EastWind Cluster

East of England

EAST WIND
Offshore Cluster

Commissioned by:

OffshoreWind IndustryCouncil

THE CROWN ESTATE

EAST WIND
Offshore Cluster

Delivering our regional growth through

Smart Environmental Services

Next Generation Installation and O&M

Industrialised Foundations & Substructures

Enabled by

5GW Operational
10GW Consented or in Planning

Plus:

- Freeport East
- Strong trade and sector groups
- Multiple O&M base locations
- SOV base capability in project LEEF
- Early grid upgrades

Working with

LOCAL STAKEHOLDERS

- Engagement of local authorities in Norfolk, Suffolk & Essex
- EEEGR sector councils, especially Marine Science & Technology Sector Council
- Generate
- Wider energy representation and cross sector capability and shared learning

And building on

SKILLS

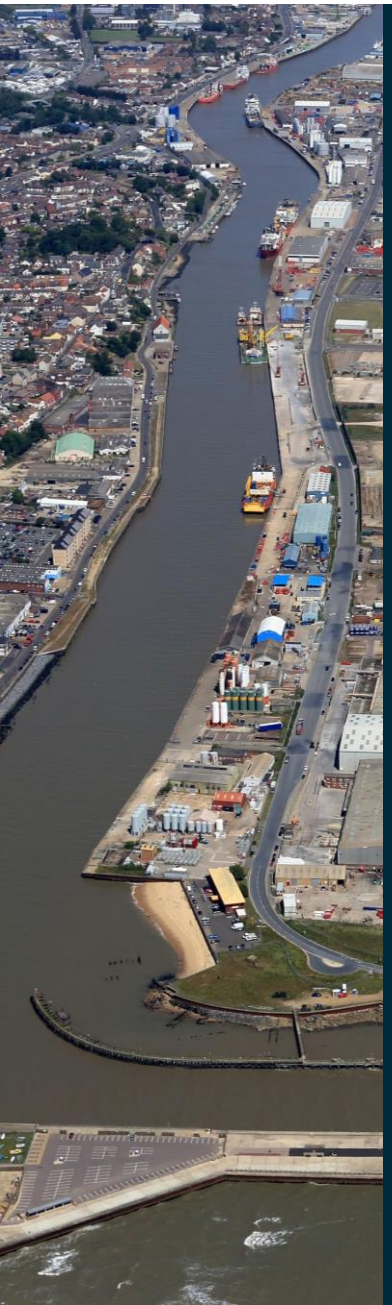
- Apprenticeships – East Coast College, City College Norwich & College of West Anglia
- Training providers – Maritime Academy, DNV, Petans Maersk, Hexis, Energy Skills Centre
- East Coast College (Skills Taskforce Lead)
- Colchester Institute, Tendring Technical College for Essex
- East Coast Energy Training Academy

INNOVATION

- Innovation Task Group
- Network of 27 leading innovation, science & research hubs - linked through Connected Innovation
- New Anglia Local Action Plan
- Universities of East Anglia (incl Energy Engineering & Data Science for Renewables MSc courses), Suffolk, Essex

INFRASTRUCTURE

- Freeport East investment pipeline
- Mature and established port infrastructure – Freeport East Harwich, Peel Ports' Great Yarmouth (O&M Campus & deep-water outer harbour), ABP Lowestoft LEEF (O&M facility expansion) & Lowestoft Power Park



EastWind Cluster: O&M strength in depth and an active pipeline of new offshore wind installation to create value from

Deep knowledge in offshore wind installation, operation and maintenance, with major upgrades planned to support future energy growth, and a dynamic innovation ecosystem

The EastWind Cluster is home to a widespread and active group of companies successfully winning work in offshore wind, oil and gas and nuclear as well as other industries. The region is home to a set of mature offshore wind farms, with important learning and experience gained from these. Today, a new pipeline of projects are planned to be delivered by the end of this decade. This means opportunities to grow the existing O&M expertise, while growing strong installation know-how and capturing value from delivering larger installation packages. These capabilities align well to the national priority areas of Smart Environmental Services and Next-Generation Installation, Operations, and Maintenance.

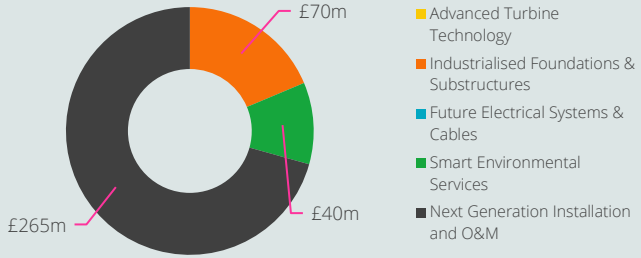
The cluster benefits from strategic port infrastructure, with existing facilities and expansion plans at key locations such as Great Yarmouth, Lowestoft and Harwich. The region has a network of specialist public and private training providers focused on O&M training and is a hotspot for innovation in related digital services and conservation.

The most substantial economic opportunity in offshore wind lies in supporting the region to capture additional value from next generation installation of pipeline of new offshore wind projects. The region also faces challenges and related opportunities and will need to adapt and grow its O&M expertise as the offshore wind sector integrates digital and other hi-tech innovations into offshore wind farm management.

There are also opportunities within region to support the UK wide role out of Industrialised Foundations and Substructures. This could involve utilisation of concrete and construction expertise being assembled in the region to support Sizewell C and the Lower Thames Crossing, as well as leveraging existing oil and gas expertise with regional presence from specialists such as Acteon.

Relevant Investment Need

Shared between relevant clusters



Cluster's unique proposition

Respond:
- Clarity of pipeline in southern North Sea
- Opportunities in Smart Environmental Services and Next-Generation Installation, Operations, and Maintenance

Expand:
- Support wide SME base to secure larger packages of work within O&M phase
- Build on strong port capability to capture greater value from installation phase of next generation of offshore wind projects
- Grow installer presence within region

Disrupt:
- Significant port capacity expansion to support future construction and installation needs
- Leverage region's digital capability to solve next generation O&M challenges
- Next Gen eVessels

Analysis

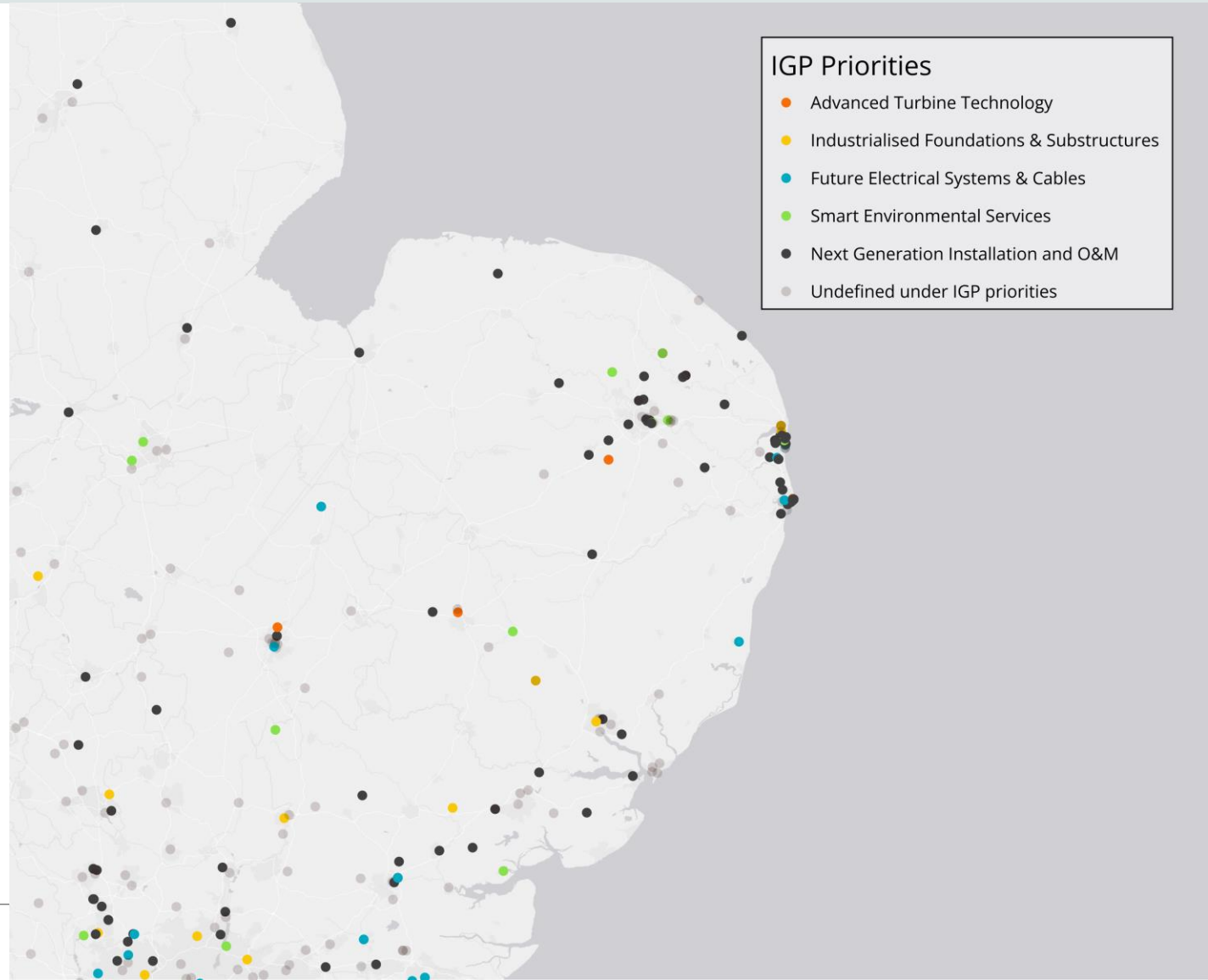
EAST WIND Offshore Cluster – Company mapping

The UK's Industrial Growth Plan has identified a series of opportunities, grouped under five priorities, for the UK to prioritise and grow value. The Regional Growth Prospectus assessment shows a strong mapping of current capabilities in the EastWind Cluster. While current capability is not the sole determinant of future capability, it is clearly a good place to start. The UK can then supplement this as needed through innovation, investment in start ups and foreign direct investment.

The map right shows capability across the east of England, based on the Supply Chain Capability Assessment commissioned by OWIC and the OWGP complimented with additional data from the cluster.

Most prevalent are companies focused in Next Generation Installation and O&M, with a clear hub of activity around Lowestoft, Great Yarmouth and Norwich. The region also has wider installation and O&M expertise in Harwich and Essex.

Mapping also highlights wider regional capability around the set of five Industrial Growth Plan (IGP) priorities. Around Norfolk is a small cluster of companies focused on Smart Environmental Services, while across the East Midlands wider capability around foundations and substructures can be seen.



EAST WIND
Offshore Cluster

IGP aligned priorities

Investment £170-375m
Investment needed, shared between relevant clusters

Based on a national 'make or buy' analysis of critical components and services, the IGP highlights areas essential to domestic supply or where the UK has the potential to build global competitiveness.

While national in scope, the IGP emphasises the vital role of the UK's clusters in driving local supply chain growth and attracting targeted investment based on regional strengths.

This Regional Growth Prospectus helps to set out how the IGP can best build on these regional strengths. Developed with input from EastWind Cluster, the table right shows the most relevant Investment Opportunities set out in the IGP for this region. Also set out is IGP data showing target dates for investment, the value of required UK level investment and expected UK GVA if this investment is made.

IGP priorities	Opportunity		Target date	Investment	National level GVA
Industrialised Foundations & Substructures	Increase UK capacity of mooring and anchors by 50% from 2023	Respond	2030	£20-50m	£ 0.3 – 0.5 bn
Smart Environmental Services	Build extensive marine datasets	Respond	2026	£5-10m	£ 80-120m
Next Generation Installation and O&M	Increase the UK's supplier base of EPCI companies	Respond	2027	£1-5m	£0.4-0.8 bn
Next Generation Installation and O&M	Increase the UK's fleet of cable laying vessels	Respond	2027	£100-200m	£0.6-1.2bn
Industrialised Foundations & Substructures	Develop UK manufacturing capability to produce advanced material for mooring and anchors	Expand	2035	£10-20m	-
Smart Environmental Services	Claim the top position globally in providing surveying services across global serviceable markets, with more than 30% of contracts awarded to UK suppliers	Expand	2030	£10-20m	£ 0.2-0.3bn
Next Generation Installation and O&M	Implement a new cable installation technique in the UK eliminating cable damage during installation	Expand	2028	£2-10m	-
Next Generation Installation and O&M	Use only low carbon emission vessels for all installations, operations and maintenance services in the UK	Expand	2030	£10-20m	N/A
Smart Environmental Services	Integrate multiple Machine learning techniques optimising environmental surveys and minimising ecological impact in the UK	Disrupt	2030	£1-10m	-
Next Generation Installation and O&M	Integrate Machine Learning (ML) algorithms optimising operations and maintenance services	Disrupt	2030	£1-5m	-
Next Generation Installation and O&M	Commercialise next generation inspection, monitoring and installation services, implementing autonomous vehicles, robotic system and ML algorithms to process data from sensors	Disrupt	2035	£10-25m	-
Industrialised Foundations & Substructures - materials	Grow UK concrete capability to supply into offshore wind	N/A	-	-	-

EAST WIND
Offshore Cluster

IGP aligned priorities

Investment £170-375m
Investment needed, shared between relevant clusters

Next Generation Installation and O&M

The EastWind Cluster has greatest strength and depth in installation and operations and maintenance. The region has a mature set of operating wind farms and has a resulting mature supply chain in training, vessels and equipment supply supporting this group of projects. With port development underway, there are opportunities for the region to secure greater value from offshore wind installation, plus responding to changes in O&M to build new service models utilising machine learning. The region is the UK base of Danish installer Cadeler (and previously the HQ of Seajacks), so has potential to build on this footprint to grow a UK supplier base of EPCIs.

The region has vessel capability relating to the supply of CTVs, offering a route to development of low emission vehicles using companies in the region.

Smart Environmental Systems

The region has a wider digital economy expertise that can be leveraged to support offshore wind growth in the region, and innovation and supply chain expertise in conservation that will be important for delivery of nature positive offshore wind projects. The region has existing global players based or headquartered in the region active in offshore development, supported by EEEGR's Marine Science & Technology Sector Council and wider research expertise in environmental sciences.

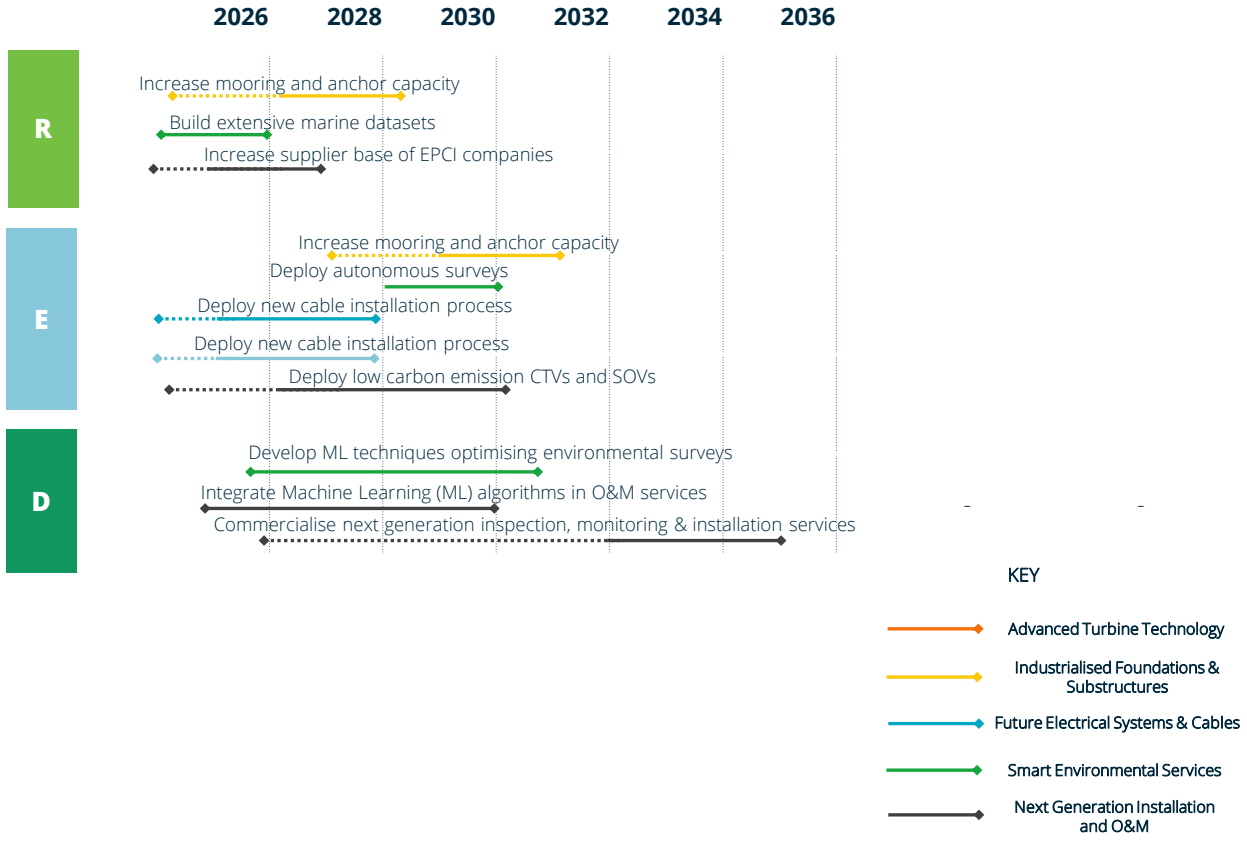
Industrialised Foundations & Substructures

The region has strong expertise in mooring and anchors, for example with Acteon headquartered in Norfolk. EastWind Cluster companies can utilise expertise here to support UK growth of floating offshore wind mooring and anchor solutions, alongside companies based in the Celtic Sea and Scotland.

The region is also building up expertise in high volume high-tech concrete production – particularly for nuclear, and expanding its port capabilities. There is therefore potential for this growing regional expertise to be used to supply into floating offshore wind.

(R)espond, (E)xpand and (D)isrupt Programmes

Below are shown the IGP Investment Opportunities identified as most relevant to EastWind Cluster. Investment data and timelines are taken from the IGP to help focus regional and national conversations on investment priorities.



Analysis

EAST WIND Offshore Cluster – Ports summary

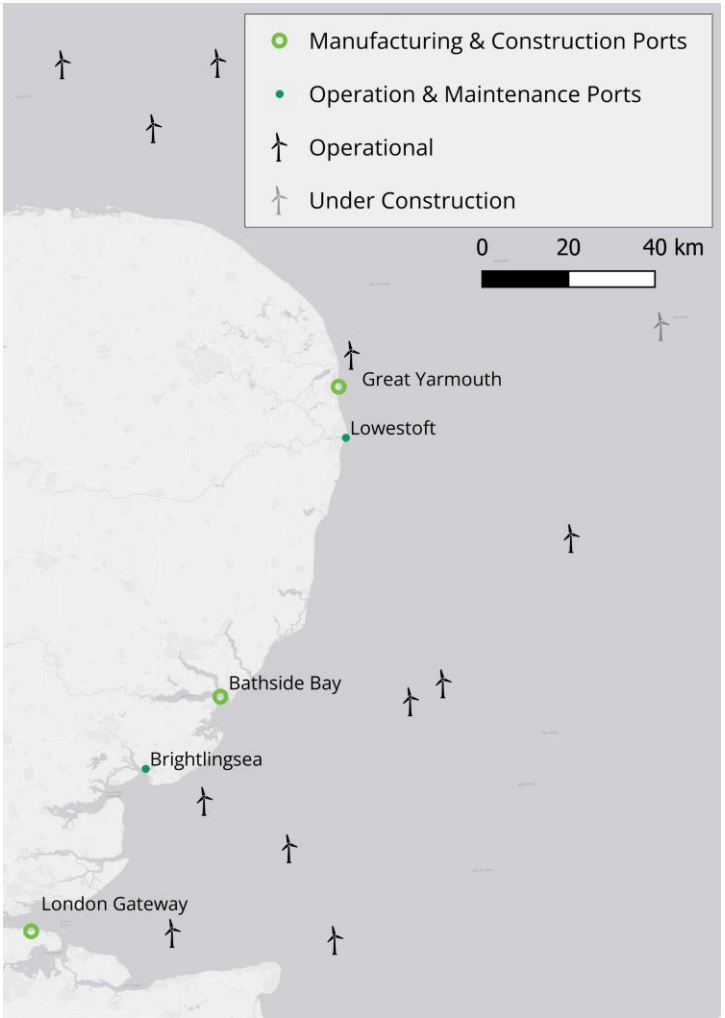
The EastWind Cluster was established in 2021 with the aim to drive the implementation of the Offshore Wind Sector Deal. It is a key player in the development of offshore wind in the Eastern region, driving industry growth and supporting various work streams:

- Norfolk & Suffolk: Great Yarmouth and Lowestoft are key ports supporting offshore wind. Great Yarmouth is equipped to handle large-scale offshore wind components and operation and maintenance activities, ABP's new Lowestoft Eastern Energy Facility (LEEF) provides purpose-built quayside facilities for large vessels and berths suitable for crew transfer and service operation vessels, both crucial for the installation and operation of offshore wind projects. Felixstowe could also enhance its infrastructure to support offshore wind.
- Essex & London: Harwich is set to become a major green energy hub with the proposed Bathside Bay development seeking to support offshore wind. London Gateway Port plans to improve its capabilities for handling large-scale wind turbine components.

Peel Ports is planning to expand the construction capabilities of Great Yarmouth, building on its preexisting North Terminal. It intends to create a new southern site to include a new heavy lift pad area and around 10 hectares storage space. Work is also underway to transform nearby industrial land into a state-of-the-art offshore energy Operations & Maintenance Campus.

Advanced plans for the Port of Harwich's Bathside Bay development include a 130 hectare expansion of the existing port area, which could support the development of new offshore wind projects, including floating. Originally planned as a new container terminal, the port is seeking to pivot to offshore wind.

O&M is a key activity in the cluster with port and supply chain experience in providing O&M services in and around Great Yarmouth and Lowestoft.



Analysis

EAST WIND Offshore Cluster – Ports and O&M

O&M is a key activity in the cluster with O&M activities being run from both Great Yarmouth and Lowestoft.

Equinor has its O&M Hub in Great Yarmouth that supports projects such as Sheringham Shoal, while RWE has committed to building its O&M base for the Norfolk Offshore Wind Zone at Great Yarmouth. Brightlingsea serves Gunfleet Sands.

Lowestoft supports O&M and SOV based activities for major wind farms such as SSE's Greater Gabbard and ScottishPower Renewables' East Anglia One and East Anglia Three (under construction).

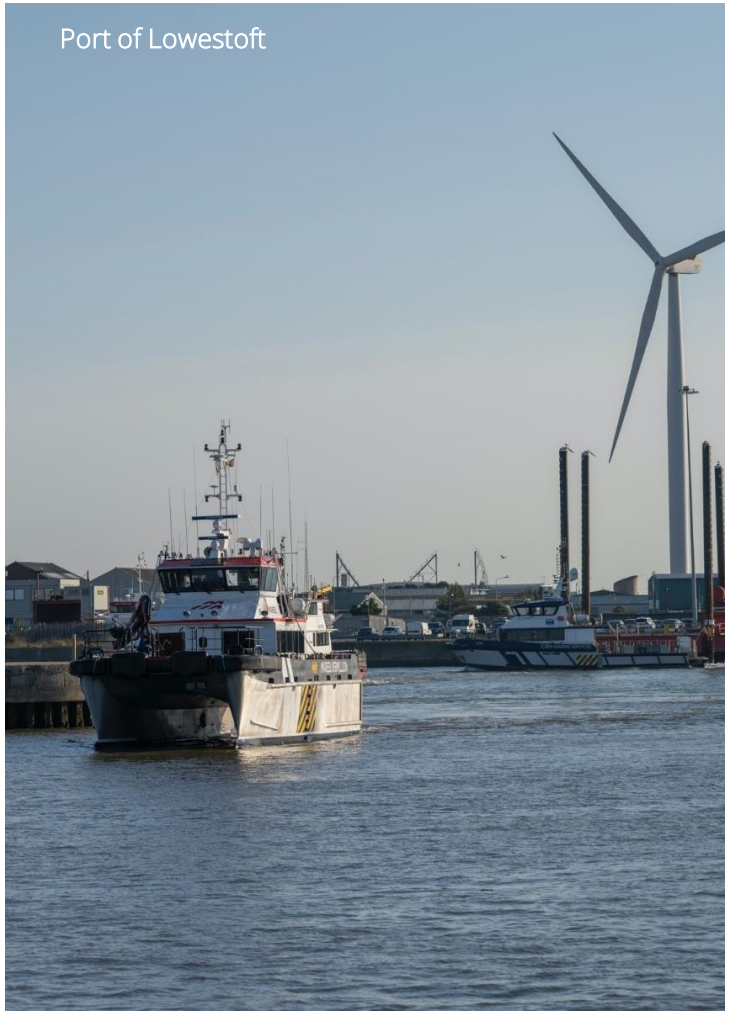
Larger ports may be able to act as bases for a range of activities, with space to support manufacturing, installation and/or O&M. In the following pages there is a focus on those ports also able to potentially support installation and manufacturing activities identified within the IGP.

Across the UK there is a general shift to larger projects further from shore, often in deeper waters. Projects further from shore cannot easily be serviced by Crew Transfer Vessels (CTVs) that take O&M staff out to wind farms from port each day. This will mean more use of Service Operations Vessels (SOVs) that stay out at a windfarm for longer periods before returning to a base port for resupply and crew change over.

While different projects may choose different ports depending on an individual project needs, there are opportunities for clustering of activities such as SOV supply and support to improve operational efficiency. Such clustering of O&M activities can potentially also enable further supply chain clustering in support of multiple projects. This clustering has taken place in oil and gas, so as the number of projects in offshore wind grows, this may also take place in offshore wind.

The IGP identifies UK expertise in O&M as a strength. UK projects and the supply chain are also leading offshore wind sector work to develop new and more efficient methods for O&M, such as remote monitoring and inspection. The UK also has capability in vessel design, operation and on-deck equipment.

IGP opportunities relating to O&M concern **low carbon emission CTVs and SOVs**; **integration of machine learning into O&M services**, and; **commercialisation of next generation inspection, monitoring and installation services**.



Port of Lowestoft

Analysis

EAST WIND Offshore Cluster

– Installation & manufacturing ports

Fabrication
Marshalling/Storage
Assembly and Integration
Installation

Great Yarmouth

- Warehouse facilities
- Able to accommodate LOLO and RORO operations
- WTG marshalling and plans to upgrade facilities
- No lock restrictions

Bathside Bay*

- Deepwater quayside
- Expansive quayside
- Heavy duty quay under development
- Significant laydown space
- Land available for further development
- Free port

London Gateway

- Deepwater quayside
- Expansive quayside
- Ongoing expansion efforts
- Freight and logistics port

* Under Development: Port upgrades underway, FID reached, or secured grant funding for expansion

Analysis

EAST WIND Offshore Cluster – IGP alignment (installation & manufacturing ports)

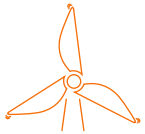
Port specifications and input from the EastWind Cluster have been used to evaluate each port's ability to support manufacturing activities, and services such as assembly and installation. These ports were selected and assessed based on track history and their installation and manufacturing characteristics, such as extensive quay lengths, large laydown areas, and high bearing capacities.

This evaluation adopts the "Expand" and "Respond" terminology set out in the 2024 Offshore Wind Industrial Growth Plan, set against priority symbols to reflect the opportunity for the key ports located in this cluster.

In this context: "Expand" indicates a port has good infrastructure, with upgrades required to fully facilitate the underlying activities; and "Respond" defines a port to have strong infrastructure, with minor to minimal improvements needed.

Notes on this assessment:

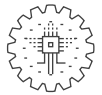
- "Disrupt" has been omitted from the evaluation as there are many ports that, with sufficient investment, could support the IGP priorities over the coming decade.
- A port is classed as being able to support a particular priority if it could host a range of the varied activities within the priority (for example it could host towers or blades or drive train components, not just one type of facility).
- The IGP priority "Smart environmental services" has been omitted from this analysis as these services are less constrained by port infrastructure. For the IGP priority "Next Generation Installation, Operations and Maintenance" only installation activities have been considered, as it is assumed there is widespread capability across multiple ports to support O&M.



Advanced Turbine Technology
- Turbine design and engineering
- Tower
- Blades
- Drive train components
- Composite-based components
- Automation of manufacturing process
- Leading edge protection

Future Electrical Systems and Cables
- Array cables
- Export cables
- Dynamic inter-array cables at 132kV
- HVDC system interoperability
- Standardised systems

Industrialised Foundations & Substructures
- Floating foundation design
- Deeper water & floating foundations
- Moorings and anchors
- Automated welding
- Composites for light weight foundations
- Synthetic mooring line materials



Next Generation Installation
- Wind turbine installation
- Cables installation vessels operation

Activity	Actions	Bathside Bay	Great Yarmouth	London Gateway
Manufacture	Expand			
	Respond			
Services	Expand			
	Respond			