan forms the basis for the development of offshore wind energy in deep waters around Scotland. It is likely to do so by identifying prospective areas of search where such development could occur.
1(b) the degree to which the PPS influences other PPS including those in a hierarchy	Yes	The Draft Plan will inform the ongoing process of sectoral marine planning for offshore wind initiated by 2011's Blue Seas – Green Energy: A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters and later expanded upon by 2013's Planning Scotland's Seas: Draft Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters.
1(c) the relevance of the PPS for the integration of environmental considerations in particular with a view to promoting sustainable development.	Yes	The Draft Plan will play a key role in contributing to the collaborative action that is being taken towards decarbonising the energy sector.

1(d) environmental problems relevant to the PPS	Yes	Scotland's seas face a number of threats, such as invasive species, overfishing, and changes in salinity and acidity due to climate change. However, many aspects of the marine environment remain poorly understood and are therefore not yet covered by relevant protective frameworks. As a result, the marine environment remains vulnerable to change and development. Marine planning aims to incorporate environmental considerations into the offshore development process.
1(e) the relevance of the PPS for the implementation of Community legislation on the environment (for example, PPS linked to waste management or water protection)	Yes	It is intended that the Draft Plan will support Scotland's efforts in meeting its renewable energy generation targets under the EU's Renewable Energy Directive and European level objectives relating to climate change mitigation and adaptation. Water protection objectives (e.g. WFD) and the principles of maritime spatial planning as laid out by EU Directive 2014/89/EU on maritime spatial planning are also relevant to the Draft Plan.
2 (a) the probability, duration, frequency and reversibility of the effects	Yes	It is considered likely that the implementation of the Draft Plan will lead to environmental effects. Certain effects will occur during the lifespan of the project and may be irreversible. The frequency of effects will vary depending on the receptor and activity from which the effect arises.
2 (b) the cumulative nature of the effects	Yes	The Draft Plan is of national scale and provides a prospective framework within which several deep water offshore wind arrays may be installed. As such, there is potential for cumulative effects when considered across multiple sites as well as in combination with other types of marine activity, including other forms of offshore renewable development.

2 (c) transboundary nature of the effects (i.e. environmental effects on other EU Member States)	No	Given that deep water sites may be located some distance from shore, the potential for transboundary impacts to arise is recognised. As a result, the SEA of the Draft Plan will be undertaken in accordance with both the 2005 Act and the 2004 Regulations.
2 (d) the risks to human health or the environment (for example, due to accidents)	No	The Draft Plan is not expected to directly impact upon human health. However, it will be important to recognise potential hazards to other marine users.
2 (e) the magnitude and spatial extent of the effects	Yes	Although the exact number of areas of search is not yet known, the spatial extent of the Draft Plan is expansive, encompassing both Scottish territorial and offshore waters out to 200nm.
2 (f) the value and vulnerability of the area likely to be affected due to- (i) special natural characteristics or cultural heritage; (ii) exceeded environmental quality standards or limit values; or (iii) intensive land-use.	Yes	Scotland's marine environment fulfils a multitude of functions and is recognised for its ecological and social importance. However, existing pressures make Scottish seas sensitive to further change and disturbance caused by development. Many marine natural and cultural features are either poorly documented or are unknown. This is particularly true of deep waters. As such, there is a risk of damage or loss to natural and cultural assets including seabed habitats and offshore archaeology, seascapes, and underwater landscapes.
2 (g) the effects on areas or landscapes which have a recognised national, community or international protection status	Yes	Some degree of change in the visual character of landscapes or seascapes remains a possibility, with the potential for associated impacts on the visual setting of cultural heritage features as well as on residential amenity.

3.0 Conclusion

3.1 It has been concluded that the Draft Plan for identifying areas of search for offshore wind development in Scotland is likely to give rise to significant environmental effects, and as such, a full SEA is required. The views of the Consultation Authorities and UK consultation bodies are now sought, as required under the 2005 Act and the 2004 Regulations.

Appendix B Abbreviations

CEC	Crown Estate Commission
EMF	electro-magnetic field
EU	European Union
GHG	greenhouse gas(es)
GIS	Geographic Information System
GW	gigawatt(s)
HES	Historic Environment Scotland
HRA	Habitats Regulations Appraisal
IPF	Initial Plan Framework
MaRS	Marine Resource System
MARPOL	International Convention for the Prevention of Pollution from Ships
MESH	Mapping European Seabed Habitats
MW	megawatt(s)
NMPi	National Marine Plan interactive
nm	nautical mile(s)
PPS	plans, programmes, and strategies
RLG	Regional Locational Guidance
ROC	Renewables Obligations Certificates
SA	Sustainability Appraisal
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SNH	Scottish Natural Heritage
SW2	South West Option 2
TRL	Technology Readiness Level
The 2005 Act	The Environmental Assessment (Scotland) Act 2005
The 2004 Regulations	The Environmental Assessment of Plans and Programmes Regulations 2004
UK	United Kingdom

UKCP09	UK Climate Projections 2009
UNESCO	United Nations Education, Scientific, and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
WFD	Water Framework Directive

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