



Cenos Offshore Windfarm Limited



Cenos EIA

Appendix 31 - Cumulative Effects Assessment Methodology

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Aberdeen

www.xodusgroup.com

5th Floor Capitol Building
429-431 Union Street . Aberdeen
AB11 6DA . UK



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CONTENTS

ACRONYMS	4
GLOSSARY	5
APPENDIX 31 CUMULATIVE EFFECTS ASSESSMENT METHODOLOGY	10
31.1 Introduction	10
31.2 Methodology	11
31.2.1 Overview	11
31.2.2 Cumulative Long List	12
31.2.3 Consultation	18
31.2.4 Cumulative Short List	19
31.3 References	23
APPENDIX A CUMULATIVE LONG LIST	24

ACRONYMS

ACRONYM	DEFINITION
CCS	Carbon Capture and Storage
CEA	Cumulative Effects Assessment
CNS	Central North Sea
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIC	Energy Industries Council
EICC	Export/Import Cable Corridor
FTU	Floating Turbine Unit
IAC	Inter-Array Cable
INTOG	Innovation and Targeted Oil & Gas
JNCC	Joint Nature Conservation Committee
km	kilometres
MD-LOT	Marine Directorate - Licensing Operations Team
MMO	Marine Management Organisation
MPA	Marine Protected Area
NM	Nautical Miles
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSCP	Offshore Substation Converter Platform
PINS	Planning Inspectorate
RIAA	Report to Inform Appropriate Assessment
UK	United Kingdom
WTG	Wind Turbine Generator
ZoI	Zone of Influence

GLOSSARY

TERM	DEFINITION
2023 Scoping Opinion	Scoping Opinion received in June 2023, superseded by the 2024 Scoping Opinion.
2023 Scoping Report	Environmental Impact Assessment (EIA) Scoping Report submitted in 2023, superseded by the 2024 Scoping Report.
2024 Scoping Opinion	Scoping Opinion received in September 2024, superseding the 2023 Scoping Opinion.
2024 Scoping Report	EIA Scoping Report submitted in April 2024, superseding the 2023 Scoping Report.
Area of Opportunity	The area in which the limits of electricity transmission via High Voltage Alternating Current (HVAC) cables can reach oil and gas assets for decarbonisation. This area is based on assets within a 100 kilometre (km) radius of the Array Area.
Array Area	The area within which the Wind Turbine Generators (WTGs), floating substructures, moorings and anchors, Offshore Substation Converter Platforms (OSCPs) and Inter-Array Cables (IAC) will be present.
Cenos Offshore Windfarm ('the Project')	'The Project' is the term used to describe Cenos Offshore Windfarm. The Project is a floating offshore windfarm located in the North Sea, with a generating capacity of up to 1,350 Megawatts (MW). The Project which defines the Red Line Boundary (RLB) for the Section 36 Consent and Marine Licence Applications (MLA), includes all offshore components seaward of Mean High Water Springs (MHWS) (WTGs, OSCP, cables, floating substructures moorings and anchors and all other associated infrastructure). The Project is the focus of this Environmental Impact Assessment Report (EIAR).
Cenos Offshore Windfarm Ltd. (The Applicant)	The Applicant for the Section 36 Consent and associated Marine Licences.
Cumulative Assessment	The consideration of potential impacts that could occur cumulatively with other relevant projects, plans, and activities that could result in a cumulative effect on receptors.
Developer	Cenos Offshore Windfarm Ltd., a Joint Venture between Flotation Energy and Vårgrønn As (Vårgrønn).

TERM	DEFINITION
Environmental Impact Assessment (EIA)	The statutory process of evaluating the likely significant environmental effects of a proposed project or development. Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and maintenance and decommissioning.
Environmental Impact Assessment Regulations	This term is used to refer to the Environmental Impact Assessment Regulations which are of relevance to the Project. This includes the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended); and the Marine Works (Environmental Impact Assessment) Regulations 2007.
Environmental Impact Assessment Report	A report documenting the findings of the EIA for the Project in accordance with relevant EIA Regulations.
Export/Import Cable	High voltage cable used to export/import power between the OSCP's and Landfall.
Export/Import Cable Bundle (EICB)	Comprising two Export/Import Cables and one fibre-optic cable bundled in a single trench.
Export/Import Cable Corridor (EICC)	The area within which the Export/Import Cable Route will be planned and the Export/Import Cable will be laid, from the perimeter of the Array Area to MHWS.
Export/Import Cable Route	The area within the Export/Import Export Corridor (EICC) within which the Export/Import Cable Bundle (EICB) is laid, from the perimeter of the Array Area to MHWS.
Floating Turbine Unit (FTU)	The equipment associated with electricity generation comprising the WTG, the floating substructure which supports the WTG, mooring system and the dynamic section of the IAC.
Flotation Energy	Joint venture partner in Cenos Offshore Windfarm Ltd.
Habitats Regulations	The Habitats Directive (Directive 92/43/ECC) and the Wild Birds Directive (Directive 2009/147/EC) were transposed into Scottish Law by the Conservation (Natural Habitats &c) Regulations 1994 ('Habitats Regulations') (up to 12 NM); by the Conservation of Offshore Marine Habitats and Species Regulations 2017 ('Offshore Marine Regulations') (beyond 12 NM); the Conservation of Habitats and Species Regulations 2017 (of relevance to consents under Section 36 of the Electricity Act 1989); the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001; and the Wildlife and

TERM	DEFINITION
	<p>Countryside Act 1981. The Habitats Regulations set out the stages of the Habitats Regulations Appraisal (HRA) process required to assess the potential impacts of a proposed project on European Sites (Special Areas of Conservation, Special Protection Areas, candidate SACs and SPAs and Ramsar Sites).</p>
<p>Habitats Regulations Appraisal</p>	<p>The assessment of the impacts of implementing a plan or policy on a European Site, the purpose being to consider the impacts of a project against conservation objectives of the site and to ascertain whether it would adversely affect the integrity of the site.</p>
<p>High Voltage Alternating Current (HVAC)</p>	<p>Refers to high voltage electricity in Alternating Current (AC) form which is produced by the WTGs and flows through the IAC system to the OSCP. HVAC may also be used for onward power transmission from the OSCP to assets or to shore over shorter distances.</p>
<p>High Voltage Direct Current (HVDC)</p>	<p>Refers to high voltage electricity in Direct Current (DC) form which is converted from HVAC to HVDC at the OSCP and transmitted to shore over longer distances.</p>
<p>Horizontal Directional Drilling (HDD)</p>	<p>An engineering technique for laying cables that avoids open trenches by drilling between two locations beneath the ground's surface.</p>
<p>Innovation and Targeted Oil & Gas (INTOG)</p>	<p>In November 2022, the Crown Estate Scotland (CES) announced the Innovation and Targeted Oil & Gas (INTOG) Leasing Round, to help enable this sector-wide commitment to decarbonisation. INTOG allowed developers to apply for seabed rights to develop offshore windfarms for the purpose of providing low carbon electricity to power oil and gas installations and help to decarbonise the sector. Cenos is an INTOG project and in November 2023 secured an Exclusivity Agreement as part of the INTOG leasing round.</p>
<p>Inter-Array Cable (IAC)</p>	<p>The cables which connect the WTGs to the OSCP. WTGs may be connected with IACs into a hub or in series as a 'string' or a 'loop' such that power from the connected WTGs is gathered to the OSCP via a single cable.</p>
<p>Joint Venture</p>	<p>The commercial partnership between Flotation Energy and Vårgrønn, the shareholders which hold the Exclusivity Agreement with CES to develop the Cenos site as an INTOG project.</p>
<p>Landfall</p>	<p>The area where the Export/Import Cable from the Array Area will be brought ashore. The interface between the offshore and onshore environments.</p>
<p>Marine Licence</p>	<p>Licence required for certain activities in the marine environment and granted under the Marine and Coastal Access Act 2009 and/or the Marine (Scotland) Act 2010.</p>

TERM	DEFINITION
Marine Protected Area (MPA)	Marine sites protected at the national level under the Marine (Scotland) Act 2010 out to 12 NM, and the Marine and Coastal Access Act 2009 between 12-200 NM. In Scotland MPAs are areas of sea and seabed defined so as to protect habitats, wildlife, geology, underseas landforms, historic shipwrecks and to demonstrate sustainable management of the sea.
Marine Protected Area (MPA) Assessment	A three-step process for determining whether there is a significant risk that a proposed development could hinder the achievement of the conservation objectives of an MPA.
Mean High Water Springs (MHWS)	The height of Mean High Water Springs is the average throughout the year, of two successive high waters, during a 24-hour period in each month when the range of the tide is at its greatest.
Mean Low Water Springs (MLWS)	The height of Mean Low Water Springs is the average throughout a year of the heights of two successive low waters during periods of 24 hours (approximately once a fortnight).
Mitigation Measures	<p>Measures considered within the topic-specific chapters in order to avoid impacts or reduce them to acceptable levels.</p> <ul style="list-style-type: none"> • Primary mitigation - measures that are an inherent part of the design of the Project which reduce or avoid the likelihood or magnitude of an adverse environmental effect, including location or design; • Secondary mitigation – additional measures implemented to further reduce environmental effects to ‘not significant’ levels (where appropriate) and do not form part of the fundamental design of the Project; and • Tertiary mitigation – measures that are implemented in accordance with industry standard practice or to meet legislative requirements and are independent of the EIA (i.e. they would be implemented regardless of the findings of the EIA). <p>Primary and tertiary mitigation are referred to as embedded mitigation. Secondary mitigation is referred to as additional mitigation.</p>
Mooring System	Comprising the mooring lines and anchors, the mooring system connects the floating substructure to the seabed, provides station-keeping capability for the floating substructure and contributes to the stability of the floating substructure and WTG.
Nature Conservation Marine Protected Area (NCMPA)	MPA designated by Scottish Ministers in the interests of nature conservation under the Marine (Scotland) Act 2010.
Offshore Substation Converter Platforms (OSCPs)	An offshore platform on a fixed jacket substructure, containing electrical equipment to aggregate the power from the WTGs and convert power between HVAC and HVDC for export/import via the Export/Import Cable to/from the shore. The OSCP will also act as power distribution stations for the Oil & Gas platforms.

TERM	DEFINITION
Onward Development	Transmission projects which are anticipated to be brought forward for development by 3 rd party oil and gas operators to enable electrification of assets via electricity generated by the Project. All Onward Development will subject to separate marine licensing and permitting requirements.
Onward Development Area	The area within which oil and gas assets would have the potential to be electrified by the Project.
Onward Development Connections	Oil and gas assets located in the waters surrounding the Array Area will be electrified via transmission infrastructure which will connect to the Project's OSCPs. These transmission cables are referred to as Onward Development Connections.
Project Area	The area that encompasses both the Array Area and EICC.
Project Design Envelope	A description of the range of possible elements that make up the Project design options under consideration and that are assessed as part of the EIA for the Project.
Study Area	Receptor specific area where potential impacts from the Project could occur.
Transboundary Assessment	The consideration of impacts from the Project which have the potential to have a significant effect on another European Economic Area (EEA) state's environment. Where there is a potential for a transboundary effect, as a result of the Project, these are assessed within the relevant EIA chapter.
Transmission Infrastructure	The infrastructure responsible for moving electricity from generating stations to substations, load areas, assets and the electrical grid, comprising the OSCPs, and associated substructure, and the Export/Import Cable.
Vågrønn As (Vågrønn)	Joint venture partner in Cenoss Offshore Windfarm Ltd.
Wind Turbine Generator (WTG)	The equipment associated with electricity generation from available wind resource, comprising the surface components located above the supporting substructure (e.g., tower, nacelle, hub, blades, and any necessary power transformation equipment, generators, and switchgears).
Worst-Case Scenario	The worst-case scenario based on the Project Design Envelope which varies by receptor and/or impact pathway identified.

APPENDIX 31 CUMULATIVE EFFECTS ASSESSMENT METHODOLOGY

31.1 Introduction

Cenos Offshore Windfarm ('the Project') was awarded an Exclusivity Agreement under the Innovation and Targeted Oil & Gas (INTOG) Leasing Round in 2022. The Project is entirely located within the area INTOG 'E-a' and aims to supply the United Kingdom (UK) Grid with electricity and additionally play a role in the decarbonisation of the UK oil and gas industry by delivery of electrical power to offshore oil and gas installations. The Project is a floating offshore windfarm, located approximately 200 kilometres (km) offshore east of Aberdeen, in the Central North Sea (CNS).

The Project will comprise up to 95 Floating Turbine Units (FTUs), each consisting of a Wind Turbine Generator (WTG) and a floating substructure, which will be anchored to the seabed to ensure station-keeping within the Array Area. Dynamic and static portions of Inter-Array Cables (IACs) will also be required within the ~333 km² Array Area. Included in the transmission assets, are up to two Offshore Substation Converter Platforms (OSCPs) and the Export/Import Cable. The IACs will connect to the OSCP to transmit power from the WTGs to the OSCP. The location of the Project is shown in Figure 1.1 of Environmental Impact Assessment Report (EIAR) Vol. 2, Chapter 1: Introduction.

To assist the assessment of cumulative effects in the EIAR and in-combination impacts within the **Report to Inform Appropriate Assessment (RIAA)** and **Marine Protected Area (MPA) Assessment**, a review of reliable, publicly available information relating to existing and forthcoming plans, projects (developments) and activities (including oil and gas, cables, and renewables, amongst others) that could have the potential to interact with the Project has been undertaken.

Given the speculative nature of plans, projects (developments) and activities not within the public domain, which cannot be assessed with certainty, the Cumulative Effects Assessment (CEA) process focusses exclusively on 'reasonably foreseeable' plans, projects (developments) and activities. This is in line with the terminology used in the Scottish Government (2018) Marine Scotland Consenting and Licensing Guidance for Offshore Wind, Wave and Tidal Energy Applications. This approach ensures a robust and reliable assessment, supported by publicly available data, thereby providing a clear and defensible basis for evaluating cumulative and in-combination impacts. Plans, projects (developments) and activities in relation to the Onward Development Connections which are speculative and considered to be 'unknown' in relative terms, are considered within **EIAR Vol. 3, Chapter 22: Statement of Combined Effects**.

Section 31.2 describes this review process. The relevance of this process and the plans, projects (developments) or activities which ultimately contribute to the CEA within the wider EIAR are described in Section 31.2.4.

31.2 Methodology

31.2.1 Overview

A CEA is a legal requirement under the Environmental Impact Assessment (EIA) Regulations¹. The EIA Directive (Annex IV, Article 5e) states "A description of the likely significant effects of the project on the environment resulting from: [...] the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources".

A CEA provides consideration of the potential significant effects on the same receptor or resource as defined in the EIA Regulations, arising from the Project alone and cumulatively with other relevant plans, projects (developments) and activities.

Please note, CEA is distinct from inter- and intra-relationships which are defined in **EIAR Vol. 2, Chapter 7: EIA Methodology** but are briefly defined here. Inter-relationships are defined as the interaction between different Project receptor-specific impacts assessed within this EIAR (e.g. an impact on fish and shellfish may indirectly impact marine mammals, due to the dependence of the latter on the former as prey). Inter-related effects are concerned with the potential effects of multiple impacts affecting a single receptor. Inter-related effects consider the spatial and temporal overlap of all effects arising from works associated with the Project on a single receptor.

To support undertaking the CEA, it is necessary to first identify those reasonably foreseeable plans, projects (developments) or activities within the public domain with which the Project may interact and have the potential to result in a potential cumulative effect. A staged approach was undertaken to identify relevant plans, projects (developments) and activities for consideration within the EIA. This approach aims to be systematic and transparent. First, a 'long list' of cumulative plans, projects (developments) and activities was compiled using publicly accessible databases and in consultation with Marine Directorate - Licensing and Operations Team (MD-LOT) in October 2024, based on defined areas of search specific to different types of plans, projects (developments) and activities. The long list was centred around the proposed Project construction timeline (from 2030 to 2035), ± 1 year either side to capture any uncertainty in other plans, projects (development) or activity schedules.

This long list was then reduced to a 'short list' by taking receptor-specific potential pathways of impact (e.g. temporal and spatial overlap of impacts) into account through various 'screening tests'. Where plans, projects (developments) and activities identified in the long list pass these screening tests, they have been included within the short list of plans, projects (developments) and activities. Each short list is specific to a receptor and is described further in the respective topic chapter of Volume 3 of the EIAR, including stakeholder consultation, where applicable.

The process followed to define the long list is presented in Section 31.2.2, and the further short-listing process is described in Section 31.2.4. The complete long list is shown in Appendix A with the topic / receptor specific short lists in each chapter.

¹ The EIA Regulations here refers collectively to the following: The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended); The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended); and The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

The cumulative long list did not include those plans, projects (developments) and activities relevant to ornithology. The approach to the cumulative effects assessment for ornithology is described in **EIAR Vol. 3, Chapter 12: Ornithology**. **EIAR Vol. 4, Appendix 17: Marine Mammal Cumulative Effects Assessment Screening** describes the approach to the cumulative effects assessment for marine mammals which, owing to nuances of noise modelling, requires additional explanation of the methodology.

31.2.2 Cumulative Long List

As part of creating the long list, the types of plans, projects (developments) and activities relevant for inclusion had to be defined. A search area was attributed to each of the types of plans, projects (developments) and activities which dictated the range of search. This range is conservatively based on the maximum extent of an impact pathway. Any reasonably foreseeable plans, projects (developments) and activities within this range were deemed relevant for inclusion within the long list.

31.2.2.1 Types of Developments Considered

Plans, projects (developments) and activities within the public domain which are part of the following industries were identified as being of relevance to the CEA:

- Aggregate, dredging and disposal;
- Cables and pipelines;
- Ports and harbours;
- Offshore energy;
- Oil and gas developments; and
- Carbon Capture and Storage (CCS).

Activities associated with these industries have the potential to act cumulatively with those of the Project. Other INTOG and ScotWind offshore wind developments, amongst other leasing round developments, have been considered where there is sufficient publicly available information to conduct a meaningful assessment of cumulative effects. Where sufficient detail is not available, it may not be possible to conduct a meaningful assessment of effects, and therefore, these plans or projects (developments) and activities are not considered within the CEA. This justification was used during the short-listing process to refine the list (see Section 31.2.4.1). Data confidence is also discussed in Section 31.2.4.1.

A range of data sources were investigated to identify as many plans, projects (developments) or activities as possible including, but not limited to, government websites (specifically the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED)², the Marine Directorate Marine Projects webpage³, the Planning Inspectorate (PINS) planning portal⁴, the Marine Management Organisation (MMO) public register⁵, the EMODnet human activities database and mapper⁶, the Energy Industries Council (EIC) Data Stream portal⁷, and the 4C Offshore database⁸.

² <https://www.gov.uk/government>

³ <https://marine.gov.scot/marine-projects>

⁴ <https://national-infrastructure-consenting.planninginspectorate.gov.uk>

⁵ <https://marinelicensing.marinemanagement.org.uk>

⁶ <https://emodnet.ec.europa.eu/en/human-activities>

⁷ <https://eicidastream.the-eic.com>

⁸ <https://www.4coffshore.com>

The long list of plans, projects (developments) and activities was provided to MD-LOT for comment in October 2024. MD-LOT consulted with NatureScot and the Joint Nature Conservation Committee (JNCC) who were generally satisfied with the long list of developments and those screened in for potential cumulative effects. (2nd December 2024) (see Section 31.2.3 for further information).

In addition, it was proposed at Scoping that the following plans, projects (developments) or activities be considered cumulatively:

- Commercial Fisheries;
- Military and Civil Aviation; and
- Shipping and Navigation.

However, it has subsequently been decided that these activities are better described as receptors, and themselves are unlikely to, in combination with the Project, generate cumulative effects. Instead, these receptors are more likely to be affected by cumulative effects. Therefore, commercial fishing grounds, military, aviation, and radar features, and shipping lanes are not included within the cumulative list as plans, projects (developments) or activities. The CEA is undertaken for these receptors within their respective chapters:

- EIAR Vol. 3, Chapter 14: Commercial Fisheries;
- EIAR Vol. 3, Chapter 15: Shipping and Navigation; and
- EIAR Vol. 3, Chapter 18: Military and Civil Aviation;

31.2.2.2 Development Phases Considered

Plans, projects (developments) and activities which are currently within the following development phases are included for consideration within the cumulative long list:

- **Pre-Application (Early Development):** plans, projects (developments) and activities which are in the early phases of conception within the public domain (e.g. tender/bidding stage/screening) and are yet to commence scoping;
- **Pre-Application (Scoping):** plans, projects (developments) and activities which have undertaken scoping but are yet to submit an application;
- **Application:** plans, projects (developments) and activities which have submitted an application but are yet to receive consent (i.e. are under consideration);
- **Consented:** plans, projects (developments) and activities which have received consent and/or are in the pre-construction phase;
- **Under Construction:** plans, projects (developments) and activities which are being constructed at time of writing;
- **Operational:** plans, projects (developments) and activities which are active/operational (please note, operational developments are generally not considered within CEA⁹ and are usually part of the baseline; developments within this category have only been considered where additional development works are planned); and
- **Decommissioning:** plans, projects (developments) and activities which have reached the end of their operational life, are no longer active/operational or in the process of being decommissioned.

⁹ Operational developments are considered within the cumulative effects assessment for ornithology, commercial fisheries, marine archaeology, and (in the case of existing oil and gas assets) marine geology, oceanography and coastal processes. Additional justification on the approaches for these topics is provided in EIAR Vol 3, Chapter 12: Ornithology, Chapter 14: Commercial Fisheries, Chapter 16: Marine Archaeology, and Chapter 8: Marine Geology, Oceanography and Coastal Processes and is summarised in Section 31.2.4.2.

Any plans or projects (developments) or activities in early planning phases prior to scoping are unlikely to have sufficient information available in the public domain to conduct a full assessment of cumulative effects. Furthermore, consent pathways within other European countries can look different and this is reflected in the level of information available in the public domain. Confidence in the available data is also lower earlier in the planning process. However, even 'pre-application' plans, projects (developments) and activities can be reasonably foreseeable and therefore are included within the long list. Short-listing takes into consideration the level of available information, which is explained further in Section 31.2.4, and determines the extent to which these plans, projects (developments) or activities are considered within the CEA.

It is recognised that the consenting process for a plan, project (development) or activity is continuous and hence the below timescales for the inclusion of a plan, project (development) or activity within the cumulative effects assessments have been utilised:

- Quantitative assessment of plans, projects (developments) and activities that requested a Scoping Opinion up to four months prior to the Project Application submission;
- Qualitative assessment of plans, projects (developments) and activities that requested a Scoping Opinion up to three months prior to the Project Application submission; and
- Acknowledgement of plans, projects (developments) and activities that requested a Scoping Opinion up to two months prior to the Project Application submission.

31.2.2.3 Search Areas

Having followed the process described in Section 31.2.2.1 and Section 31.2.2.2, parameters need to be set within which plans, projects (developments) or activities contribute to the long list.

The following areas were used to define the area of search for different plans, projects (developments) or activities (Table 31-1). The areas of search were applied as buffers across the entirety of the Project boundary (inclusive of both the Array Area and the Export/Import Cable Corridor (EICC)). Each of these search extents is specific to each type of industry and represents a conservative area within which there may be an opportunity for impact pathways to interact cumulatively with that of the Project. The context provided in Table 31-1, as presented at Scoping, underpinned the defined search areas.

Table 31-1 Cumulative long list search areas

TYPE OF INDUSTRY	SEARCH AREA (km)	JUSTIFICATION
Aggregate, dredging and disposal	50	This range represents a precautionary maximum distance at which effects from aggregate dredging and disposal could occur (e.g. changes to the hydrodynamic regime and physical processes).
Cables and pipelines	50	This range represents a precautionary distance at which effects from cables and pipelines (e.g. increases to Suspended Sediment Concentrations from installation) could occur.
Ports and harbours	200	This range represents a precautionary maximum distance at which effects from Port and Harbour Developments could occur (numerous receptor types (marine mammals, socio-economic impacts, shipping and navigation impacts etc.) therefore the search area is wide enough to cover noise impacts from the movement of vessels and construction or development activities as part of the port/harbour).
Offshore energy	510	This range represents a precautionary maximum distance at which effects from offshore energy (e.g. collision risk to bird species with large foraging ranges) could occur.
Oil and gas developments	500	This range represents a precautionary maximum distance at which effects from oil and gas activities (e.g. underwater noise from piling) could occur.
Carbon Capture and Storage	500	This range represents a precautionary maximum distance at which effects from CCS could occur (e.g. underwater noise from piling activities). This distance will be considerably reduced if existing wells and platforms are used.

31.2.2.4 Completed Cumulative Long List

Having used the above search areas (Table 31-1), a long list was generated and is shown in Appendix A. The long list contained a total of 224 plans, projects (developments) and activities across the six industries listed in Section 31.2.2.1. Within the list, across the proposed Project construction timeline (from 2030 to 2035) ± 1 year either side, were:

- 139 offshore wind farms;
- 38 CCS projects and/or licence areas;
- 18 oil and gas decommissioning programmes;
- 10 cable projects;
- 7 disposal sites;
- 7 tidal projects;
- 3 port/harbour developments; and
- 2 wave energy projects.



Based on the search areas in Table 31-1, these plans, projects (developments) and activities covered a considerable portion of the North Sea. Plans, projects (developments) and activities in the long list were located across five EEZs, those of the UK, Denmark, Germany, the Netherlands, and Norway. Some plans, projects (developments) and activities (namely cable projects) were located across borders. A visual representation of these plans, projects (developments) and activities is shown in Figure 31-1.

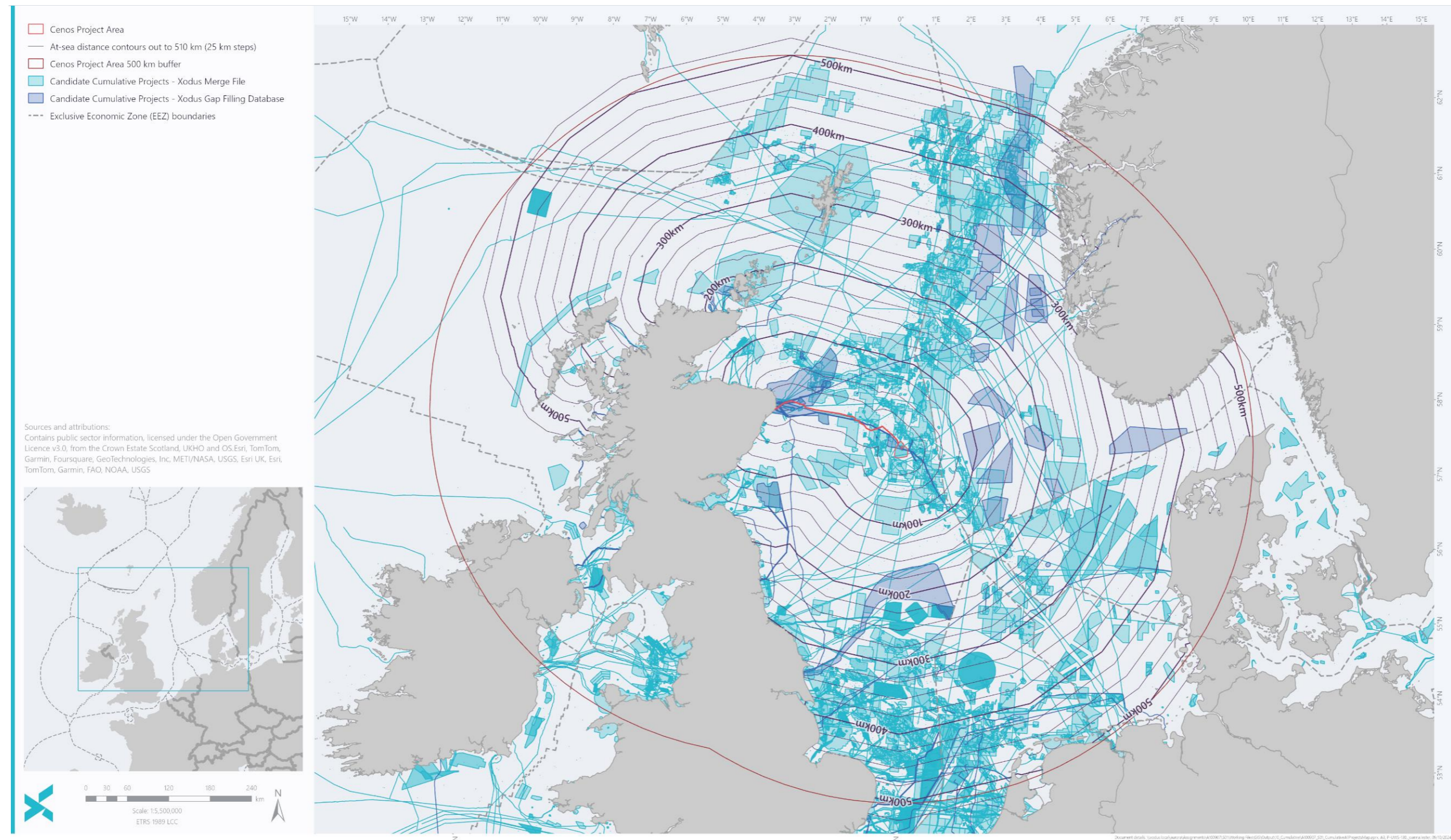


Figure 31-1 Search areas around the Project boundary showing the extent of plans, projects (developments) or activities within the cumulative long list

31.2.3 Consultation

Consultation in relation to the long list of plans, projects (developments) and activities was provided to MD-LOT for comment in October 2024. MD-LOT consulted with NatureScot and the Joint Nature Conservation Committee (JNCC) who were generally satisfied with the long list of plans, projects (developments) and activities and those screened in for potential cumulative effects. The NatureScot response was received 2nd December 2024.

NatureScot noted an expectation that the EIAR would be accompanied by a cumulative effects assessment screening methodology note which outlines the cumulative effects assessment process in full. This document addresses this request in outlining the full cumulative effects assessment methodology applied throughout the EIAR. NatureScot additionally requested that the EIAR contain maps which highlight the long-listed and short-listed plans, projects (developments) and activities. The long list plans, projects (developments) and activities are shown in Figure 31-1. The short list of plans, projects (developments) and activities vary between chapter/topic and can be found in receptor specific chapters of the EIAR.

The tiered approach to consideration of the status of plans, projects (developments) and activities referenced by NatureScot in their response, and the nature of assessment (e.g. qualitative or otherwise) associated with the levels of status, is addressed in Section 31.2.2.2. In summary, NatureScot's recommendations are considered to be suitably addressed within this document and the EIAR.

The JNCC raised some additional points in regards to the long list, these are addressed below.

- With reference to the East of Gannet and Montrose Fields NCMFA, the JNCC requested inclusion of operational oil and gas pipelines, surface installation and other associated infrastructure within the cumulative long list.
 - operational infrastructure is considered part of the baseline environment Section 31.2.2.2. Therefore, this infrastructure is not included within the CEA. **EIAR Vol. 3, Chapter 8: Marine Geology, Oceanography and Coastal Processes** is an exception to this, wherein blockage effects due to cumulative impacts between the operational phase of the Project and existing oil and gas infrastructure are assessed (with specific reference to features within the East of Gannet and Montrose Fields NCMFA).
- The JNCC noted the decommissioning of the Banff and Kyle fields (which partly overlap the East of Gannet and Montrose Fields NCMFA) has not been considered.
 - Based on publicly available information (Offshore Petroleum Regulator for Environment & Decommissioning (OPRED) website¹⁰), decommissioning of the Banff and Kyle fields (and associated infrastructure) will be completed in 2027 (CNR International, 2021), this is prior to commencement of Project construction (in 2030), therefore has not been considered further.
- The JNCC noted an unresolved issue in relation to additional rock placement in breach of licence conditions.
 - The project to which this unresolved issue relates is operational. Therefore, it has been considered as part of the baseline environment. At the time of writing, the Applicant is not aware of any publicly available information in relation to the additional rock placement which is in breach of licence conditions.

¹⁰ <https://www.gov.uk/guidance/oil-and-gas-decommissioning-of-offshore-installations-and-pipelines>

- The JNCC requested additional justification behind consideration of certain plans, projects (developments) or activities as part of the existing baseline environment. Specifically, the JNCC stated that plans, projects (developments) or activities which are not yet constructed or operational, but should be in the near future prior to construction of the Project, should be considered within the CEA (e.g. Culzean Floating Offshore Wind Turbine Pilot Project, Central North Sea Electrification (CNSE) Project etc.).
 - The initial long list captured plans, projects (developments) and activities which were proposed but construction had not yet commenced. As part of the short-listing (refinement) process, overlap in construction periods was examined as part of each receptor-specific screening tests. Upon review of the long list, where the construction periods of the identified plans, projects (developments) or activities did not overlap with the construction phase of the Project, these plans, projects (developments) or activities were not considered further within the CEA.

Consultation in relation to the specific approach to the cumulative effects assessment for marine mammals and ornithology is considered within the **EIAR Vol. 3, Chapter 12: Ornithology** and **EIAR Vol. 3, Chapter 11: Marine Mammal Ecology** (and **EIAR Vol. 4, Appendix 17: Marine Mammal Cumulative Effects Assessment Screening**), respectively.

31.2.4 Cumulative Short List

31.2.4.1 Refining the Long List

Further information was gathered on each of the plans, projects (developments) or activities within the cumulative long list, to understand the activities, timescales and nature of the other plans, projects (developments) or activities to review against the Project's proposed programme of activities. This additional information was reviewed to determine the potential channels for cumulative effect, taking into consideration potential impact pathways and/or the potential for spatial or temporal overlap of impacts with Project activities. Spatial overlap is defined on the basis of topic-specific Zones of Influence (Zols), which are described in Section 31.2.4.2.

Plans, projects (developments) or activities were screened in or out for inclusion within the CEA according to the following criteria:

- Screened out: included as part of the topic baseline (e.g. operational developments);
- Screened out: insufficient data / detail to conduct an assessment;
- Screened out: no temporal overlap;
- Screened out: no spatial overlap;
- Screened out: no pathway for impact on receptor; and
- Screened in: potential for cumulative effects.

Where cumulative effects are only expected to arise during the construction phase, only those plans, projects (developments) or activities with an overlapping construction period were screened into the topic-specific short lists.

While this applies to most receptors, there may be exceptions to this wherein additional conservatism has been applied in the case of specific receptors (i.e. marine mammals, ornithology, commercial fisheries, and marine archaeology). This is addressed within the respective chapters, as applicable. By way of example, the CEA within **EIAR Vol. 3, Chapter 11: Marine Mammal Ecology** and detailed further within **EIAR Vol. 4, Appendix 17: Marine Mammal Cumulative Effects Assessment Screening** incorporates an additional \pm one year either side of the Project construction timeline in order to fully account for underwater noise impacts in modelling.

In addition to the above, although many plans, projects (developments) or activities are yet to be constructed (at the time of writing), those which will have completed construction by 2030 were assumed to be operational by the time of the Project's construction. Therefore, they were screened out on the basis of being included as part of the topic baseline. This was contingent on information about plans, projects (developments) or activity timelines being available.

Data confidence has also been considered when screening plans, projects (developments) and activities. Data confidence was given as low/medium/high. Low confidence was applied to plans, projects (developments) or activities at pre-application or application stage. Medium confidence was attributed to plans, projects (developments) or activities which had achieved consent. High data confidence was reserved for plans, projects (developments) or activities which were under construction (or are operational, if applicable to the topic). Disposal sites are an exception to this; despite being operational, they are marked as 'Low' owing to uncertainty over frequency of use.

31.2.4.2 Zones of Influence

In order to refine the long list to a short list, Zols must be defined for each EIA receptor, as listed in Table 31-2. The Zols provide the maximum extent within which other plans, projects (developments) or activities can be screened in/out of the cumulative short list.

Table 31-2 Zols for offshore EIA receptors

CHAPTER	EIA RECEPTOR/	Zol
8	Marine Geology, Oceanography, and Coastal Processes	Defined by the extent of tidal ellipses along the EICC, and 50 km around the Array Area (in order to account for blockage effects).
9	Marine Water and Sediment Quality	
10	Benthic Ecology	20 km around the Project Area in order to conservatively account for suspended sediments.
11	Marine Mammal Ecology	200 km to account for underwater noise impacts.
12	Ornithology	Species-specific, based on breeding season and non-breeding season regional populations.
13	Fish and Shellfish	60 km to account for underwater noise impacts.
14	Commercial Fisheries	For non-scallop targeting fisheries: 100 km. For scallopers: all plans, projects (developments) and activities which overlap with scallop grounds to be included.
15	Shipping and Navigation	50 nautical miles (NM) for most plans, projects (developments) and activities. 2 NM for cables
16	Marine Archaeology	50 km
17	Infrastructure and Other Users	10 NM
18	Military and Civil Aviation	50 km based on potential impacts to aviation radar systems.
19	Socio-economics, Tourism, and Recreation ¹¹	5 km

For **EIAR Vol. 3, Chapter 12: Ornithology**, a separate list of plans, projects (developments) or activities was generated, the approach to any consultation on this list is discussed within the chapter itself, as the topic follows a unique approach.

In addition, a separate list of plans, projects (developments) and activities is provided in **EIAR Vol. 3, Chapter 11: Marine Mammal Ecology** and **EIAR Vol. 4, Appendix 17: Marine Mammal Cumulative Effects Assessment Screening**. The approach to underwater noise modelling necessitates a tailored approach. NatureScot have been consulted on the list of, plans, projects (developments) and activities relevant to marine mammals, as discussed in a meeting on the 2nd October 2024 and agreed by email 14th October 2024.

Operational plans, projects (developments) or activities are considered to be part of the existing baseline and are assessed as part of the Project-specific impact assessment; therefore, are not considered within CEA. Ornithology, commercial fisheries and marine archaeology are notable exceptions to this. In brief, operational plans, projects (developments) or activities (particularly offshore windfarms) represent a potential risk to birds, an area of exclusion

¹¹ Please note, **EIAR Vol. 3, Chapter 19: Socio-economics, Tourism, and Recreation**, also considers cumulative effects in a local (Aberdeenshire Council and Aberdeen Council, Highland Council) and regional (Scotland) context. While CEA is primarily undertaken with reference to plans, projects (developments) and activities within the 5 km Zol, impacts are assessed at a broader scale; although this is done without specific reference to individual plans, projects (developments) and activities throughout the defined local and regional areas.

to fisheries, and marine archaeological receptors (unlike others) have no capacity for recovery once impacted. More comprehensive justification for these differing methodologies is provided in the respective chapters (EIAR Vol. 3, Chapter 12: Ornithology, EIAR Vol. 3, Chapter 14: Commercial Fisheries, and EIAR Vol. 3, Chapter 16: Marine Archaeology). In the case of marine geology, oceanography and coastal processes, blockage effects from operational oil and gas infrastructure could cause modifications to waves, tides and associated sediment transport processes, leading to a morphological response. Therefore, existing oil and gas assets are considered further in EIAR Vol. 3, Chapter 8: Marine Geology, Oceanography and Coastal Processes.

31.2.4.3 Completed Short List

The topic/receptor specific short lists vary based on the differing Zols. Following the justifications provided in Table 31-2 regarding the Zols, the following number of plans, projects (developments) or activities were short-listed for CEA within each chapter:

- 7 plans, projects (developments) or activities were short-listed for consideration within CEA for EIAR Vol. 3, Chapter 8: Marine Geology, Oceanography, and Coastal Processes;
- 7 plans, projects (developments) or activities for EIAR Vol. 3, Chapter 9: Marine Water and Sediment Quality;
- 6 plans, projects (developments) or activities EIAR Vol. 3, Chapter 10: Benthic Ecology;
- 9 plans, projects (developments) or activities for EIAR Vol. 3, Chapter 11: Marine Mammal Ecology;
- 12 plans, projects (developments) or activities for EIAR Vol. 3, Chapter 13: Fish and Shellfish Ecology;
- 19 plans, projects (developments) or activities for EIAR Vol. 3, Chapter 14: Commercial Fisheries;
- 15 plans, projects (developments) or activities for EIAR Vol. 3, Chapter 15: Shipping and Navigation;
- 16 plans, projects (developments) or activities for EIAR Vol. 3, Chapter 16: Marine Archaeology; and
- 7 plans, projects (developments) or activities for EIAR Vol. 3, Chapter 17: Marine Infrastructure and Other Users;

All the topic-specific short lists can be found within the respective chapters. The plans, projects (developments) or activities included within the short lists are assessed cumulatively within each of the chapters wherein specific approaches to assessment are defined. As noted, the approach to the CEA in EIAR Vol. 3, Chapter 12: Ornithology is beyond the scope of this document.

31.3 References

CNR International (2021). Banff and Kyle Fields Decommissioning Programmes (P0009-CNR-EN-REP-00013).

Available online at:

https://assets.publishing.service.gov.uk/media/618bd31b8fa8f50381640215/Banff_and_Kyle_DP.pdf [Accessed on: 19/12/2024]

Scottish Government (2018). Marine Scotland Consenting and Licensing Guidance For Offshore Wind, Wave and Tidal Energy Applications. Available online at:

<https://www.gov.scot/binaries/content/documents/govscot/publications/consultation-paper/2018/10/marine-scotland-consenting-licensing-manual-offshore-wind-wave-tidal-energy-applications/documents/00542001-pdf/00542001-pdf/govscot%3Adocument> [Accessed on: 19/12/2024]



APPENDIX A CUMULATIVE LONG LIST

Northern Endurance Partnership (NEP) East Coast Cluster (Net Zero Teesside and Zero Carbon Humber)	United Kingdom	CCUS	Application	2030	Unknown	<p>The Northern Endurance Partnership (NEP) carbon capture and storage site will capture carbon dioxide from the Net Zero Teesside and East Coast Cluster onshore sites and store it in the Endurance Store saline aquifer. The project will involve drilling of wells at the Endurance Store and the construction of new pipelines. The Endurance Store is approximately 145 km from the Teesside coast.</p> <p>Further details available here: https://www.bp.com/en/global/corporate/news-and-insights/reimagining-energy/northern-endurance-partnership-to-develop-offshore-ccus-infrastructure.html and https://ccushub.ogci.com/focus_hubs/east-coast-cluster/</p> <p>Environmental Statement:https://www.gov.uk/government/publications/northern-endurance-partnership-development. Offshore installation Q1 - Q4 2026, commissioning and first injection in 2027</p>							287.65 NNE	304.90 NNE	287.65 NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
Acorn (Scottish Cluster)	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Acorn is a CO₂ transportation and storage system which reuses legacy oil and gas infrastructure to transport captured industrial CO₂ emissions from the Scottish Cluster, to permanent storage 2.5km (1.5miles) under the North Sea. https://www.theacornproject.uk/</p> <p>As of 15 September 2023, Acorn CCS has been awarded two additional storage licences under the NSTA first carbon storage licensing round.https://www.vikingccs.co.uk/news/harbour-energy-awarded-four-carbon-storage-licences</p>							121.68 SSE	44.73 SSW	44.73 SSW	B2	B2	B2	B4	B4	B2	B3	B4	B4	B2	B4	B4	
Orion CCS (CS017)	United Kingdom	CCUS	Consented	2031	30 years	<p>Designed to deliver a significant Carbon Capture and Underground Storage capacity, with an initial injection capacity of 1Mtpa rising to 6Mtpa and commencing injection in 2031.</p> <p>The full project encompasses both the decommissioned Amethyst field and currently producing West Sole field, utilising depleted gas reservoirs, in which to permanently store captured CO₂ within geological formations.</p> <p>Perenco operate significant infrastructure in the Humberstone area, via the Dimlington Terminal and have the possibility to reuse existing key assets, such as strategic pipelines to facilitate the project.</p> <p>Orion will complement other CCS projects currently in development, providing additional capacity for the decarbonisation of Humberstone and adjacent areas, for a 30-year period.</p> <p>Phase 1 Construction and Commissioning - 2029 - 2031 Phase 2 Build Out 2031 - 2035 Phase 3 Build Out 2035 - 2040</p> <p>https://perenco-ccs.com/the-orion-project/</p>							358.22 NNE	378.02 NNE	358.22 NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
Poseidon Project (CS009)	United Kingdom	CCUS	Consented	2029	40 years	<p>In the North Sea Transition Authority's (NSTA's) first competitive Carbon Capture and Storage (CCS) licence round, Perenco UK and partner Carbon Catalyst Ltd (CCL) were awarded a licence to progress The Poseidon Project, a carbon storage project in the Leman gas field. Leman is the largest reservoir complex in the UKCS, located in the Southern North Sea sector of the UK Continental Shelf (UKCS) and offers a mixture of depleted gas reservoirs and saline aquifers in which to permanently store recovered CO₂. Ultimate storage capacity, utilising both the BC9 aquifer and the various depleted reservoirs is ~1000Mt. The project, which has the potential to significantly decarbonise the East Anglia, Greater London and the Southeast of England, is due to come online by 2029. Initial CO₂ injection rates will be circa 1.5 million tonnes per annum (Mtpa), ramping up to ~10Mtpa by 2034, and with further geological potential to peak up to ~40Mtpa, over a 40-year period.</p> <p>Poseidon Phase 1 Construction and Commissioning - 2026 - 2029 Phase 2 Build Out 2029 - 2032 Phase 3 Build Out 2032 - 3025</p> <p>https://perenco-ccs.com/the-poseidon-project/</p>							414.00 NNE	434.12 NNE	414.00 NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B2	B3	B2
C2023/01 (INEOS and Wintershall)	Denmark	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>License awarded as part of the first licensing round 2022-2023 by the Danish Energy Agency for exploration and storage of CO₂ in the Danish North Sea. The INEOS-Wintershall consortium's license covers depleted oil and gas fields in the Siri Canyon area and is located to the north inside the planning area. https://ens.dk/en/our-responsibilities/ccs-carbon-capture-and-storage/licenses-exploration-and-storage-co2-including</p>							185.25 WNW	204.66 WNW	185.25 WNW	B2	B2	B2	B4	B2	B2	B3	B2	B2	B2	B3	B2	
C2023/02 (TotalEnergies)	Denmark	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>License awarded as part of the first licensing round 2022-2023 by the Danish Energy Agency for exploration and storage of CO₂ in the Danish North Sea. The two licenses awarded to TotalEnergies cover the depleted oil and gas fields in the Harald area. https://ens.dk/en/our-responsibilities/ccs-carbon-capture-and-storage/licenses-exploration-and-storage-co2-including</p>							171.68 WNW	191.99 WNW	171.68 WNW	B2	B2	B2	B4	B2	B2	B3	B2	B2	B2	B3	B2	
C2023/03 (TotalEnergies)	Denmark	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>License awarded as part of the first licensing round 2022-2023 by the Danish Energy Agency for exploration and storage of CO₂ in the Danish North Sea. The two licenses awarded to TotalEnergies cover the depleted oil and gas fields in the Harald area. https://ens.dk/en/our-responsibilities/ccs-carbon-capture-and-storage/licenses-exploration-and-storage-co2-including</p>							178.65 WNW	198.71 WNW	178.65 WNW	B2	B2	B2	B4	B2	B2	B3	B2	B2	B2	B3	B2	
Equinor ASA	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>License blocks 16/6, 16/9, 17/4, 17/5, 17/7, 17/8. https://www.sodir.no/globalassets/1-sodir/fakta/co-to/tiltalsel/1-2024/eng/co2-2024-1-work-program-english.pdf</p> <p>Additional info: https://www.sodir.no/en/whats-new/news/general-news/2024/six-companies-offered-acreage-for-co2-storage/ and https://www.regjeringen.no/en/aktuelt/awarding-four-new-licenses-for-co2-storage-on-the-norwegian-continental-shelf/id3046114/</p>							156.29 SSW	158.26 WSW	156.29 SSW	B2	B2	B2	B4	B2	B2	B3	B2	B2	B2	B3	B2	
Equinor ASA	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>License blocks 25/3, 25/6, 26/1, 26/2, 26/4, 26/5. https://www.sodir.no/globalassets/1-sodir/fakta/co-to/tiltalsel/1-2024/eng/co2-2024-1-work-program-english.pdf</p> <p>Additional info: https://www.sodir.no/en/whats-new/news/general-news/2024/six-companies-offered-acreage-for-co2-storage/ and https://www.regjeringen.no/en/aktuelt/awarding-four-new-licenses-for-co2-storage-on-the-norwegian-continental-shelf/id3046114/</p>							271.94 SSW	265.33 SSW	265.33 SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
Vår Energi ASA, OMF (Norge) AS and Lime Petroleum AS	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>License blocks 25/6, 25/9, 26/4, 26/7. https://www.sodir.no/globalassets/1-sodir/fakta/co-to/tiltalsel/1-2024/eng/co2-2024-1-work-program-english.pdf</p> <p>Additional info: https://www.sodir.no/en/whats-new/news/general-news/2024/six-companies-offered-acreage-for-co2-storage/ and https://www.regjeringen.no/en/aktuelt/awarding-four-new-licenses-for-co2-storage-on-the-norwegian-continental-shelf/id3046114/</p>							233.00 SSW	228.37 SSW	228.37 SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	

Aker BP ASA and PGNIG Upstream Norway AS	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Licence blocks 25/3, 26/1, 26/2, 30/12, 31/10, 31/11. https://www.sodir.no/globalassets/1-sodir/fakta/co-to/tillatelse/nr-1-2024/eng/co2-2024-1-work-program-english.pdf</p> <p>Additional info: https://www.sodir.no/en/whats-new/news/general-news/2024/six-companies-offered-acreage-for-co2-storage/ and https://www.regjeringen.no/en/aktuelt/awarding-four-new-licenses-for-co2-storage-on-the-norwegian-continental-shelf/id3046114/</p>								294.25	SSW	286.01	SSW	286.01	SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2		
EL-001	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Exploitation licence northern lights. Valid from January 2019. https://factpages.sodir.no/en/bsns_arr_area/pageview/all/34751726</p>									342.54	SSW	334.91	SSW	334.91	SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
EXL-002	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Exploration licence valid from June 2022 https://factpages.sodir.no/en/bsns_arr_area/pageview/all/40889547</p>									357.14	SSW	352.98	SSW	352.98	SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
EXL-005	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Exploration licence valid from May 2023 https://factpages.sodir.no/en/bsns_arr_area/pageview/all/41319884</p>									216.46	WSW	229.98	WNW	216.46	WSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
EXL-006	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Exploration licence valid from May 2023. https://factpages.sodir.no/en/bsns_arr_area/pageview/all/41319885</p>									184.34	WSW	196.14	WSW	184.34	WSW	B2	B2	B2	B4	B2	B2	B3	B2	B2	B2	B3	B2	
EXL-007	Norway	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Exploration licence valid from Septemeb 2023 https://factpages.sodir.no/en/bsns_arr_area/pageview/all/41319892</p>									111.16	SSW	111.65	SSW	111.16	SSW	B2	B2	B2	B4	B2	B2	B3	B2	B2	B2	B3	B2	
Longship	Norway	CCUS	Pre-Application (Early Development)	2025	Unknown	<p>Longship is a full-scale carbon capture and storage (CCS) project that will demonstrate the capture of CO₂ from industrial sources, as well as transport and safe storage of CO₂. CO₂ will be captured at Heidelberg Materials' (previously Norcem)'s cement factory and Hafslund Oslo Celso's (previously Fortum Varme) waste incineration plant, then it will be liquefied and collected by ships. It will then be transported to an intermediate storage facility in Øygarden northwest of Bergen, before it is pumped through pipes to the Norwegian continental shelf, where it will be stored safely 2600 meters below the seabed. Initially, there is a storage capacity of 1.5 million tonnes of CO₂ per year at the storage site, while the pipe from the onshore facility to the reservoir is dimensioned for 5 million tonnes. Northern Lights, which is responsible for the transport and storage part of Longship, plans to increase storage capacity to 5 million tonnes per year through an additional development phase (Phase 2) and an increasing customer base. Longship will be operational from early 2025. Both Northern Lights and Heidelberg Materials are on track to initiate operations from 2025.</p> <p>Additional info: https://www.regjeringen.no/en/topics/energy/landingssteder/ny-side/sporsmal-og-svar-om-langskip-prosjektet/id2863902?expand=facebox2995914 and https://norlights.com/what-we-do/ and https://www.regjeringen.no/en/historical-archiver/solbergs-government/Ministries/smk/Press-releases/2020/the-government-launches-longship-for-carbon-capture-and-storage-in-norway/id2765288/ and https://www.equinor.com/energy/northern-lights</p>									383.40	SSW	376.14	SSW	376.14	SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
Aramis Project	Netherlands	CCUS	Pre-Application (Early Development)	2026	Unknown	<p>The Netherlands Authority for Consumers and Markets (ACM) has given approval to competitors Shell and TotalEnergies to collaborate on CO₂ storage in empty natural-gas fields in the North Sea.</p> <p>Shell and TotalEnergies plan to store CO₂ on a large scale as part of the Aramis project, collaborating with the government, Gasunie and Energie Beheer Nederland (EBN) to build a high-capacity trunkline that connects to empty gas fields, among other activities. The project, announced in July 2021, involves developing new CO₂ transport infrastructure to enable offshore CO₂ storage and is based on an 'open access' philosophy to give industrial customers and offshore storage providers the possibility to connect to the infrastructure at a later stage.</p> <p>Partners behind Aramis plan to take a final investment decision by 2023 with an operational start-up in 2026, and aim at a synergistic relationship with the Porthos project.</p> <p>https://www.offshore-energy.biz/dutch-regulator-shell-and-totalenergies-can-collaborate-on-co2-storage/</p>									421.54	NNW	442.33	NNW	421.54	NNW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
L10CCS	Netherlands	CCUS	Pre-Application (Early Development)	2028	Unknown	<p>L10CCS seeks to store 5 Mton CO₂ annually, said to be equivalent to a third of the total CO₂ emissions from Dutch domestic vehicles in one year. L10CCS, to be connected to the Aramis CO₂ transport and storage initiative in the Dutch part of the North Sea, has entered the next phase in the project – front-end engineering design (FEED). Completion of the technical FEED scopes is anticipated during the second half of 2024, with a view to progressing towards a project final investment decision (FID) shortly thereafter in 2025.</p> <p>Neptune Energy noted that the timeline of L10CCS is fully aligned with the Aramis project timeline and is planned to be connected and operational as of the first day of the opening of this CO₂ transport system, now planned in 2028. https://www.offshore-energy.biz/large-scale-dutch-co2-storage-project-passes-to-next-phase/</p>										418.08	NNW	439.12	NNW	418.08	NNW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2
CS025	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>BP EXPLORATION OPERATING COMPANY LIMITED and EQUINOR NEW ENERGY LIMITED. Start Date 1 September 2023. https://www.nstauthority.co.uk/media/9qfjg0j/carbon-dioxide-appraisal-and-storage-licence-cs025-deed-of-variation-dated-13-march-2024-retracted-1.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=54.719704%2C2.685068%2C8.75</p>									276.59	NNE	296.45	NNE	276.59	NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS023	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>CHRYSAOR PRODUCTION (UK) LIMITED and BP EXPLORATION OPERATING COMPANY LIMITED. 1 September 2023. https://www.nstauthority.co.uk/media/mi4pwbak/cs023-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=53.922122%2C3.419215%2C7.96</p>									389.13	NNE	409.27	NNE	389.13	NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS024	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>CHRYSAOR PRODUCTION (UK) LIMITED and BP EXPLORATION OPERATING COMPANY LIMITED. 1 September 2023. https://www.nstauthority.co.uk/media/ybrbxpg/cs024-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=53.922122%2C3.419215%2C7.96</p>									369.14	NNE	389.26	NNE	369.14	NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS008	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>ENI UK Limited. 1 July 2023. https://www.nstauthority.co.uk/media/44oavkxu/cs008-eni-uk-limited-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=53.922122%2C3.419215%2C7.96</p>									418.29	NNE	438.27	NNE	418.29	NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
CS013	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Enquest CCS Limited https://www.nstauthority.co.uk/media/y4dg2wtb/cs013-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessible-version.pdf // License start date 1 August 2023. SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=59.283005%2C2.655878%2C7.27</p>									462.49	SSW	439.34	SSW	439.34	SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS014	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	<p>Enquest CCS Limited Start Date 1 Aug 2023. https://www.nstauthority.co.uk/media/wfwjdf0h/cs014-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessible-version.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=59.283005%2C2.655878%2C7.27</p>									444.23	SSW	423.43	SSW	423.43	SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	

CS015	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	Enquest CCS Limited Start Date 1 August 2023. https://www.nstauthority.co.uk/media/htylrpcf/cs015-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessible-version.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=59.283005%2C2.655878%2C7.27							432.02	SSW	405.91	SSW	405.91	SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS016	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	Enquest CCS Limited Start Date 1 August 2023. https://www.nstauthority.co.uk/media/xhjed3dr/cs016-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessible-version.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=59.283005%2C2.655878%2C7.27							440.71	SSW	416.78	SSW	416.78	SSW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS021	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	Neptune Energy CCS Limited & ESSO Exploration & Production UK Limited. Start Date 1 August 2023. https://www.nstauthority.co.uk/media/xvdzbe2/cs021-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=54.719704%2C2.685068%2C8.75							256.59	NNW	276.69	NNW	256.59	NNW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS020	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	Neptune Energy CCS Limited. Start Date 1 August 2023. https://www.nstauthority.co.uk/media/3lbbkbo1/cs020-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=54.719704%2C2.685068%2C8.75							267.54	NNE	287.45	NNE	267.54	NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS022	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	Neptune Energy CCS Limited. Start Date 1 August 2023. https://www.nstauthority.co.uk/media/v2nlosqm/cs022-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=54.719704%2C2.685068%2C8.75							302.05	NNW	322.24	NNW	302.05	NNW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B4	
CS011	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	Shell UK Limited. Pale Blue Dot Energy Limited. Chrysaor Limited. 1 August 2023. Licence Doc: https://www.nstauthority.co.uk/media/2q3jslr/cs011-pale-blue-dot-energy-limited-and-chrysaor-limited-and-shell-uk-limited-carbon-dioxide-appraisal-and-storage-licence-appraisal-term.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=58.740249%2C2.903002%2C7.27							110.64	SSE	46.48	SSW	46.48	SSW	B2	B2	B2	B4	B4	B2	B3	B4	B4	B4	B4	B4	B4
CS012	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	Shell UK Limited. Pale Blue Dot Energy Limited. Chrysaor Limited. 1 July 2023. https://www.nstauthority.co.uk/media/orukckre/cs012-pale-blue-dot-energy-limited-and-chrysaor-limited-and-shell-uk-limited-carbon-dioxide-appraisal-and-storage-licence-appraisal-term.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=58.740249%2C2.903002%2C7.27							99.06	SSW	76.45	SSW	76.45	SSW	B2	B2	B2	B4	B2	B2	B3	B4	B2	B2	B3	B4	
CS018	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	PERENCO UK LIMITED and Carbon Catalyst Limited. 1 August 2023. https://www.nstauthority.co.uk/media/ku1js0vp/cs018-perenco-west-sole-area-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessible-version.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=53.922122%2C3.419215%2C7.96							337.84	NNE	357.61	NNE	337.84	NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
CS027	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	SHELL UK LIMITED and ESSO Exploration and Production UK Limited. 1 September 2023. https://www.nstauthority.co.uk/media/f3x12qda/cs027-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=53.922122%2C3.419215%2C7.96							391.15	NNW	411.35	NNW	391.15	NNW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
CS026	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	SHELL UK LIMITED and ESSO Exploration and Production UK Limited. 1 September 2023. https://www.nstauthority.co.uk/media/1s5h4vfe/cs026-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=53.922122%2C3.419215%2C7.96							413.91	NNW	434.10	NNW	413.91	NNW	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
CS028	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	Shell UK limited and ESSO Exploration and Production UK Limited. 1 September 2023. https://www.nstauthority.co.uk/media/kmgjwqrx/cs028-carbon-dioxide-appraisal-and-storage-licence-appraisal-term.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=53.922122%2C3.419215%2C7.96							329.62	NNE	349.26	NNE	329.62	NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
CS019	United Kingdom	CCUS	Pre-Application (Early Development)	Unknown	Unknown	SYNERGIA ENERGY CCS LIMITED and WINTERSHALL DEA CARBON MANAGEMENT SOLUTIONS UK (now Harbour Energy). 1 August 2023. https://www.nstauthority.co.uk/media/k5payxri/cs019-synergia-carbon-dioxide-appraisal-and-storage-licence-appraisal-term-accessibility-copy.pdf // SOURCE: https://opendata-nstauthority.hub.arcgis.com/datasets/45c438c321754c9f87ea34c70c3a8020_0/explore?location=53.922122%2C3.419215%2C7.96							438.00	NNE	458.15	NNE	438.00	NNE	B2	B2	B2	B2	B2	B2	B3	B2	B2	B2	B3	B2	
Renewables - INTOG																															
Culzean Floating Offshore Wind Turbine Pilot Project	United Kingdom	Offshore Wind	Consented	2026	10 years	INTOG ID: 12 - TotalEnergies. Description: A single turbine with a capacity of 3 MW. Construction will occur over a one-month period, with cable installation planned for Q3 2025. The lifespan of the pilot turbine will be 10 years, with a minimum duration of 5 years use. Consent granted in August 2024: https://marine.gov.scot/data/marine-licence-application-culzean-floating-offshore-wind-turbine-pilot-project-east-aberdeen							16.71	WSW	30.71	WNW	16.71	WSW	A	A	A	A	A	A	A	A	C	B2	A	A	B2
Cedar (North Sea Renewables Grid (NSRG))	United Kingdom	Offshore Wind	Pre-Application (Early Development)	Unknown	Unknown	INTOG ID: 10 - Cerulean Winds. Description: North Sea Renewables Grid, Cedar development (Capacity 1008 MW). Further information: https://ceruleanwinds.com/north-sea-renewables-grid-nsrg/							29.28	ENE	20.27	NNE	20.27	NNE	B4	B4	B2	B4	B4	B1	B1	C	B4	B2	B4	B4	
Judy Electrification	United Kingdom	Offshore Wind	Pre-Application (Early Development)	Unknown	Unknown	INTOG ID: 13 - Harbour Energy. Judy. 15 MW							53.26	WNW	74.84	NNW	53.26	WNW	B2	B2	B2	B4	B4	B1	B1	C	B2	B2	B3	B4	
Beech (North Sea Renewables Grid (NSRG))	United Kingdom	Offshore Wind	Pre-Application (Early Development)	Unknown	Unknown	INTOG ID: 9 - Cerulean Winds. Description: North Sea Renewables Grid, Beech development (Capacity 1008 MW). Further information: https://ceruleanwinds.com/north-sea-renewables-grid-nsrg/							57.87	SSW	55.41	SSW	55.41	SSW	B2	B2	B2	B4	B4	B1	B1	C	B2	B2	B3	B4	
Floating Offshore Wind Farm Harbour Energy	United Kingdom	Offshore Wind	Pre-Application (Early Development)	Unknown	Unknown	INTOG ID: 8 - Harbour Energy. 15 MW. Project potentially cancelled.							66.63	SSE	51.29	SSW	51.29	SSW	B2	B2	B2	B4	B4	B1	B1	C	B2	B2	B3	B4	
Aspen (North Sea Renewables Grid (NSRG))	United Kingdom	Offshore Wind	Pre-Application (Early Development)	Unknown	Unknown	INTOG ID: 7 - Cerulean Winds. Description: North Sea Renewables Grid, Aspen development (Capacity 1008 MW). Further information: https://ceruleanwinds.com/north-sea-renewables-grid-nsrg/							97.24	ESE	11.83	SSW	11.83	SSW	B2	B2	B4	B4	B4	B1	B1	B4	B4	B4	B4	B4	
Green Volt Offshore Wind Farm	United Kingdom	Offshore Wind	Consented	2027	50 years	INTOG ID: 6. Flotation Energy. Consent is being sought for a floating offshore wind farm off the coast of North East Scotland, consisting of 30 turbines. The Project would complete electrification of the Buzzard oil and gas field in addition to an export cable to shore. A Scoping Report was submitted for the site in November 2021 and the Marine Licence and Section 36 applications were submitted in February 2023. Construction is expected to commence in Q4 2025 (with site investigation surveys occurring in the two years prior), with the site being operational in late 2027. Latest information on the project suggests that operation will now be reached in 2027. Further details available here: https://marine.gov.scot/ml/green-volt-floating-offshore-wind-farm							127.92	ESE	0.00	SSW	0.00	SSW	B2	B2	B2	A	A	A	A	A	C	C	C	A	C

Broadshore Hub Offshore Wind Farms	United Kingdom	Offshore Wind	Pre-Application (Scoping)	2033 (assumed)	25 to 50 years	Development of a 900MW floating offshore wind farm north of Fraserburgh, Scotland. The site secured development rights as part of Crown Estate Scotland's competitive first ScotWind leasing round. The wind farm falls under the designated NE6 option area. A scoping report was submitted in January 2024. https://marine.gov.scot/ml/scoping-broadshore-hub-wind-farm-development-areas-moray-firth . It notes construction could commence seven years from consent award, with construction phase of two to three years. A conservative assumption of construction starting in 2030 has been made here. It is noted that the 99.5MW Sinclair and 99.5MW Scaraben floating arrays, that were awarded in the 2023 INTOG auction, are a part of a phased delivery of the Broadshore project.				202.02	ESE	60.56	SSE	60.56	SSE	B2	B2	B2	B3	B2	B1	B1	B2	B2	B2	B3	B2	
Ossian Offshore Wind Farm	United Kingdom	Offshore Wind	Application	2031	Unknown	Application submitted July 2024. https://www.ossianwindfarm.com/array-consent-application . Commencement of offshore construction phase (site preparation activities) expected Q2 2031. Completion of construction expected Q4 2038. More info: https://marine.gov.scot/node/23264				89.03	ENE	66.12	NNE	66.12	NNE	B2	B2	B2	C	B2	C	C	C	B2	B2	B3	B2	
Morven Offshore Wind Array Project	United Kingdom	Offshore Wind	Pre-Application (Scoping)	2036 (assumed)	Unknown	Development of a 2.9GW offshore wind farm around 60km off the coast of Aberdeen. The site secured development rights as part of Crown Estate Scotland's competitive first ScotWind leasing round. The approximately 860km2 lease is in the designated option area E1 and will feature fixed-bottom turbines. The Scoping Report for the array was submitted in July 2023: https://marine.gov.scot/sites/default/files/230728_-_morven_-_scop-0028_-_scoping_-_scoping_submission_scoping_report_-_developer_to_md-lot_redacted.pdf . Virtual consultation documentation for the project suggests that, following examination, a decision from the Secretary of State could be expected in 2028. The Scoping Report indicates a construction phase of seven years. A conservative assumption has been made here suggesting that, based on the anticipated consent timeline, construction will commence in 2029 and be completed in 2035.				120.82	ENE	67.10	NNE	67.10	NNE	B2	B2	B2	C	B2	B1	B1	B2	B2	B2	B2	B3	B2
Caledonia Offshore Wind Farm	United Kingdom	Offshore Wind	Application	2031	Unknown	Development of a 2GW offshore wind farm in the outer Moray Firth in Scotland, to the east of the Moray East Offshore Wind Farm, with up to 150 turbines. The site secured development rights as part of Crown Estate Scotland's competitive first ScotWind leasing round. The 429km2 area - designated as NE4 by Marine Scotland in 2020 - has water depths from 40 to 100 metres and will feature both fixed bottom and floating foundations (75-25% split). Fixed turbines of up to 111 units will feature in the 307 square-kilometre northern portion of the site, and the remaining 39 floating units in the 122 square-kilometre area's southern end of the lease zone. Turbines rated at between 14MW and 25MW with rotors of up to 310 metres on towers of up to 200 metres are in the frame. Its output is expected to meet the needs of over 1 million average UK households, and consideration is being given to using part of the output for green hydrogen production. The distance from shore is also short enough to support AC instead of DC transmission. The wind farm will be developed in two phases, Caledonia North and Caledonia South. The windfarm is located in the Moray Firth and is expected to have a capacity of 2 GW. Assuming the Proposed Development is awarded the necessary consents, it is anticipated that construction of the offshore elements will take approximately 3 years (subject to change) between 2028 to 2030. Scoping Report submitted in October 2022.				234.74	ESE	67.85	SSE	67.85	SSE	B2	B2	B2	B3	B2	C	C	B2	B2	B2	B2	B3	B2
Buchan Offshore Wind	United Kingdom	Offshore Wind	Pre-Application (Scoping)	2031	Unknown	Located 75 km northeast of Fraserburgh on the Aberdeenshire Coast with a capacity of around 1GW, NE8. Scoping Report submitted September 2023. https://marine.gov.scot/datafiles/lot/buchan/230928-Buchan_Offshore_Wind-Scoping-Offshore_Scoping_Report.pdf . It is anticipated that construction offshore may commence around 2028 and take between three and five years to complete, although three years is considered more likely at this stage.				186.34	ESE	70.89	SSW	70.89	SSW	B2	B2	B2	C	B2	C	C	B2	B2	B2	B3	B2	
Seagreen Alpha and Bravo Offshore Wind Farms	United Kingdom	Offshore Wind	Operational	2023	25 years	Situated 27km off the Angus coastline in the North Sea and 66km off the East Lothian coastline, Seagreen has 114 turbines with a total generating capacity of 1,075MW. https://www.seagreenwindenergy.com/ Seagreen became operational in October 2023. https://marine.gov.scot/ml/seagreen-alpha-and-bravo-offshore-wind-farms				173.85	ENE	83.16	NNE	83.16	NNE	B2	B2	B2	A	B2	A	A	A	B2	B2	B3	B2	
Moray East Offshore Windfarm	United Kingdom	Offshore Wind	Operational	2019	25 years	Fixed - bottom offshore wind farm (295 km2) within the Moray Firth, consented in 2014. Construction began in 2018. Installation of the turbines was completed in September 2021. The site became operational in 2022. Further details available here: https://www.morayeast.com/				248.10	ESE	84.19	SSE	84.19	SSE	B2	B2	B2	A	B2	A	A	A	B2	B2	B3	B2	
Seagreen 1A Offshore Wind Farm	United Kingdom	Offshore Wind	Consented	2025	25 years	Seagreen was originally consented for up to 150 turbines. The remaining 36 turbines are still to be built. These turbines form part of the Seagreen 1A project which has consent to connect to the National Grid at Cockenzie in East Lothian. In December 2021, Scottish Government Ministers granted the Marine Licence. The Marine Licence covers the offshore elements of the project, including an export cable approximately 110km in length, to connect the project to the grid at Cockenzie. https://www.seagreen1a.com/ . https://marine.gov.scot/ml/seagreen-alpha-and-bravo-offshore-wind-farms and https://www.seagreen1a.com/documents As of 2022, construction was planned to commence 2023 and be operational by 2024/2025. https://energycentral.com/news/seaway-7-has-been-designated-preferred-supplier-seagreen-1a#:text=Execution%20of%20the%20scope%20will%20be%20led%20from,late%202024%20and%20could%20be%20operational%20by%202025%2F26 .				188.43	ENE	92.26	NNE	92.26	NNE	B2	B2	B2	A	B2	A	A	A	B2	B2	B2	B3	B2
Moray West Offshore Wind Farm	United Kingdom	Offshore Wind	Under Construction	2025	25 years	Fixed-bottom offshore wind farm of up to 85 wind turbines, consented in early 2019, with construction planned in 2022 / 2023 - lasting to 2024 / 2025. Further details available here: https://www.moraywest.com/about-us/project Delivered first Power in July 2024				261.93	ESE	92.60	SSE	92.60	SSE	B2	B2	B2	A	B2	A	A	A	B2	B2	B3	B2	
Stromar Offshore Wind Farm	United Kingdom	Offshore Wind	Pre-Application (Scoping)	2033	25 - 50 years	Development of a 1GW floating offshore wind farm east of Caithness, Scotland. The site secured development rights as part of Crown Estate Scotland's competitive first ScotWind leasing round. The wind farm falls under the designated NE3 option area. Scoping Report submitted in January 2024. https://marine.gov.scot/sites/default/files/240110_-_scotwind_ne3_-_stromar_-_scoping_-_scoping_opinion_-_scoping_report.pdf The current programme assumes the Proposed Offshore Development will become commercially operational between 2030 and 2033. The construction phase is seven years.				232.93	ESE	93.42	SSE	93.42	SSE	B2	B2	B2	B3	B2	C	C	B2	B2	B2	B3	B2	
Inch Cape Offshore Wind Farm	United Kingdom	Offshore Wind	Consented	2025	Operational life of 50 years (~2075)	Fixed-bottom offshore wind farm within the Firth of Forth and Tay region, consisting of up to 72 turbines. Offshore construction is expected to commence in 2023 and will be completed by 2025. Further details available here: https://www.inchcapewind.com/				207.80	ENE	94.55	NNE	94.55	NNE	B2	B2	B2	A	B2	A	A	B2	B2	B2	B3	B2	
Beatrice Offshore Wind Farm (BOWL)	United Kingdom	Offshore Wind	Operational	2019	Unknown	Located approximately 13km from the Caithness coast, Beatrice became fully operational in June 2019. Beatrice has 84 wind turbines, with a 588 MW installed capacity. The consent application was submitted in 2012 and granted in 2014. https://marine.gov.scot/datafiles/lot/bowl/ES/ES%20Volume%201%20-%20ES%20Sections/7_Project%20Description.pdf				264.66	ESE	101.64	SSE	101.64	SSE	B2	B2	B2	A	B2	B2	A	B2	B2	B2	B3	B2	

Berwick Bank Wind Farm	United Kingdom	Offshore Wind	Application	2027	Unknown	Consent is being sought for a fixed-bottom offshore wind farm in the Firth of Forth and Tay region, consisting of up to 307 turbines. A Scoping Report for the site was submitted in 2021. The consent application was submitted in December 2022. Offshore construction expected to commence in 2025, with the site being operational in 2033. Further details available here: https://www.berwickbank.com/							173.92	ENE	105.09	NNE	105.09	NNE	B2	B2	B2	C	B2	B2	C	B2	B2	B2	B3	B2	
Near na Gaoithe Offshore Wind Farm	United Kingdom	Offshore Wind	Operational	2020	Operational life of 25 years (~2047)	Fixed-bottom offshore wind farm within the Firth of Forth and Tay region, consisting of up to 54 turbines. Construction commenced in 2020. As of April 2024, testing and commissioning phase began and full operations will occur in 2024. Further details available here: https://nngoffshorewind.com/project/								222.70	ENE	122.84	NNE	122.84	NNE	B2	B2	B2	A	B2	B2	A	B2	B2	B2	B3	B2
Ayre Offshore Wind Farm	United Kingdom	Offshore Wind	Pre-Application (Scoping)	2034	Unknown	Development of a 1GW floating offshore wind farm off the coast of Orkney. The site secured development rights as part of Crown Estate Scotland's competitive first ScotWind leasing round. The 201km2 area - designated as NE2 - will be developed in two phases. 50-60 turbines will be located 33 kilometres from the East Mainland of Orkney, in water depths of up to 100 metres. Turbine capacities will have an individual capacity of 18-25 MW each, depending upon the final design choice. The preferred project concept would utilise tension-leg platform (TLP) foundations but this will depend on ground and sea state data. Scoping Report submitted July 2024. https://marine.gov.scot/node/25327 Construction to commence 2029.								256.32	SSE	131.02	SSE	131.02	SSE	B2	B2	B2	B3	B2	B2	C	B2	B2	B2	B3	B2
ForthWind Demonstration Project	United Kingdom	Offshore Wind	Consented	2024	25 years	Consent application submitted in May 2022, with consent granted in March 2023. https://marine.gov.scot/ml/marine-licence-forthwind-offshore-wind-demonstration-project-methyl-firth-forth-0009834 EIA: https://marine.gov.scot/data/environmental-impact-assessment-report-forthwind-offshore-wind-demonstration-project-methyl-firth-forth-0009834 . Construction works will take 3 months, with the total construction phase of six months. Further information: https://forthwind.co.uk/								280.31	ENE	165.41	NNE	165.41	NNE	B2	B2	B2	A	B2	B2	A	B2	B2	B2	B3	B2
Pentland Floating Offshore Wind Farm	United Kingdom	Offshore Wind	Consented	2026	25 years	Development of a 100MW floating offshore wind farm featuring 7 turbines. The project will be developed in two phases: The first stage consists of a single turbine demonstrator capable of generating 8.6MW. The second stage is the larger array project comprising of the rest of the turbines, which will be collectively capable of generating up to 100MW. Variation submitted in October 2023 (https://marine.gov.scot/node/24535), following submission of the consent application in August 2022 (https://marine.gov.scot/node/22753). Variation proposed 6 turbines, operational life of 25 years. Variation approved April 2024. The offsite fabrication activities for the Offshore Development are planned to commence upon financial close, anticipated in Q4 2024, and will continue for approximately 18 months. The full array is anticipated to be commissioned and operational by the end of Q4 2026. Further details available here: https://pentlandfloatingwind.com/ As of 3 September 2024, Pentland has not been successful in the UK's sixth Contract for Difference (CFD) Allocation Round (AR6) and therefore will not be reaching financial close and beginning construction in 2024.								346.67	ESE	192.56	SSE	192.56	SSE	B2	B2	B2	A	B2	B1	B1	B2	B2	B2	B3	B2
West of Orkney Wind Farm	United Kingdom	Offshore Wind	Application	2028	30 years	Development of a 2GW offshore wind farm 30km off the west coast of Orkney in Scotland. The site secured development rights as part of Crown Estate Scotland's competitive first ScotWind leasing round. The development in the N1 zone will feature fixed-bottom foundations and could deliver renewable power to the Flotta Hydrogen Hub, a proposed large-scale green hydrogen production facility in Orkney. Offshore construction will commence in 2028, with first power in 2029. Operational life of 30 years. EIA Application submitted October 2023. https://www.westoforkney.com/planning-consent/west-orkney-offshore-application								355.76	ESE	201.65	SSE	201.65	SSE	B2	B2	B2	B2	B2	B2	A	B2	B2	B2	B3	B2
Dogger Bank Wind Farm phase B	United Kingdom	Offshore Wind	Under Construction	2023	Design life of 35 years (~2059)	Dogger bank offshore wind farm, off the east coast of England, is being developed in three phases across Dogger Bank A, B and C. The second phase is Dogger Bank b which will consist of up to 95 turbines. Construction commenced in 2023 with Dogger Bank B is expected to be operational in 2024. Further details available here: https://doggerbank.com/about/								208.81	NNE	228.94	NNE	208.81	NNE	B2	B2	B2	B2	B2	B2	A	B2	B2	B2	B3	B2
Sofia Offshore Wind Farm	United Kingdom	Offshore Wind	Under construction	2023	Unknown	Sofia offshore wind farm is located off the east coast of England and will consist of up to 100 fixed-bottom turbines. Consent was granted in 205 for the site (then named Dogger Bank Teesside B). Offshore construction commenced in 2023 and completed in 2026. Further details available here: https://sofiawindfarm.com/								210.43	NNW	230.61	NNW	210.43	NNW	B2	B2	B2	B2	B2	B2	A	B2	B2	B2	B3	B2
Dogger Bank C Offshore Wind Farm	United Kingdom	Offshore Wind	Under Construction	2024	Design life of 35 years (~2060)	Dogger bank offshore wind farm, off the east coast of England, is being developed in three phases across Dogger Bank A, B and C. The third phase is Dogger Bank C which will consist of up to 87 turbines. Construction commenced in 2024 with Dogger Bank C is expected to be operational in 2025. Further details available here: https://doggerbank.com/about/								217.93	NNW	238.06	NNW	217.93	NNW	B2	B2	B2	B2	B2	B2	A	B2	B2	B2	B3	B2
Dogger Bank A Offshore Wind Farm	United Kingdom	Offshore Wind	Under Construction	2022	Design life of 35 years (~2058)	Dogger bank offshore wind farm, off the east coast of England, is being developed in three phases across Dogger Bank A, B and C. The first phase is Dogger Bank A which will consist of up to 95 turbines. Construction commenced in 2022 and first power was produced in October 2023. Further details available here: https://doggerbank.com/about/								237.16	NNE	257.25	NNE	237.16	NNE	B2	B2	B2	B2	B2	B2	A	B2	B2	B2	B3	B2

Thybo	Denmark	Offshore Wind	Unknown/On Hold	Unknown	Unknown	In 2023, the Danish Energy Agency suspended the processing of some offshore wind developments. Further details available here: https://www.4coffshore.com/windfarms/denmark/thybo-denmark-dk1.r.html#:~:text=View%204C%20Offshores%20latest%20information%20on%20Thybo%20Offshore%20Wind%20farm						265.14	WNW	279.78	WNW	265.14	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2		
Thybo II	Denmark	Offshore Wind	Unknown/On Hold	Unknown	Unknown	In 2023, the Danish Energy Agency suspended the processing of some offshore wind developments. Further details available here: https://www.4coffshore.com/windfarms/denmark/thybo-ii-denmark-dk1u.html							367.83	WNW	381.80	WNW	367.83	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2		
Vesterhav Nord	Denmark	Offshore Wind	Operational	2023	Unknown	The project became operational in 2023. Further details available here: https://www.power-technology.com/projects/vesterhav-nord-and-syd-offshore-wind-project-north-sea-denmark/?cf-view							383.06	WNW	398.84	WNW	383.06	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2		
Vesterhav Syd	Denmark	Offshore Wind	Operational	2024	Unknown	Vesterhav Syd's 20 wind turbines were erected from July to September last year. On 10 November 2023, Vattenfall delivered the farm's first power. Further details available here: https://group.vattenfall.com/press-and-media/pressreleases/2024/danish-offshore-wind-farms-vesterhav-nord-and-vesterhav-syd-inaugurated#:~:text=Combined,%20the%20winds%20farms%20are%20expected%20to%20generate%20an%20annual							391.95	WNW	409.51	WNW	391.95	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2	
Vigso Bay	Denmark	Offshore Wind	Unknown/On Hold	Unknown	Unknown	In 2023, the Danish Energy Agency suspended the processing of some offshore wind developments. Further details available here: https://www.4coffshore.com/windfarms/denmark/vigso-c3b8-bay-denmark-dk2g.html#:~:text=View%204C%20Offshores%20latest%20information%20on%20Vigso%20C3%88%20Bay%20Offshore%20wind							414.49	WNW	428.68	WNW	414.49	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2	
Fano Bugt	Denmark	Offshore Wind	Unknown/On Hold	Unknown	Unknown	In 2023, the Danish Energy Agency suspended the processing of some offshore wind developments. Further details available here: https://www.4coffshore.com/windfarms/Denmark/fan%20C3%88-bugt---screened-area-for-future-offshore-wind-project-denmark-dk0g.html#:~:text=View%204C%20Offshores%20latest%20information%20on%20Fan%20C3%88%20Bugt%20-%20Screened							425.15	WNW	444.90	WNW	425.15	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2
Nordsren II vest	Denmark	Offshore Wind	Pre-Application (Early Development)	2027	Unknown	Project should be operational by 2027. Project joined with Nordsren III vest. Further details available here: https://www.4coffshore.com/windfarms/denmark/vest-nords-c3b8-ben-ii-2b-iii---screened-area---island-connection-denmark-dk0u.html#:~:text=View%204C%20Offshores%20latest%20information%20on%20Vest%20Nords%20C3%88ben%20II%20+							306.84	WNW	326.67	WNW	306.84	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2	
Jammerbugt	Denmark	Offshore Wind	Unknown/On Hold	Unknown	Unknown	This Screened Area for future offshore wind projects was omitted in a report published by The Danish Energy Agency in 2020. Therefore, the development area is assumed to be cancelled. Further details available here: https://www.4coffshore.com/windfarms/Denmark/jammerbugt---screened-area-for-future-offshore-wind-project-denmark-dk0j.html#:~:text=View%204C%20Offshores%20latest%20information%20on%20Jammerbugt%20-%20Screened%20Area							435.21	WNW	449.03	WNW	435.21	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2	
Nordsren III vest	Denmark	Offshore Wind	Pre-Application (Early Development)	Unknown	Unknown	Project should be operational by 2027. Project joined with Nordsren II vest. Further details available here: https://www.4coffshore.com/windfarms/denmark/vest-nords-c3b8-ben-ii-2b-iii---screened-area---island-connection-denmark-dk0u.html#:~:text=View%204C%20Offshores%20latest%20information%20on%20Vest%20Nords%20C3%88ben%20III%20+							234.45	WNW	252.40	WNW	234.45	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2
Thor	Denmark	Offshore Wind	Under Construction	2027	Unknown	The project will feature 72 offshore wind turbines, making it Denmark's largest windfarm. Construction is due to begin in 2026 with operation following in 2027. Further details available here: https://thor.rwe.com/project-information							356.20	WNW	373.85	WNW	356.20	WNW	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	B2	
Other Renewables																																
Meygen (Inner Sound)	United Kingdom	Tidal	Operational	2018	25 years	Phase 1 of the project is operational with Phase 2 and Phase 3 targeting commissioning in 2027 and 2028 respectively. Further detail available here: https://saerenewables.com/tidal-stream/meygen/							302.90	ESE	148.79	SSE	148.79	SSE	B2	B2	B2	A	B2	A	B2	B2	B2	B2	B3	B2		
European Marine Energy Centre (EMEC) Scapa Flow	United Kingdom	Wave	Operational	Unknown	Unknown	The Scapa Flow scale wave test site allows the European Marine Energy Centre (EMEC) to test their prototype devices. Further details available at: https://www.emec.org.uk/?wpfb_dl=401							306.04	ESE	168.14	SSE	168.14	SSE	B2	B2	B2	A	B2	A	B2	B2	B2	B2	B3	B2		
European Marine Energy Centre (EMEC) Deer Sound (United Kingdom	Tidal	Operational	2020	17 years	Orbital Marine Power (Orkney) plc deployed the Orbital O2 2MW tidal turbine at the EMEC Fall of Wharfedale test site in Orkney in 2020 for a long-term deployment of up to 17 years. In order to perform certain maintenance tasks on the turbine or infrastructure on site, the turbine will need to be removed for varying periods of time. It is proposed that a simple mooring is established in a sheltered location, and a location in Deer Sound has been selected for this purpose. Further details are available here: https://marine.gov.scot/sites/default/files/supporting_information_0.pdf							305.80	SSE	171.89	SSE	171.89	SSE	B2	B2	B2	A	B2	A	B2	B2	B2	B2	B2	B3	B2	
European Marine Energy Centre (EMEC) Shapinsay Sound	United Kingdom	Tidal	Operational	Unknown	Unknown	The Scapa Flow scale wave test site allows the European Marine Energy Centre (EMEC) to test their prototype devices. Further details available at: https://www.emec.org.uk/?wpfb_dl=401							311.07	SSE	179.49	SSE	179.49	SSE	B2	B2	B2	A	B2	A	B2	B2	B2	B2	B3	B2		
European Marine Energy Centre (EMEC) Fall of Wharfedale	United Kingdom	Tidal	Operational	2020	17 years	The Scapa Flow scale wave test site will allow the European Marine Energy Centre (EMEC) to test their prototype devices. Further details available at: https://www.emec.org.uk/?wpfb_dl=401							316.81	SSE	188.33	SSE	188.33	SSE	B2	B2	B2	A	B2	A	B2	B2	B2	B2	B3	B2		
European Marine Energy Centre (EMEC) Billia Croo	United Kingdom	Wave	Operational	Unknown	Unknown	The Scapa Flow scale wave test site will allow the European Marine Energy Centre (EMEC) to test their prototype devices. Further details available at: https://www.emec.org.uk/?wpfb_dl=401							332.00	ESE	185.66	SSE	185.66	SSE	B2	B2	B2	A	B2	A	B2	B2	B2	B2	B3	B2		

Westray Tidal Array	United Kingdom	Tidal	Pre-Application (Scoping)	2030	25 years	<p>The Westray South Tidal Array project consists of a 200MW tidal array which would require the installation and operation of up to 200 tidal turbines. The project is located in the Westray Firth off the coasts of Eday, Egilsay and Rousay. The agreement for lease was issued by the crown estate in 2010, with a formal request for a scoping opinion in 2011. https://tethys.pnnl.gov/sites/default/files/publications/Westray_South_Tidal_Array_ESR.pdf</p> <p>In 2023, it was announced that a subset of the original lease has been awarded to Orbital Marine Power as part of the Orbital Marine Power Westray Firth Tidal Array. The Westray Tidal Array Project aims to install around 70 Orbital tidal turbine devices at Westray Firth, Orkney, with a total generating capacity of 170 MW. The project will pass through the EMEC Fall of Warness tidal array. A scoping report was submitted in 2023. https://marine.gov.scot/sites/default/files/scoping_report_8.pdf</p> <p>The 2023 Scoping Report states that installation is expected to take 5 years and commence in the late 2020s or would take place around 2030, with an operational life of 25 years and decommissioning around 2055.</p>	321.46 SSE	192.54 SSE	192.54 SSE	B2	B2	B2	B3	B2	C	B2	B2	B2	B2	B3	B2
Yell Sound Array	United Kingdom	Tidal	Pre-Application (Early Development)	Unknown	Unknown	<p>As of 2022, Nova has been awarded an Option Agreement from Crown Estate Scotland to develop a 15MW tidal array at Yell Sound, between the islands of Yell and Bigga. https://novainnovation.com/news/nova-innovation-wins-seabed-lease-to-help-drive-shetlands-clean-energy-future</p>	392.68 SSE	327.74 SSW	327.74 SSW	B2	B2	B2	B2	B2	B1	B2	B2	B2	B2	B3	B2
Bluemull Sound	United Kingdom	Tidal	Operational	2016	20 years (2038)	<p>Nova Innovation - Shetland Tidal Array. In 2016, Nova Innovation deployed the world's first offshore tidal array to supply electricity to the grid with greater than 17,000 generating hours reached in 2019. The first three Nova M100 devices (installed capacity 300 kW) were deployed in 2016 and 2017. In 2018, Nova Innovation was granted licences to extend the array to six turbines (increase capacity to 600 kW) and reconfigure the turbines within the array. In August 2020 a fourth 100 kW turbine was added to the array. A further two 100 kW turbines were installed in 2021, taking the total to six. https://marine.gov.scot/sma/assessment/case-study-nova-innovation-shetland-tidal-array.</p> <p>In 2023 licences were granted to partially decommission the array by removing the three original M100 turbines and associated offshore infrastructure. Decommissioning the three M100 devices was completed in October 2023. https://tethys.pnnl.gov/project-sites/nova-innovation-shetland-tidal-array</p> <p>Array operation is between 2018 to 2038, with decommissioning in 2038. https://marine.gov.scot/sites/default/files/extension_environmental_assessment_report_-_12_february_2018.pdf</p>	408.71 SSE	347.94 SSW	347.94 SSW	B2	B2	B2	B2	B2	A	B2	B2	B2	B2	B3	B2