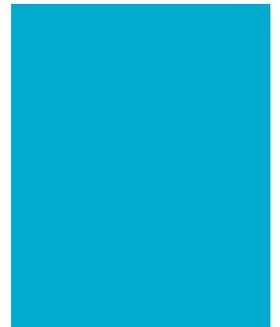


OFFSHORE WIND OPERATIONS & MAINTENANCE A £9 BILLION PER YEAR OPPORTUNITY BY 2030 FOR THE UK TO SEIZE

OPERATIONS & MAINTENANCE



SUMMARY

New data compiled by the Offshore Renewable Energy (ORE) Catapult reveals the UK offshore wind operations & maintenance (O&M) market will grow faster in relative terms than any other offshore wind sub sector market over the next decade. By 2030, it will be the UK's second largest sub sector market after turbine supply: a projected £1.3 billion per year opportunity.

The Rest of the World (excluding UK) offshore wind O&M market opportunity is even greater. We project it will be valued at £7.6 billion per year by 2030.

To discuss commercial dynamics in offshore wind O&M, we conducted an interview with energy industry leader Sir Ian Wood, which is summarised below. His comments highlight that offshore wind O&M is an area that plays to the UK's existing strengths in offshore oil and gas services and associated technologies. O&M already has the highest level of UK content of any part of the offshore wind supply chain.

In short, there is a sizable opportunity for the UK to create internationally significant service businesses in offshore wind O&M, learning from experience from the North Sea oil and gas industry.

We already have the vital elements to capture this opportunity but investment in infrastructure to create the environment for collaborative development and demonstration of the enabling technologies and services is required.



DEFINING OFFSHORE WIND O&M

A clear definition of offshore wind O&M comes from a report published by GL Garrad Hassan:



Offshore wind O&M is the activity that follows commissioning to ensure the safe and economic running of the project. The objective of this activity is to make sure the project achieves the best balance between running cost and electricity output. O&M occurs throughout the life of the project, which is nominally 25 years. ”

Garrad Hassan – A Guide to UK Offshore Wind Operations & Maintenance, 2013

The chart below summarises the key services that make up offshore wind O&M:

OPERATIONS	MAINTENANCE	SUPPORT	R&D
<ul style="list-style-type: none"> • Remote condition monitoring • Forecasting (yield, weather and maintenance) • Yield optimisation/plan predictive maintenance • Data and risk analysis • Planning and scheduling • Marine coordination • Comms network support • Grid integration • Training • Logistics and parts • Emergency response and coordination • Administration • Emerging: <ul style="list-style-type: none"> • Market analysis/prediction 	<ul style="list-style-type: none"> • Inspection – Blades, nacelles, tower, safety and access equipment, substations and plant, cables, foundations and sub-sea • Maintenance – Planned and unplanned • Repair – Minor to major • Troubleshooting • Specialist tools • Vessels and transit • On site safety 	<ul style="list-style-type: none"> • End of life planning • Decommissioning • Finance • Insurance • Stakeholder management • Sales and marketing • Regulatory considerations • Critical component storage and availability • Supply chain feedback: <ul style="list-style-type: none"> • Vessel design • Equipment and training design 	<ul style="list-style-type: none"> • Robotics and Autonomous Systems – Inspection, maintenance, repair • Aquaculture and multi-use • Decarbonised maritime • Recycling • Circular economy

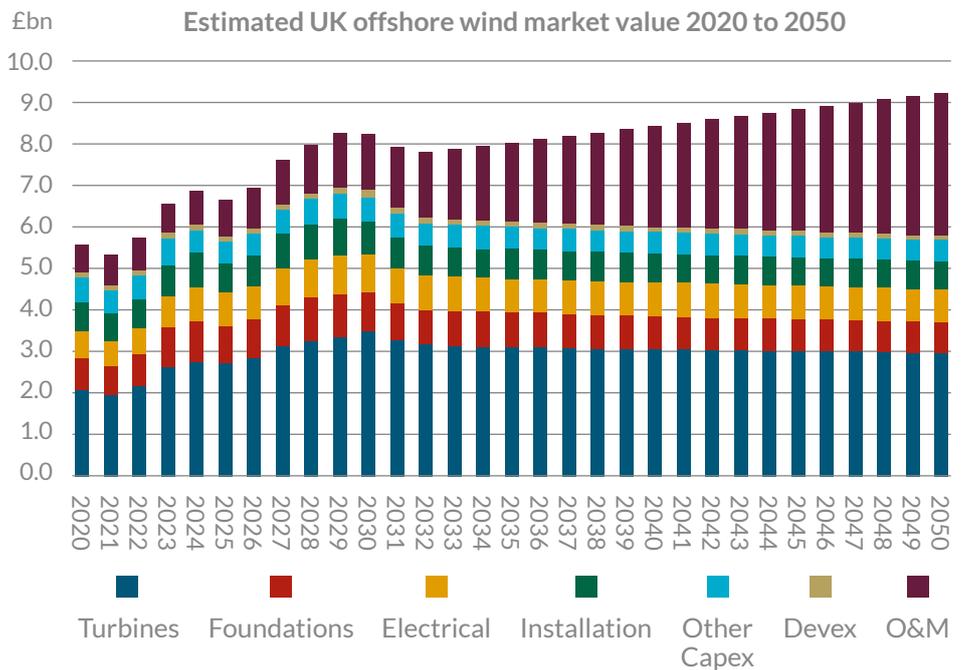
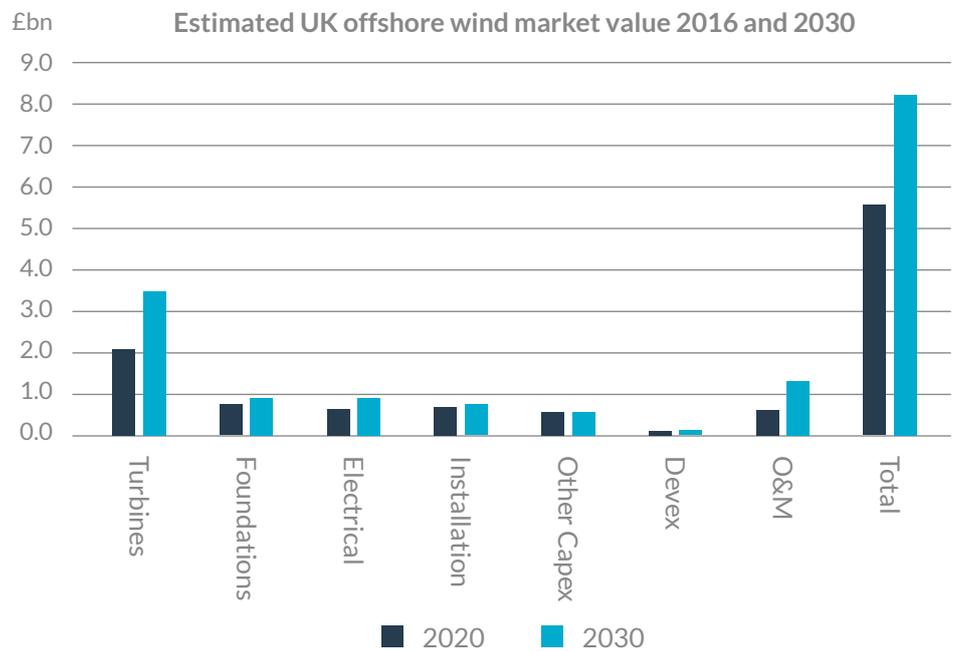
The UK has existing world-class businesses, of varying scales, in each and every one of the service areas listed on the chart. This includes companies at the forefront of technological change, a number supported by ORE Catapult.

The four charts below present outputs of ORE Catapult's new data on the value of the different offshore wind sub sector markets, including O&M, both for the UK and Rest of the World (excluding UK).

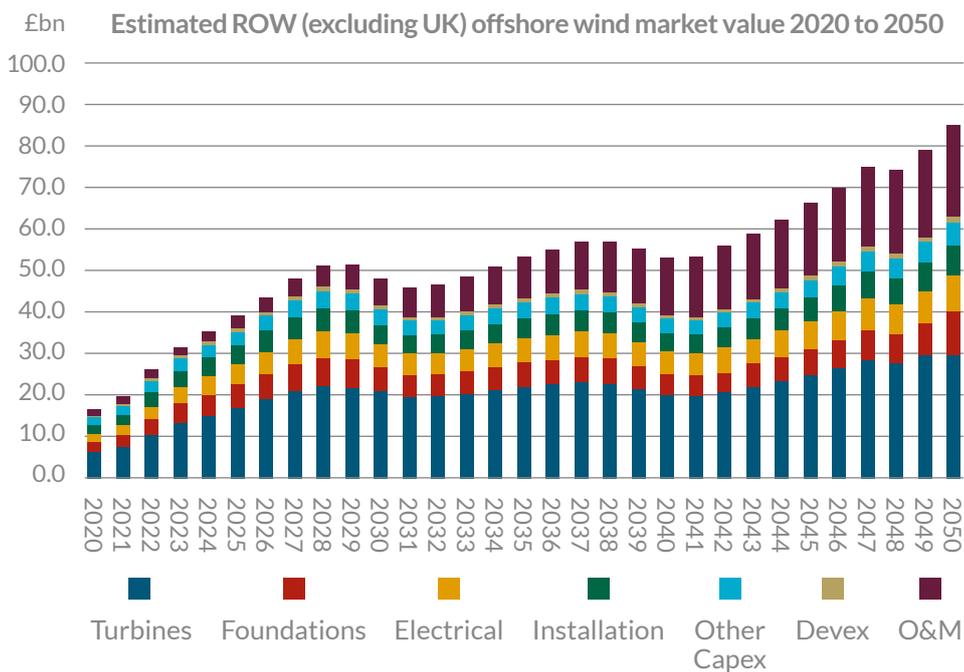
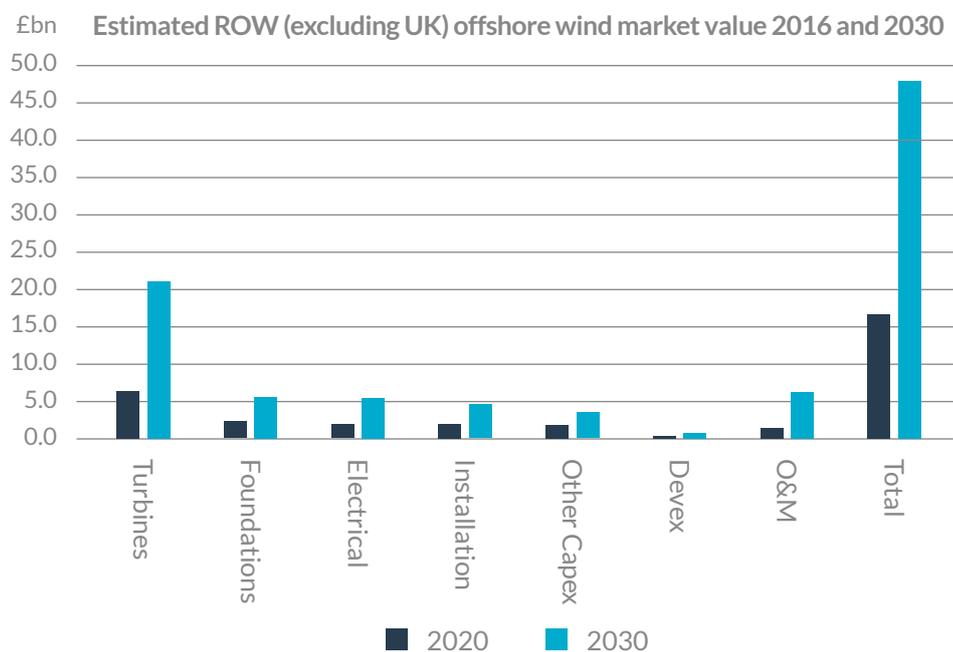
In both UK and ROW cases, O&M rises to become the second largest offshore wind sub sector market after turbine supply by 2030.

Beyond 2030, the value of the O&M market rises further, surpassing the value of the turbine sub sector market in the UK before 2050 and approaching this level in the Rest of the World by then.

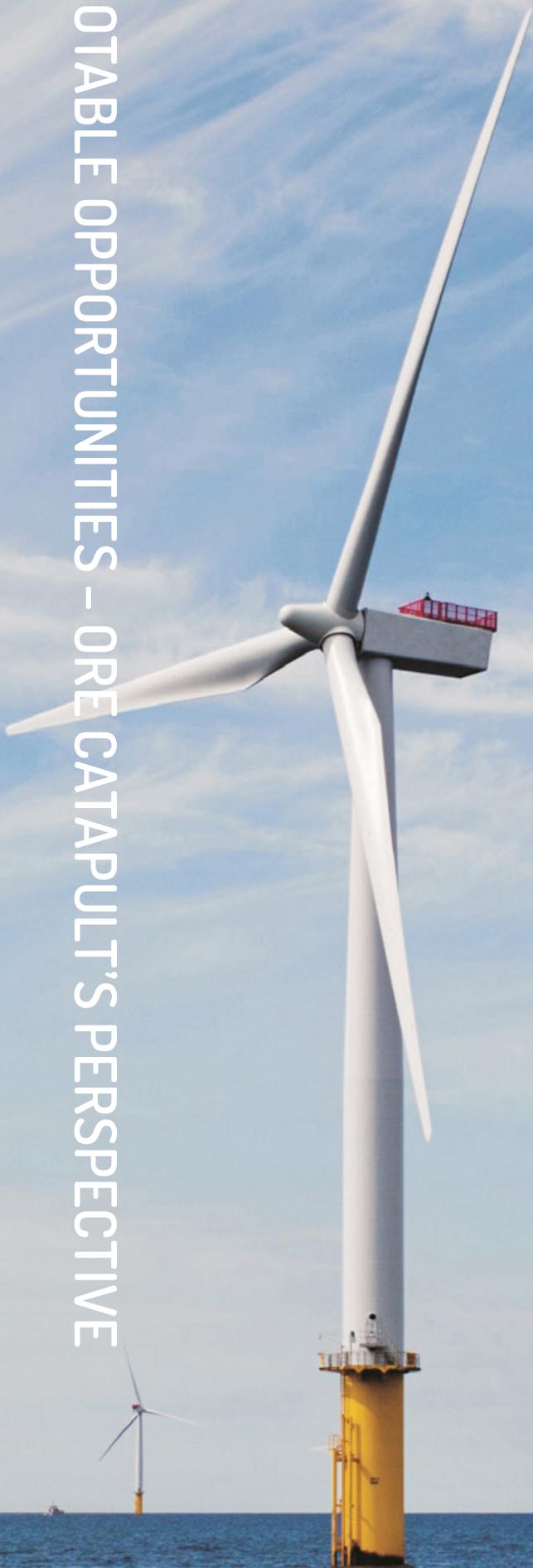
1. PROJECTED ANNUAL SPEND, BY SUB-SECTOR WITHIN THE UK OFFSHORE WIND MARKET, £BN



2. PROJECTED ANNUAL SPEND, BY SUB-SECTOR WITHIN THE REST OF THE WORLD OFFSHORE WIND MARKET, £BN



NOTABLE OPPORTUNITIES - ORE CATAPULT'S PERSPECTIVE



The ORE Catapult's Operations and Maintenance Centre of Excellence (OMCE) provides a focal point for O&M innovation and demonstration. Based in Grimsby, currently the largest offshore wind O&M port in the world, the OMCE provides a global centre of gravity for the development of industry leading technology and techniques.



Ben George,
General Manager of
the OMCE, comments:

"The tremendous relative growth in O&M provides enormous opportunity for UK PLC to capitalise on its current homegrown capabilities, leveraging emerging technology and techniques to realise greater growth in market share both domestically and for exports.

The UK already has world leading, and highly sought after, expertise in operational control: analysing data and logistics to develop efficient O&M techniques and value adding digital technology (e.g. sensors, analysis and decision support tools). The UK also leads in remote operations, including experience with Service Operations Vessels, improved communications and remote sensor integration.

Maintaining this global O&M leadership will require continued innovation and effort. I see three areas being particularly important:

- Realising safe and cost-effective remote operation of offshore assets through increased integration and use of robotics and autonomous systems.
- Use of alternate fuels in offshore wind workboats: electric, hydrogen and ammonia vessel design and manufacture, as well as operational and port integration of these new technologies.
- Smart logistics: predictive maintenance and just-in-time logistics that mark a phase shift for O&M cost efficiency.

UK leadership in these emerging areas, however, is not a given, as the rest of the world seeks to catch up to the UK as quickly as possible. While we have the experience and technology advantage now, the UK risks losing that position if we don't seek to actively maintain and strengthen our current lead.

Also, as windfarms move further offshore, the need to be "local" to operate them reduces. It follows that without a compelling experience, technology and skills advantage, UK windfarm O&M could be outsourced to staff based in other countries, thereby losing valuable long-term technology focused jobs in this country.

At the OMCE, I see it as our mission to be working at the leading edge of offshore wind O&M market trends to continue to drive UK excellence and to develop world leading UK companies."

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I believe there are a number of valuable lessons the offshore wind industry could learn from the growth and development of oil and gas in the North Sea over more than 40 years. Chief among these are skills in managing large complex projects, developing integrated supply chain logistics capability and managing operational assets. ”

SIR IAN WOOD INTERVIEW

To assess the offshore wind O&M growth opportunity in greater depth, ORE Catapult conducted an interview with energy industry leader Sir Ian Wood.

The interview focused on parallels for the offshore wind O&M market to be drawn from Sir Ian's experience within the North Sea oil and gas sector while he was leading John Wood Group Plc (also known as Wood) as Chief Executive from 1967 to 2006 and subsequently as Chairman until 2012. During this period, John Wood Group emerged as a leading UK based oilfield services business with a significant presence both in the North Sea and around the world.

1. Overall, do you agree that the emerging offshore wind O&M market would benefit from understanding the rise of oilfield services companies in the North Sea during the 1970s-90s?

I believe there are a number of valuable lessons the offshore wind industry could learn from the growth and development of oil and gas in the North Sea over more than 40 years. Chief among these are skills in managing large complex projects, developing integrated supply chain logistics capability and managing operational assets. Oilfield service companies have played a critical role in helping operators increase production, optimise efficiency and lower costs, building up a highly skilled, internationally experienced supply chain. Overall, there is a huge amount of common knowledge and expertise between the two industries.



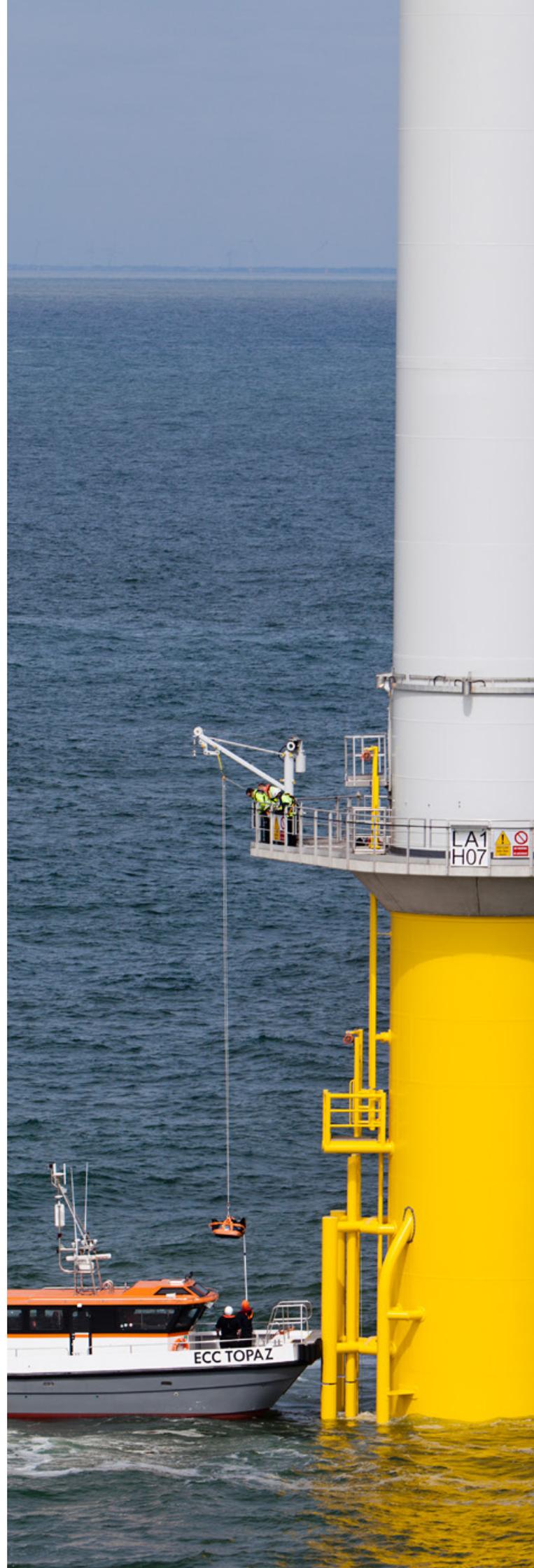
Sir Ian Wood,
Energy Industry Leader

2. What were the key commercial drivers that encouraged the majors and other North Sea oil and gas project owners to outsource maintenance and other service activities to independent specialists such as the Wood Group?

Above all it was economics. Oil and gas operators were seeking to save fixed costs. As had been demonstrated in the Gulf of Mexico, oilfield service businesses were able to provide skilled workers flexibly, adding to owners' own staff on a platform as well as staff from the operator, and we would often have wide responsibility, in some cases across multiple platforms, and would be highly respected. All data, knowledge and good practice would be shared. There was a strong spirit of collaboration. The 1986 oil price crash shocked the entire market. But subsequently oilfield service companies found their feet again.

3. How important was regulation and other government intervention, e.g. the Offshore Supplies Office, in helping UK based oilfield service companies to establish themselves and grow in strength?

We knew the Offshore Supplies Office (OSO) well [the OSO was a UK government agency with a remit to support British suppliers to the offshore oil and gas industry in the British sector of the North Sea set up in 1973 and disbanded in 1999]. It was trying to get a balance between work won by the UK supply chain whilst not interfering with the performance of operations offshore. The OSO did help: their presence helped us to win projects, especially in the early days of the North Sea's development when UK government licences were very valuable, and the operators were keen to please. Over time, the OSO's remit moved more into supporting exports. The Piper Alpha disaster of 1988 had a massive impact on safety right across the sector. Joint safety committees were set up within the industry to compare best practice, and this helped improve safety standards. Everyone quickly became aware regulators were very conscious of safety and would step in if necessary, with the ultimate sanction being loss of licence.



4. What are the key differences you see between the North Sea oil and gas O&M market and the North Sea offshore wind O&M market?

The nature of the offshore platforms are of course fundamentally different. Oil and gas platforms are bigger and heavier structures, generally fixed, with typically 1-2 platforms within a field. Offshore wind involves a larger number of installations across a wide field. Floating wind will be a significant change and is a major part of the future. Offshore oil and gas platforms are more commercially complex to manage. This is because more contractors are involved, perhaps 20 on a typical platform, with many staff living on board. Really good people managers are required. In general, there is now real collaboration in oil and gas, companies, including competitors, putting their heads together to encourage cost cutting and increased efficiency. I have not yet seen this in any way in offshore wind.

5. Informed by your experience, are there any technologies or specific services where you see the UK offshore wind O&M sector having key advantages, with the potential for companies in these areas to become globally significant players?

There is a huge amount of diversification work underway in the oil and gas sector, which is helping companies – especially SMEs – develop skills for ‘net zero’ technologies including offshore wind.

For example, we heard recently that the Energy Transition Zone in Aberdeen, which I am involved with, has won both UK and Scottish government funding. The ETZ is an ambitious project that will transform the North East of Scotland into a global leader in energy transition. It will be the catalyst for innovation and high value manufacturing and a centre of excellence for offshore renewables, large scale production of hydrogen and CO2 storage making a massive contribution to the net zero objective.

The ETZ will help to establish a new long-term sustainable international industry base with export potential and also support companies to win in the domestic market, including in the big offshore wind O&M market, where there is significant overlap.

Opportunity North East (ONE) is supporting the ORE Catapult Fit For Offshore Renewables programme to ensure supply chain businesses are prepared to compete for, and secure, contracts at UK offshore wind farms by making them more attractive to offshore renewables’ project developers.

There will be something wrong if, by 2035, the UK has not built on its current strong position to be recognised as a world leading player in the international renewable sector. We should become a centre of excellence.

6. The UK government is seeking to encourage enhanced UK manufacturing within the offshore wind supply chain. Do you see any scope for this within the O&M sector, especially in light of a growing emphasis on low-zero carbon supply chain solutions?

There is a whole range of equipment we can manufacture in the UK. As well as smaller components such as transition pieces, moorings, and a range of tubular products that can be used across all phases of construction, we have recently seen a number of encouraging announcements on larger scale manufacturing contract awards, including foundation jackets at Methil and tower manufacture at Nigg. I do see opportunities in the hydrogen supply chain, floating wind and the carbon capture and storage supply chain. There is also a real opportunity in decommissioning offshore wind farms. Unlike with oil and gas, the market requirement for offshore wind will be there for the long term, so current structures will be replaced after 25 years. This will create a circular economy and employment for a long period of time. Yards set up for oil and gas decommissioning could be well suited for this offshore wind decommissioning work. This is an exciting future opportunity.





The UK's offshore wind O&M market is set to grow relentlessly to become the second largest sub-sector of the UK offshore wind industry by value by 2030. The Rest of the World (excluding UK) offshore wind O&M market will also grow.

This will result in a projected global (UK and Rest of the World combined) £9 billion per year offshore wind O&M market by 2030.

This offshore wind O&M growth trend will lead to very significant domestic and export business opportunities for the range of UK based businesses with world-class expertise across the various services that make up O&M.

As Sir Ian Wood's interview highlights, much can be learned from the experience of UK oilfield service businesses during the development of the North Sea oil and gas industry.

Overall, offshore wind O&M is a major commercial opportunity, one that the UK should actively seize through supportive policy and investment.

ORE Catapult collaborated with Camberwell Energy to compile this article.



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Engage with us

