

Written evidence submitted by Orsted

1. **About Ørsted:**

The Ørsted vision is a world that runs entirely on green energy. Ørsted develops, constructs and operates offshore and onshore wind farms, solar farms, energy storage facilities, and bioenergy plants, and provides energy products to its customers. Ørsted UK focuses on the development, construction, and operation of offshore wind farms and waste-to-energy solutions and has over 1,000 direct employees. Ørsted is the largest offshore wind farm developer, generator and owner in the UK, and the world.

2. Ørsted UK owns or partially owns 12 operational wind farms, with one further wind farm under construction and a further three in our development pipeline. By 2022 Ørsted's offshore wind farms in the UK will generate over 6% of the UK's electricity. We own and operate one battery storage project (20MW) and also one 2MW battery integrated with an offshore wind farm as a proof of concept project. Ørsted's Hornsea 1 project became fully operational in 2020 and at 1.2GW is the world's largest and the first truly utility-scale offshore wind farm. We have invested over £10bn over the last decade in the construction of new offshore wind farms in the UK.

3. **Introduction and Executive Summary of key points:**

As the UK considers how to stimulate economic growth whilst simultaneously reducing carbon emissions, it is clear that offshore wind will need to play a significant role in any 'green recovery'. It is a pertinent time for the Committee to be examining this subject and Ørsted welcomes the opportunity to respond to this consultation.

4. As the largest offshore wind developer in the UK and globally, Ørsted applauds the ongoing commitment to offshore wind from the UK and devolved Governments. The UK Government has created a highly effective and stable regulatory regime in the UK that has given developers and supply chain companies the confidence to invest, whilst providing the competitive tension required to drive down prices at an unprecedented rate.
5. It is also a regulatory regime that has supported and encouraged innovation. When Ørsted became the first company to use the 6MW turbine in a full-scale development we did so in the UK, and we chose the UK again when we became the first company to use the 8MW turbines. We have significant R&D partnerships with UK universities including Durham, Hull and Oxford, and we work closely with the UK Research Institutions including the Offshore Renewable Energy Catapult and the Energy Systems Catapult.
6. As the UK looks to hit a target of 40GW of offshore wind by 2030 and looks for 75GW or more by 2050, there is enormous opportunity for UK supply chain companies provided they continue to receive support to innovate and invest. This is true both

fixed-bottom technologies that continue to develop at a phenomenal rate having already become the cheapest form of new-build electricity generation, and is also true for floating technologies that need support at the early stages of deployment in order to start their journey down the cost curve.

7. There is also a huge opportunity for UK companies to innovate in technologies such as renewable hydrogen and battery storage – technologies that are going to be key in enabling a low-carbon grid for the future. As a company that is already working with commercial partners and the UK Government to develop both these technologies, Ørsted believes that the UK is well placed to become leaders in these fields.
8. Finally, in order to benefit from these new technologies, the UK will only deploy at a sufficient rate to reach 40GW by 2030 if it takes action to remove barriers. First and foremost this will require an update to the environmental framework; secondly it must make more seabed available for leasing; and thirdly it must continue to support work to adapt civil and military radar. All of these actions are achievable.

How effective has the Government's offshore wind Sector Deal been in moving the sector towards becoming an integral part of a low-cost, low-carbon, flexible grid system and boosting the productivity and competitiveness of the UK supply chain?

9. The offshore wind industry has demonstrated a remarkable reduction in cost to the point where the price of electricity from new projects is now cheaper than new-build gas, coal and nuclear generation. The industry has benefitted from consistent support from government and investment by supply chain companies and developers has been possible by the clear policy signals provided by government and a policy framework that has provided support for a developing technology whilst maintaining competitive pressure to reduce cost.
10. Ørsted greatly welcomed the Offshore Wind Sector Deal which built on the strong foundations of government support for the industry and set out an ambitious partnership between government and industry which will see offshore wind become the backbone of Britain's electricity system, generating at least a third of the UK's power by 2030. Ørsted strongly believes that both the process of negotiating the Sector Deal and the Deal itself has been hugely beneficial to encourage a relatively young and newly established industry to work even more closely with each other and that it enabled the industry and government to take a more strategic approach to the future of the industry.
11. Throughout the negotiations between the Offshore Wind Industry Council (OWIC) and the Government, OWIC was chaired by Benj Sykes, the Country Manager for Ørsted UK. The fact that Ørsted asked Benj to dedicate so much of his time and commitment to negotiating the Sector Deal, working with colleagues from other key

companies in the UK industry, indicates the importance we placed on the process and on the outcome.

12. Ørsted believes that some of the successes of the Sector Deal to date include:

- The implementation of the Offshore Wind Growth Partnership, funded by developers, which focuses on supporting the UK supply chain to become more productive and competitive in the UK and the global markets, including funding for innovation in the supply chain.
- Collaboration between the industry and government departments and agencies to find a solution to ensuring offshore wind farms are compatible with civil and military radar.
- Ongoing cooperation between offshore wind clusters to share best practice on how to further leverage the economic benefit of offshore wind for regional economies.
- The initiation of a 'Barriers to Growth' group to remove regulatory and technical barriers to achieving greater deployment of offshore wind
- The fact that the UK Government felt confident to increase the target for offshore wind capacity to 40GW by 2030.

13. Future success, including progress on the creation of a flexible grid and on integrating offshore wind into a hydrogen economy, and progress on creating an environmental framework that will enable the sustainable build-out of 75GW or more of offshore wind in the coming decades, will require the continuing collaboration between government and industry.

14. **Sector Deal success - further developing the UK supply chain from a strong base:**

There are many success stories in the UK supply chain and the industry has already reached a UK content figure of almost 50% for the lifetime of a wind farm. The industry directly supports over ten thousand jobs with tens of thousands more in the supply chain and the number of jobs will multiply as the industry expands in the 2020s. Ørsted greatly welcomes the creation of the Offshore Wind Growth Partnership (OWGP) by the industry which will play an important role in the strengthening of the UK supply chain in the coming years. It is important that the UK and Devolved Governments build on the work of the OWGP by ensuring that infrastructure development, including port infrastructure, supports the needs of the growing UK industry.

15. **Sector Deal success - enhancing offshore wind support for regional economies:**

The UK is home to a number of offshore wind clusters that are having a significant impact on regional economies. In the last decade Ørsted has invested over £10bn in the development, and construction of UK offshore wind farms, contributing to the local economies of the areas in which we operate – the Humber, Liverpool, Barrow-in-Furness and Brightlingsea - and across the UK. For example, in the Humber, the

location of Ørsted's largest Operations and Maintenance Hub, there is a world-class offshore wind cluster. In addition to Ørsted, Innogy has recently opened up new facilities and the Offshore Renewable Energy Catapult has also opened up an office to deliver innovation in operations and maintenance. There are numerous supply chain companies including those providing marine services, blade production facilities, and many more. The local LEPs are highly supportive and there are strong links with local and regional universities, education and training establishments and the local business community.

16. The creation of a low-carbon hub in one of the regions with the highest level of industrial emissions has also created opportunities for the offshore wind industry to be part of an integrated low-carbon energy system. That is to say that the industry will not only be the backbone of the electricity generation but will also play an important role in the decarbonisation of industry and of heat and transport via the generation of hydrogen. Creating a strong and vibrant UK supply chain remains a priority of the UK offshore wind industry, but it should also be noted that it will be providing low-cost energy that will support UK industry and businesses across the UK economy.

17. Sector Deal success - developing grid flexibility and energy storage:

A key part of the Sector Deal has been the focus on both the creation of a flexible electricity grid designed around variable renewable generation, and the integration of offshore wind and other renewable generation into the wider energy system including heat, transport and industry. Under the Sector Deal the industry, the UK and Devolved governments and academia have come together to create the 'Solving the Integration Challenge' working group, led by the Baroness Brown of Cambridge. The growing capacity of renewable energy on the grid requires the development of technologies that provide flexibility and storage capability, including battery storage and hydrogen. The Sector Deal has been successful in increasing the level of cooperation between industry, academia and government, but its future success will require co-funding into R&D from government and a focus on regulatory support for new technologies and services that will accelerate the transition of the electricity grid to one designed around offshore wind and renewable generation.

18. The pathway to the creation of a flexible grid and the extent to which offshore wind and renewable hydrogen will fulfil their potential to support the decarbonisation of industry, heat and transport also depends on government policy beyond the Offshore Wind Sector Deal. Ørsted was greatly encouraged by recent government policy support for the role of hydrogen in decarbonising industry and alongside our partners, ITM and Element Energy, are developing a full FEED study for a project to create renewable hydrogen from one of our wind farms to be used by an industrial partner in the Humber (Philips66). We will respond further on this point in our response to the Committee's inquiry on hydrogen as a low-carbon energy source.

What level of output can the sector deliver in the UK, and what Government support would be needed to achieve this?

19. The UK Government's target of 40GW by 2030, enough to meet more than a third of Britain's electricity demand, is ambitious but achievable and gives a clear steer to UK supply chain companies of the opportunities in the UK. Equally as significant is the growing potential of the European and global offshore wind markets. Bloomberg NEF predicts a huge expansion in the global market with public offshore wind targets totalling 175GW of offshore wind installed by 2030¹ and the potential for continued exponential growth beyond 2030 as more and more countries become interested in the technology.
20. Looking beyond 2030, the Committee on Climate Change recommended that the UK would need 75GW of offshore wind by 2050 in order to achieve a cost-efficient pathway to net zero. Given that their analysis was based on a price for offshore wind far higher than the £39.65/MWh² achieved in the 2019 auctions, it is reasonable to predict that the UK may well choose to have a far higher capacity of offshore wind by 2050. Ørsted believes that a capacity nearer to 100GW will be required if the UK is to meet its decarbonisation targets on a lowest-cost pathway. In the global market, given that offshore wind is the cheapest option for utility-scale low-carbon generation, it is reasonable to predict a substantial expansion of the technology beyond 2030. As we discuss below, a number of regulatory and technical barriers need to be overcome to achieve this level of deployment, particularly the development of a new environmental framework, but we firmly believe that it is possible to achieve this.
21. All of this points to the huge opportunity for UK supply chain companies with an increasing demand for offshore wind development throughout the 2020s and beyond.
- 22. Enabling 40GW by 2030 - government support required:**
There are also a number of policy areas that need to be unblocked by the UK Government if it is to reach its 40GW target by 2030 and increase deployment beyond this date. Without these changes, projects could encounter significant delays, which in turn will impact on UK supply chain companies. The Government has committed to taking a cross-departmental approach to reaching net zero and enabling 40GW of offshore wind by 2030 requires a joined-up approach.
- 23. An update to the environmental framework is essential to reach 40GW – a joined up approach is required**
The current environmental framework is largely fit for purpose. However, BEIS and Defra and its agencies need to work together to update the environmental framework

¹ Bloomberg New Energy Finance 2019 New Energy Outlook

² Auction Round 3 results: 2012 prices

to enable the sustainable development of offshore wind as the current interpretation and guidance risks inadvertently delaying and halting many projects despite the projects having minimal environmental impact on the wider marine environment. The current framework should be updated in two ways. Firstly, to clarify that offshore wind development should be allowed without the need for compensatory measures when there is no long-term substantial impact on sensitive environments. Secondly Defra should issue clear guidance on compensatory measures that can be adopted by projects if it is concluded that they will have an adverse effect on the integrity of a designated site. The need to develop the environmental framework to enable the sustainable development of offshore wind and to create clear, workable and flexible guidelines for developers is the most important supporting action that government can take. Otherwise there is a risk that the current framework will unintentionally block and delay a significant amount of deployment in the coming years.

24. Radar:

Secondly, the UK Government needs to continue to support the development of military and civil radar systems that are compatible with the ongoing expansion of offshore wind. This work has already started, and the positive engagement of the MoD is very much welcomed by Ørsted, as is the Government's recently announced £2m innovation competition³.

25. Additional seabed leasing:

Thirdly, both the UK and the Scottish Governments need to consider further seabed leasing rounds to ensure there is a sufficient pipeline of projects in the coming decades.

26. Resource for Defra's Agencies:

There is a thorough and robust consenting process for the consenting of offshore wind farms. This process requires substantial input from statutory consultees, particularly from Natural England and the Marine Management Organisation, both of which have Defra as their parent government department. As the number of offshore wind farm developments going through the consenting process increases, it is essential that these bodies receive sufficient resource to analyse applications made under the consenting process and to make recommendations to the Planning Inspectorate.

27. Support for UK companies:

To ensure that UK companies, and therefore UK workers and communities, are able to make the most of these opportunities it is important for the Government and the industry to work together to support UK companies to increase productivity and be competitive in the UK and global markets. The support provided by the Offshore Wind Growth Partnership has already been discussed above, but there are a number

³ <https://www.gov.uk/government/news/dasa-seeks-innovative-ideas-to-mitigate-radar-risk-of-windfarms>

of other actions that the UK Government should either expand or initiate to support the UK industry: R&D support at all TRL levels; support for UK companies in the export markets including UKEF support and DIT support to develop the international market and support UK companies in new and existing markets; infrastructure support, particularly at ports and if the UK Government chooses to adopt free ports this policy should support the expansion of facilities for offshore wind in one or more relevant ports in the UK.

How might the UK take advantage of further technological advances in offshore wind technology, particularly in relation to floating arrays?

What support does the sector require to keep pace with the most cutting-edge innovations, such as in blade technology? What does the supply chain need?

28. Innovation has been key to the offshore wind industry's success and has enabled significant cost reductions. Larger turbines and larger wind farms further from shore have enabled significant cost reductions through economies of scale, standardisation and increased efficiencies. Further technological advances across the sector have the potential to further reduce the cost of offshore wind. If the UK continues to be at the forefront of innovation in offshore wind, UK industry could benefit from exporting these new technologies to the growing global market.
29. Many of the latest technological developments in offshore wind now seen extensively in the global offshore wind market have been trialed or deployed commercially for the first time ever in the UK. For example, Ørsted was the first developer to deploy the Siemens 6 megawatt (MW) turbines at our Westermost Rough offshore wind farm in 2015, following a successful trial at our Gunfleet Sands offshore wind farm, and the first to deploy the MHI Vestas 8MW turbines at our Burbo Bank Extension offshore wind farm in 2018.
30. **Collaboration between industry, academia and Research Institutions:**
The industry already has strong collaborations with academic and Research Institutions. Ørsted and other leading developers have co-funded, alongside government, work with academic institutions within Carbon Trust's Offshore Wind Accelerator programme as well as with the Offshore Renewable Energy Catapult. A recent example of collaboration is that between Ørsted, Siemens Gamesa and the universities of Sheffield, Durham and Hull as part of the £7.64 million EPSRC Prosperity Partnership (£2.5 million provided by Ørsted). We have created a 5-year collaboration focused on fundamental research problems at early Technology Readiness Level stages, including wind turbine designs and blade erosion and inspections. Another example is Ørsted's five-year research agreement with the University of Oxford, to optimise the design of foundation structures for offshore wind turbines.

31. **Working with innovative supply chain companies:**

The industry is continuing to work with innovative supply chain companies. As the Whitmarsh Review noted, in addition to the companies already within the sector, there are numerous companies currently focussed on other sectors who could offer innovative solutions to the offshore wind industry. One recent example from Ørsted is our collaboration with Scotland-based Pict Offshore to develop a game-changing technology for offshore wind operations and maintenance which is set to improve safety and reduce costs across the whole industry. The new motion-compensated hoist will provide Operations and Maintenance teams with ladder-free access to offshore wind turbines, improving safety. Pict Offshore received funding from Scottish Enterprise, and it is important that government continue to offer support for innovative companies in the early stages of product development.

32. **Future opportunities related to reducing carbon intensity:**

In addition to ongoing innovation in the industry as it moves to reduce its own carbon footprint. Ørsted is already working with UK suppliers to bring forward new innovations. For example, we have partnered with CWind on the world's first hybrid powered Surface Effect Ship (SES) for our Borssele 1 and 2 offshore wind farms in the Netherlands. The vessel which will be built by leading UK boat builder, Wight Shipyard Company, was developed in response to an industry-wide push to develop and deploy innovative technologies that reduce CO₂ emissions. This is also an example of the opportunities available for UK supply chain companies in the global market.

33. **Floating wind:**

Floating wind is an exciting new technology and Ørsted is confident that floating offshore wind will, with the right support, become cost competitive in the medium term. We support proposals within the recent consultation on Auction Round 4 that would move fixed-bottom offshore wind to its own pot, enabling floating wind to compete in the developing technologies pot. Cost reductions in onshore and offshore wind were achieved through deployment, and making support for floating wind available now is key to enabling floating wind in the future. However, we believe fixed-bottom offshore wind will remain the technology of choice for large-scale deployment in the 2020s, while floating wind is developed to a point where it is cost-competitive.

34. **Infrastructure investment:**

As the industry moves to using larger turbines, it is important that the UK's port and other infrastructure develops in order to ensure that the UK can host supply chain companies and manufacturers that are capable of working with the larger components.

35. **Grid flexibility – essential to reach higher capacities:**

In addition to innovation related directly to offshore wind, innovation in technologies that provide flexibility will be key to support the transition to a low-carbon grid. This includes technologies related to storage that support variable generation from renewables, particularly battery storage and renewable hydrogen. We are aware that the Committee has launched a separate inquiry into hydrogen, but it is worth noting that R&D and regulatory support to develop renewable hydrogen production (i.e. production via electrolysis using electricity from offshore wind or other renewable generation) is a key component in the transition of the electricity grid to a renewables-dominated grid and is also vital to the decarbonisation of industry and transport and heat. The UK has the opportunity to be a lead developer in electrolysis and the deployment of renewable hydrogen.

36. The opportunity that these technologies offer is not just as a stand-alone solution, they also have potential to be co-located and embedded in offshore wind generation. It is important that the UK Government and regulator enable the commercial development of co-located battery and hydrogen production. The Government should be applauded for the funding programmes it has initiated under the Industrial Decarbonisation Challenge. It is important that there is funding and regulatory support for the deployment of renewable hydrogen in order to start the journey that will lead to significant reductions in price in the long run.

What is the UK industry doing to promote the sustainability of offshore wind arrays throughout their entire life-cycle from development through to decommissioning, and to improve maintenance and end-of-life repair?

37. Ørsted believes that the greatest threat to the marine environment is climate change. Offshore wind could be instrumental in limiting the negative consequences of climate change and the threats it poses to the environment through the provision of large-scale, low-cost renewable generation. It is possible to build out 40GW of offshore wind by 2030, and 75GW or more by 2050, sustainably and with minimal long-term impact on the marine environment. However, government, industry and other environmental bodies urgently need to work together to update the environmental framework, and to provide clear guidance on derogations and on appropriate compensation measures under the Habitats Directive. This will enable the sustainable build out of sufficient capacity of offshore wind to help the UK meet its decarbonisation targets whilst still protecting the marine environment.

38. Strong protections under the current consenting regime:

The offshore wind industry in the UK is heavily regulated. Before any offshore wind farm can be built, developers are required to carry out an Environmental Impact Assessment (EIA) and consult extensively with statutory bodies, environmental NGOs and local communities before they apply for development consent. Developers will be

challenged on all aspects of their applications during the pre-application consultation period and formal examination process and must be able to demonstrate that they have listened and taken on board feedback, to mitigate any potential harm. Once consented, the developers must construct and operate their wind farms in accordance with the awarded consent. While we believe that the cumulative long-term impact of offshore wind on the marine environment is small, we are keen to work closely with government and others to explore meaningful actions that we can take that will benefit marine ecosystems.

39. A sustainable supply chain:

During the last decade, Ørsted has transformed its business from fossil fuels to green energy, reducing our scope 1 carbon emissions by 86% at the end of 2019 compared to 2006. We are determined to continue to reduce our emissions and have set ourselves the target of achieving carbon neutral operations by 2025. We are also embarking on the next phase of our decarbonisation journey to address the carbon emissions across our entire carbon footprint. Earlier this year, we set ourselves the target to cut our energy trading and supply chain emissions (scope 3) in half by 2032 and reach net-zero emissions across the company's entire carbon footprint by 2040.

40. In order to meet our target, we recently launched our supply chain programme which aims to engage our strategic suppliers in the most carbon-intensive categories of our supply chains: the manufacture of wind turbines, foundations, substations and cables. Many of the low carbon technologies needed to decarbonise our supply chain are not yet cost-efficient or available at scale. There is therefore an opportunity for UK suppliers to innovate in space, which will help them to stay competitive in the future. The UK Government's support for the decarbonisation of industry is welcomed, including its support for low-carbon hydrogen.

41. Decommissioning:

Wind turbines currently have a recycling rate of 85-90%. The majority of materials, such as steel, other metals and concrete can be recycled by existing recycling systems. Other parts, particularly the composite blades, are more challenging. The industry is working with the chemicals and composites industries to develop improved solutions that will benefit the onshore and offshore wind industry, and other industries that use composite materials.

How well is the UK industry managing the environmental and social impacts of offshore wind installations, particularly on coastal communities with transmission-cable landing sites?

42. Climate change is one of the largest threats to the environment both locally and globally and tackling it will require timely change at an unprecedented scale. Building renewable energy technologies like offshore wind at scale will help to protect natural ecosystems from the consequences of climate change. However, this build out needs

to be done sustainably, in a way that balances with the need to protect the natural environment, the interest of other industries and the impact on local communities.

43. The UK industry is operating within a regulatory and planning regime that, on the whole, has been successful in ensuring that the development of offshore wind farms has been environmentally and socially responsible. However, there has been a rapid increase in the rate of deployment of the technology and the regulatory regime therefore needs to develop to adjust to this new situation. Two changes, in particular, are necessary. Firstly, a more strategic approach to connecting offshore wind farms to the transmission grid needs to be developed as soon as possible to reduce the impact of onshore construction on some communities. Secondly, a new marine planning framework is required to ensure that a technology that is vital to tackling climate change can develop sustainably with minimal impact on the marine environment.
44. Before any new offshore wind farm can be built it must go through a rigorous planning process under the Planning Act 2008. The process is front-loaded, and developers must consult extensively with statutory nature conservation bodies and local communities on draft proposals prior to applying for development consent. During this pre-application phase, the potential environmental and social impacts are assessed based on the maximum design scenario, and adjustments made to proposals to minimise any potential adverse effects. All elements of the application are then further scrutinised during the formal examination, which is conducted by an independent examining authority, before a recommendation is made to the Secretary of State as the decision maker.
45. It should be acknowledged that developers make substantial efforts to limit the environmental and social impacts of offshore wind. Ørsted's experience is that the impact can be greatly reduced through sensitive placement of infrastructure, refinements to the project design and management measures. All cabling is buried and whilst there is disruption during the cable installation process, the only long-term infrastructure that is visible above land is the substation next to the national grid substation (and booster station if required) along the cable route. Developers will consult extensively on the proposed cable route and substation location(s) and will adjust their plans where feasible based on feedback. Construction management plans are also developed and approved by the relevant local authorities to ensure that the disruption to local communities is kept to a minimum.
46. The industry is working collaboratively with government and wider stakeholders to address strategic deployment issues, including the onshore and offshore transmission regime, and cumulative environmental impacts both in the marine and onshore areas.
47. **A more strategic approach to connecting offshore wind to the grid:**

Under the current system, developers, once awarded an area of seabed from the Crown Estate, apply to National Grid for a connection point on the transmission network. After a cost benefit analysis, National Grid issues an offer with a connection point and date. This is done on a first-come, first-served basis and the developer cannot choose its own connection point. The outcome of this is many individual point-to-point connections, with cable routes sometimes criss-crossing one another, an issue that is particularly acute in East Anglia. The current system for connecting offshore wind farms to the grid was not designed for an energy system expanding towards 75GW of offshore wind by 2050 and it is clear that a more strategic approach should be put in place as soon as possible. The currently regulatory framework is set by Ofgem and we urge National Grid ESO and Ofgem to continue to work with the industry as a matter of urgency to develop a more appropriate framework for connecting offshore wind farms to the grid.

End.

May 2020