Offshore Update - July 2022

Document No.	GBPNTD-PGM-PEN-CM-00003
Project:	Pentland Floating Offshore Windfarm
Originator Company	Pentland FOWF
Revision	01
Classification	Public
Author	OR Creative
Date	01.07.2022

Revision History:

Revision	Date	Status	Author	Reviewed	Approved
01	01.072022	For Information	OR Creative	RJM	ABL

Only the right/intended addressees are allowed to access and read this document. This document may contain confidential information and shall not be disclosed to any third party, referred to or published without Highland Wind Limited's prior written approval.

PENTLAND FLOATING OFFSHORE WIND FARM

WELCOME

Welcome to the project information update for the Pentland Floating Offshore Wind Farm. We have prepared this update to keep local residents and other interested stakeholders informed and to show how we've taken on board the feedback received during the consultations, as we prepare to submit the application for the Pentland Floating Offshore Wind Farm.

Throughout the previous consultation periods we received valuable feedback from the local community and other project stakeholders. We have reviewed this feedback carefully and considered how the project design could be refined to take this on board.

The aim of this update is to share how previous feedback has informed the project design which will be submitted to Marine Scotland for determination. The virtual exhibition shows key project design changes on the offshore elements. The project design will continue to be reviewed and optimised as the project moves from the development phase to construction.

The Pentland Floating Offshore Wind Farm website **www.pentlandfloatingwind.com** provides further information about the project. Should you have any further questions or feedback on the changes, you can contact us at **pentland-stakeholder@cop.dk**.

WHO WE ARE

Pentland Floating Offshore Wind Farm is being developed by Highland Wind Limited which is majority owned by a fund managed by Copenhagen Infrastructure Partners (CIP) with Hexicon AB as a minority shareholder. Project development activities are being led by CIP's development partner, Copenhagen Offshore Partners (COP). The project development team is based in COP's Global Floating Wind Competence Centre, recently established in Edinburgh.

CIP Copenhagen Infrastructure Partners

Copenhagen Infrastructure Partners P/S (CIP) is a fund management company focused on energy infrastructure including offshore wind, onshore wind, solar photovoltaic (PV), biomass and energy-from-waste, transmission and distribution, reserve capacity and storage, and other energy assets like Power-to-X.

CIP has offices in Copenhagen, Hamburg, New York, Tokyo, Utrecht, Melbourne and London. CIP was founded in 2012 by senior executives from the energy industry in cooperation with PensionDanmark. CIP manages eight funds and has approximately €16 billion under management.

www.cipartners.dk

COP COPENHAGEN OFFSHORE PARTNERS

Copenhagen Offshore Partners (COP) is a leading and experienced provider of project development, construction management, and operational management services to offshore wind projects.

The company is headquartered in Denmark and has offices in Taiwan, USA, Australia, Japan, South Korea, UK & Vietnam. COP's team of specialists has a broad range of competencies within project management, early and late-stage project development, engineering, construction, procurement, operational management as well as business development and project financing.

www.cop.dk

hexicon

Hexicon AB is a leading floating offshore wind technology and project developer. It was founded in 2009 and is headquartered in Stockholm, Sweden.

www.hexicon.eu

PENTLAND FLOATING OFFSHORE WIND FARM

RESPONDING TO FEEDBACK

During the consultation process we received valuable feedback regarding local concerns over certain aspects of the project. The Pentland Floating Offshore Wind Farm is currently undertaking an Environmental Impact Assessment (EIA) to establish the potential impacts on various receptors in the vicinity of the Project. An extensive programme of surveys have been undertaken to underpin the EIA. The final results of the assessments will be detailed within the EIA Reports but preliminary results, where available, are indicated below:

VISUAL IMPACTS

During the public consultations, feedback was received from some of the local community regarding potential concerns over the visual impact of the wind farm. In response to this feedback, the Offshore Site of the Pentland Floating Offshore Wind Farm has now been reduced by half. This decision has been taken with the primary aim of reducing the horizontal spread associated with the wind farm when viewed from the north coast. As this reduction limits the footprint available to locate the wind turbine generators (WTGs) and associated offshore infrastructure by 50%, this demonstrates the commitment the project has made to minimise the potential visual impacts from the wind farm on land-based receptors. In addition, the maximum number of turbines being applied for has reduced from ten down to seven which will further reduce the potential visual impacts.

IMPACT ON TOURISM

Feedback was received regarding the potential impact of the Pentland Floating Offshore Wind Farm on tourism. Studies have shown that existing and proposed wind farm developments are predicted to have little overall economic effect on tourism in Scotland. For more information: https://www.climatexchange.org.uk/research/projects/the-impact-of-wind-farms-on-scottish-tourism/. Assessments of the impacts of the Pentland Floating Offshore Wind Farm on tourism are on-going but preliminary results show that there will be no significant effects on tourism throughout the life-cycle of the project. The final results of the assessment will be available in the Offshore EIA Report.

IMPACT ON BIRDS

During the consultations, feedback was received regarding the potential impacts on birds. The maximum number of turbines being applied for has reduced from ten down to seven which will reduce the potential impacts on seabirds in terms of displacement and barrier effects. In addition, the minimum blade tip clearance from the sea surface has been increased to 35m above mean sea level. A key driver for this change was to minimise the potential impacts to seabirds in terms of collision risk. Detailed assessments of the potential impacts upon birds are currently being undertaken and are supported by in-depth modelling with input from industry leading experts and consultation with regulators. The modelling is still ongoing and the final results will be detailed within the Offshore EIA Report.

IMPACT ON MARINE MAMMALS

We received feedback regarding the potential impact of the Pentland Floating Offshore Wind Farm on marine mammals. The reduction in the area for the Offshore Site and the decrease in the maximum number of turbines being applied for, from ten down to seven, and corresponding decrease in the total number of mooring lines, piles and anchoring infrastructure being consented will reduce the potential impacts on marine mammals. Detailed assessments on the potential impacts on marine mammals and other megafauna e.g. basking sharks are currently being completed. These are supported by the results of aerial surveys and underwater noise modelling. Currently the underwater noise modelling assessments are on-going with input from industry leading experts. However, preliminary results of the underwater noise modelling highlight that there will be no significant effects on marine mammals from the pre-construction and construction related activities. The final results of the assessments, including the findings of effects on marine mammals from other assessed impacts will be detailed within the Offshore EIA Report.

IMPACTS ON SHIPPING & NAVIGATION

Feedback was received regarding the potential impact of the Pentland Floating Offshore Wind Farm on shipping and navigation. The reduction in the area for the Offshore Development and the decrease in the maximum number of turbines being applied for, from ten down to seven, and corresponding decrease in the total number of mooring lines, piles and anchoring infrastructure being consented will reduce the potential impacts on shipping and navigation and other sea users. The impact assessment on shipping and navigation has been supported by vessel traffic surveys and various consultations, including hazard identification workshops with relevant stakeholders. Currently the impact assessment is on-going. However, it is anticipated from preliminary results that there will be no significant effects on shipping and navigation with the implementation of standard best practices and mitigations. The final results of the assessments will be detailed within the Offshore EIA Report.

IMPACT ON FISHING ACTIVITY

Through the public consultation, feedback was received indicating concerns on the potential impact of the Pentland Floating Offshore Wind Farm on fisheries. Local fishers were initially engaged with for site investigation surveys in 2021. A consultation workshop was held in November 2021 and SFF, SWFPA OFA, NECRIFG and local fishers were invited to attend. The Project FIR reached out to local fishers in the area and provided flyers for the workshop to maximise attendance as far as practicable. We have used the feedback from the workshop in the EIA to assess impacts on commercial fisheries. Since the workshop was held, the project has undertaken to reduce the number of anchors and mooring lines from 12 to 9 which will reduce the impacts on other sea users. In addition, the changes to the site area and the reduction in the number of turbines will minimise impacts on other sea users, including fisheries, as well as reducing the overall footprint on the seabed. Preliminary results from the commercial fisheries impact assessment indicate that there will be no residual significant effects with the implementation of mitigations which will be detailed in the Fisheries Management and Mitigation Strategy. The final results of the assessment will be detailed within the Offshore EIA Report.

IMPACTS ON FISH & SHELLFISH ECOLOGY

During the consultations we received feedback regarding the impact of electromagnetic fields (EMF) on fish and shellfish ecology. Detailed assessments are currently being undertaken to assess the potential impacts of the Pentland Floating Offshore Wind Farm on fish ecology which has been supported by a study of EMF generated by the inter-array and export cables, underwater noise modelling and the results of the benthic habitat surveys. Up to two offshore export cables are being considered. The project is currently considering burial or protection of the cables to the landfall location. Results of the EMF assessment indicate that even without cable burial, the magnetic field produced by the proposed cables would be less than that associated with the earth's magnetic field. As such fish and shellfish receptors are unlikely to detect any notable change from EMFs produced by the cables. Currently the underwater noise modelling assessments are on-going with input from industry leading experts. However, based on preliminary results of the underwater noise modelling and other supporting assessments, it is anticipated that there will be no significant effects on fish ecology. The final results of the assessments will be detailed within the Offshore EIA Report.

IMPACTS ON BENTHIC ECOLOGY

Detailed assessments are currently being undertaken to assess the potential impacts of the Pentland Floating Offshore Wind Farm on benthic ecology. The reduction in the extent of the Offshore Site and reduction in the number of turbines and associated decrease in moorings and piles or anchoring solutions will reduce the potential impact on benthic ecology. The assessments are supported by the findings of benthic habitat surveys carried out across the Offshore Site in 2021. It is anticipated from preliminary assessment results that there will be no significant effects on benthic ecology. The final results of the assessments will be detailed within the Offshore EIA Report.

IMPACTS ON AVIATION

The impact assessment for aviation and radar activity is on-going. However, it is anticipated from preliminary results that there will be no significant effects on aviation and radar with the implementation of standard best practices and mitigations. The final results of the assessments will be detailed within the Offshore EIA Report.

BENEFITS TO THE LOCAL COMMUNITY & SUPPLY CHAIN

The Pentland Floating Offshore Wind Farm is committed to supporting local suppliers, where possible, and developing the project so that it promotes the welfare, livelihood and sustainability of local communities. The Pentland Floating Offshore Wind Farm is supporting an Education and Training Fund which will award scholarships to selected students from Thurso and Farr High Schools, who are going on to study higher education and training programmes focused on Science, Technology, Engineering and Mathematics. Foundation Scotland have recently concluded consultation on the community benefit approach and received useful feedback from the local community. The feedback received will be taken into account in the design of the community benefit fund.

PENTLAND FLOATING OFFSHORE WIND FARM

PROJECT DESCRIPTION

OFFSHORE PROPOSAL

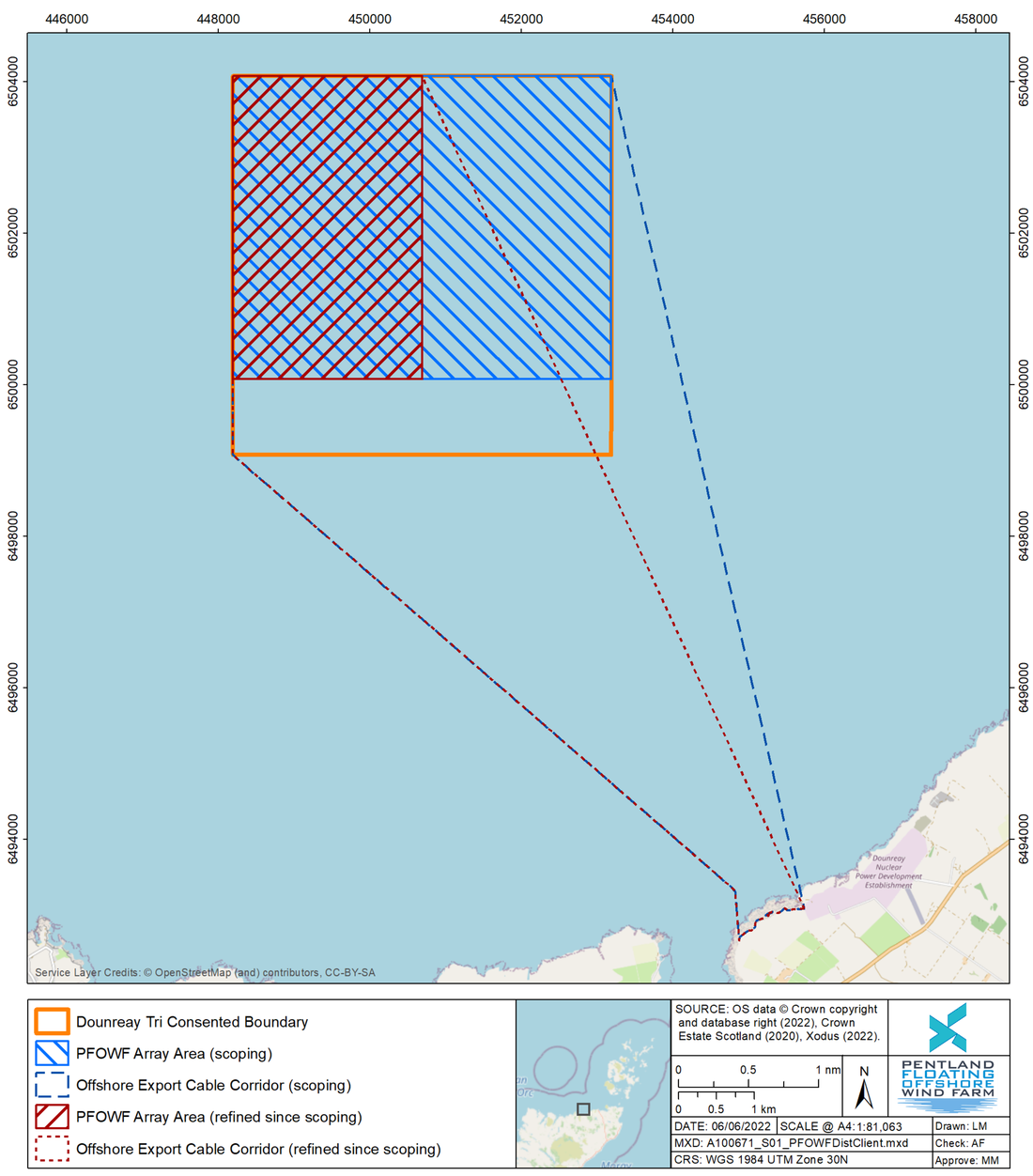
The Pentland Floating Offshore Wind Farm has adopted a design envelope approach to develop the project. This is a common approach with major infrastructure projects including offshore wind farms.

The design envelope approach does not consent specific technology, but allows outline consent to be granted and enables project impacts to be assessed on the basis of maximum parameters or worst case scenarios for specific receptors. This gives projects the flexibility to utilise new innovations in emerging floating wind technology and greater information on site conditions once this is available.

The Environmental Impact Assessment will consider the parameters that represent the worst impact for receptors caused by the development. As such, the project design envelope presented here shows the proposed maximum parameters for the project. The final project parameters may not reach these maximum limits and the final project design will be submitted for approval prior to construction.

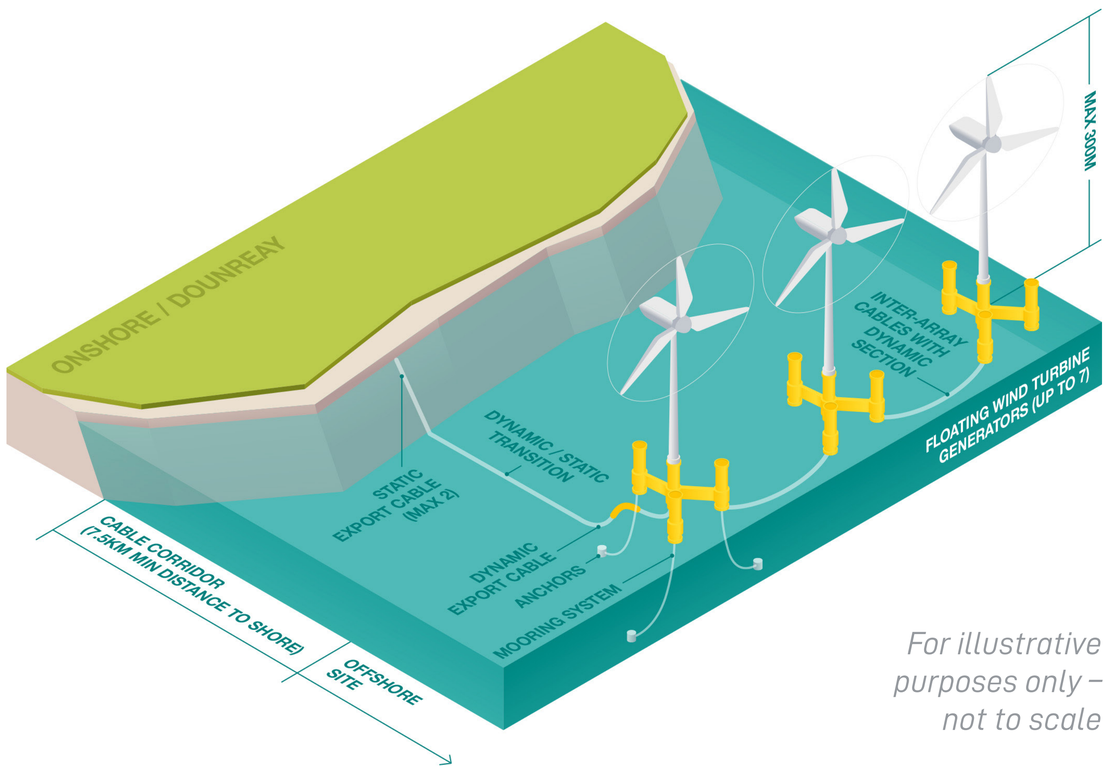
We have taken on board the feedback received during the consultations, specifically regarding visual impacts and have revised the design envelope to minimise these potential impacts. Key changes include reducing the offshore site area for the turbines by 50% and reducing the number of turbines in the design envelope from ten to seven. This means that the turbines will be located further offshore than previously presented and the horizontal spread of the turbines will be reduced.

The revised Pentland Floating Offshore Wind Farm offshore site area is 10 km^2 and is located approximately 7.5 km north of the coast of Dounreay, Caithness.



The offshore infrastructure works will comprise:

- Up to a maximum of seven floating wind turbine generators;
- Turbines with a maximum tip height of 300 m;
- Floating substructures (one per turbine) to support the turbines;
- Mooring systems (anchors and mooring lines) to ensure the turbines stay within a given footprint;
- A network of inter-array cabling linking the individual wind turbines; and
- A maximum of two offshore export cables connecting the offshore wind farm to the onshore substation.



For illustrative purposes only – not to scale

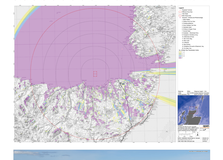
SEASCAPE, LANDSCAPE & VISUAL IMPACTS

As part of our Environmental Impact Assessment (EIA), we are undertaking a Seascape and Landscape Visual Impact Assessment (SLVIA).

The EIA concludes the economic impact effects of the Pentland Floating Offshore Wind Farm (Pilot) on receptors in a range of coastal seascapes. Photomontages and wireframes are presented below and provide a representative view of what will be seen from the selected seapoints. These photomontages and wireframes are based on the worst case and 'maximised' conditions to ensure the worst case scenario is shown. Seapoints have been selected to represent the worst case from those locations that are representative of local residents, boat users, walkers and visitors to the area.

For each seapoint, a photomontage with the Pilot Offshore Wind Farm (Pilot) and Offshore Ity Wind(ff) is presented as the worst case. The Pilot Offshore Wind Farm consists of the number of turbines being considered for the Pilot Offshore Wind Farm, with the turbines down to seven. In addition, the area of the Offshore Ity Wind has been reduced to 2 turbines. Seapoints have been selected to represent of turbines across the seascape. A key reason for these changes were to reduce the visual impact of the turbines on the seafarers. Two wireframes are presented for each seapoint, one with seven turbines at 285m tip height, and one with two turbines at 285m and one with two turbines at 185m tip height (as the previously considered basis). The wireframes show the worst case visual impacts resulting from the proposed changes to maximum turbine numbers and turbine heights.

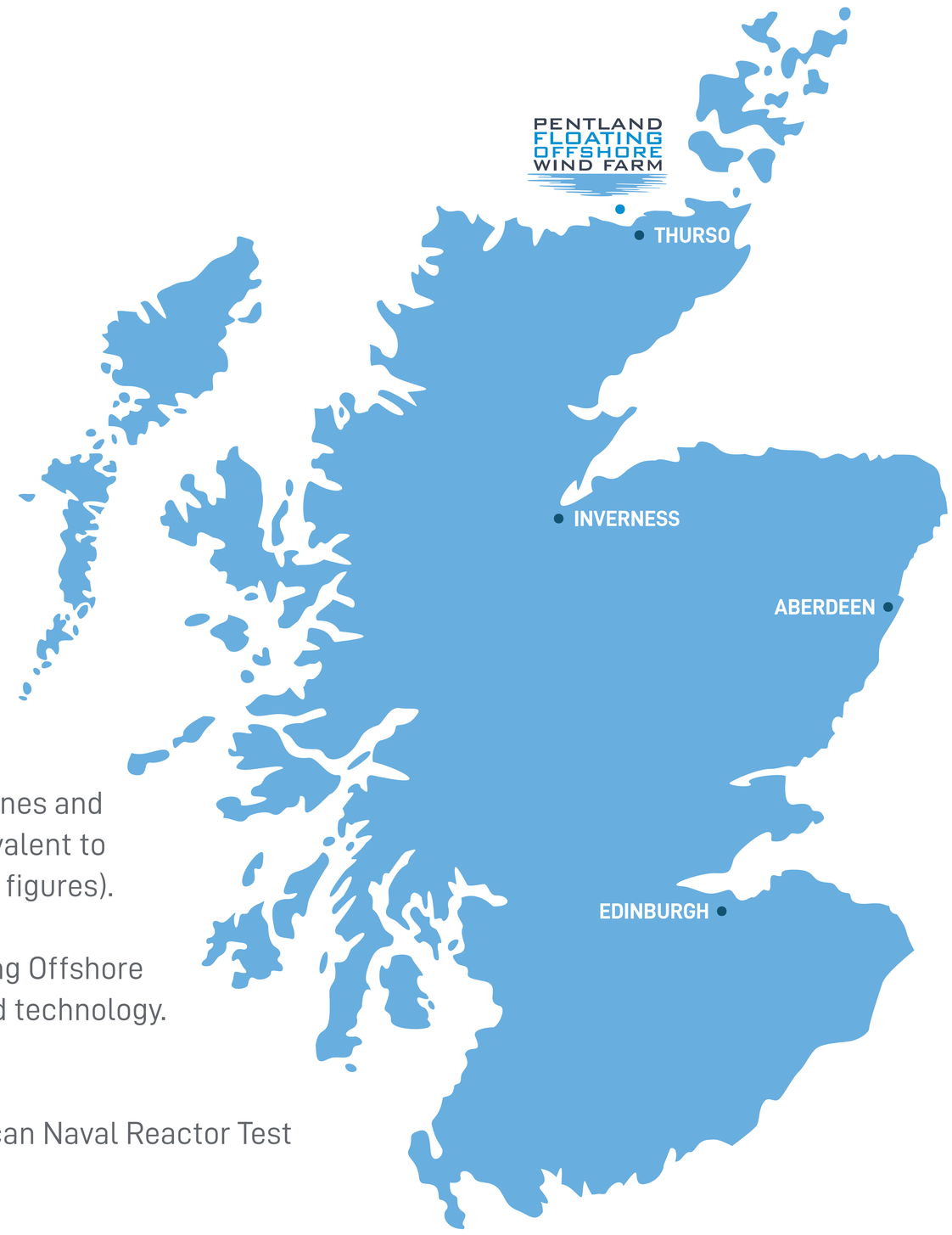
The economic basis was indicative of this stage, and the final turbine configuration will be subject to further consultation. Comparative seaskins photographs from the selected seapoints are also provided. Where the Pilot Offshore Wind Farm (Pilot) and the Zone B Theoretical Maximity (ZTM) for the seven turbine basis is included to provide a comparison between the two. Seven turbines are likely to be visible from.



Pilot Offshore Wind Farm
Offshore Ity Wind
Pilot Offshore Wind Farm (Pilot)
Offshore Ity Wind(ff)
Zone B Theoretical Maximity (ZTM)
Seapoint
Seapoint Photomontage
Seapoint Wireframe
Seapoint Photo
Seapoint Photo (Pilot)
Seapoint Photo (ZTM)
Seapoint Photo (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM) (Pilot) (ZTM)
Seapoint Photo (Pilot) (ZTM)

PENTLAND FLOATING OFFSHORE WIND FARM

THE PENTLAND FLOATING OFFSHORE WIND FARM



Pentland Floating Offshore Wind Farm will be located off the coast of Dounreay, Caithness.

The Pentland Floating Offshore Wind Farm will comprise up to seven turbines and will provide enough energy to power to approximately 70,000 homes, equivalent to approximately 65% of homes in the Highland Council Area (based on 2020 figures).

A single turbine may be deployed as the first stage of the Pentland Floating Offshore Wind Farm in 2025 to allow time to test and demonstrate the floating wind technology. The remaining turbines (up to six) will be deployed during 2026.

The onshore substation for the project will be located adjacent to the Vulcan Naval Reactor Test Establishment (NRTE) and the former Dounreay Nuclear Facility.

The Environmental Impact Assessment (EIA) for the offshore elements of the Pentland Floating Offshore Wind Farm is currently being prepared and will be submitted to Marine Scotland in summer 2022.

DEVELOPMENT

A staged approach to the deployment of the floating technology underpins the development of the Pentland Floating Offshore Wind Farm, as well as our future floating projects in Scotland and globally.

INNOVATION

The innovative technology trialled in this project will be key to the commercialisation of this floating technology. It will deliver valuable insight into developing floating wind technology in Scotland.

LEARNING

The learnings from this will help contribute to the development of a strong Scottish supply chain for floating wind.

INDICATIVE DEVELOPMENT TIMELINE

Q3 2021 – Q2 2022
Offshore EIA Report Preparation

Q2 2022
Offshore Geotechnical and UXO Surveys

Q2 2022
Submission of Offshore Application to Marine Scotland

Q2 2022
Offshore Geotechnical Survey

Q2 – Q3 2022
Consultation Period on the Submitted Applications

2025
Commencement of Construction

Q1 2023
Offshore Consent Determination

2026
Completion of Construction

THE DEVELOPMENT PROCESS

PREPARATION OF THE EIA REPORT

The Pentland Floating Offshore Wind Farm is currently at the stage of preparing the EIA Report for Submission. Within the EIA Report, impacts of the proposed offshore project design will be assessed by competent experienced professionals, using the relevant baseline information collected, various guidance, good practice guidelines and expert judgement. All the findings and proposed mitigation measures identified through the EIA process will be presented in the Offshore EIA Report. Desk based assessments and field studies helped to define the baseline environment and identify receptors for consideration and the assessments are supported by detailed modelling and technical studies.

The project design and EIA scope draws on the feedback from statutory consultees and the comments received during the Public Consultation Events.

SUBMISSION OF APPLICATIONS

An application for a marine licence and consent under Section 36 of the Electricity Act 1989 for the offshore development will be submitted to Marine Scotland. At this point, there will be a period for the public to formally comment on the proposals, information to the public on how to respond will be advertised through local press.

DETERMINATION OF APPLICATION

It is anticipated that it will take up to nine months for the applications to be determined. During this time the project will continue with engineering studies to finalise the project requirements. During this time detailed supply chain discussions will also be held as well as finalising our community benefits associated with the project.

PREPARATION FOR CONSTRUCTION

The consents granted will likely have a number of conditions associated with them. Information on the detail of the project will be submitted in order to ensure they are in line with the consented project. Construction and environmental management and monitoring plans detailing how the project will be delivered will also be submitted for approval.

CONSTRUCTION

It is anticipated that construction of the offshore elements of the wind farm will commence in 2025. The construction of the project is anticipated to take place within a two year period. An independent Environmental Clerk of Works will be employed to ensure that the construction is carried out in line with the consent.