Written evidence submitted by Offshore Renewable Energy Catapult and High Value Manufacturing Catapult (IND0020)

OREC has previously provided evidence to the Committee's inquiries on 'Securing the domestic supply chain' and 'Keeping the power on'. Our evidence from those responses still stands. Since then, OREC and HVMC have recognised that the breadth and scale of the challenge and opportunity in offshore wind warrant a combined approach. We have therefore developed a joint proposition on offshore wind for the Industrial Strategy. Our summary of our proposition, below, primarily responds to the Committee's first question:

Q: How can UK plc capture its fair share of the economic potential of emerging or less developed energy technologies?

OFFSHORE WIND: A FUTURE NATIONAL GROWTH INDUSTRY

The case for action

1. The Offshore Wind opportunity has been **valued at £1300bn over the next decade**, with the UK wind market alone forecast to undergo 4X growth. This warrants the sector being central to the UK's future industrial and investment strategy. The crossovers between the floating wind and oil and gas sectors also means that the transfer of knowledge and technologies can provide a powerful route for the transition. Oil and gas currently employs thousands of people who can transfer their skills to offshore floating wind as the technology and sector advances
2. Following the publication of the 2024 Offshore Wind Industrial Growth Plan (IGP), interventions and actions are underway to develop the installation, operation and maintenance supply chains needed for offshore wind deployment. However, there is a bigger prize at stake – the opportunity to create **a growth driving wind manufacturing industry** that serves our domestic market and captures global market share.

The benefit case

3. Investing in an industrial intervention now would **position the UK as the global leader in floating offshore wind,** delivering on the national ambition to be a clean energy superpower and driving long-term economic growth, and **supporting the oil and gas sectors to transition,** converting and creating sustainable jobs in communities across the UK .
4. The IGP identified five areas of UK strength and that account for the highest value of manufactured products: blades, floating sub-structures, cables, towers, electrical equipment. In acting to develop a manufacturing industry the UK should **target ~ 60% domestic content by 2035** (over and above O&M). This would deliver:
    - **cumulative GVA by ~£121bn by 2035** (direct, indirect and induced effects).
    - **over 100,000 direct jobs**, and over 200,000 indirect and induced jobs
    - accelerated technology and product development **cost reduction and time-to-market**
    - **expanded supply chains** to serve this growth industry

      UK IP and industrial partnerships capable of delivering market-making products and technologies
5. The innovation and investment strategies of e.g. the National Wealth Fund, GB Energy, and The Crown Estate should focus on securing this prize.

Three strategic horizons

6. The industrial opportunity that future manufacturing presents extends beyond the time horizon considered by the IGP (2024-2035). Products will be multi-generational requiring new technologies and service solutions that will sustain the industrial system for decades to come. That means to fully realise the industrial opportunity, actions need to be taken now that will realise benefits across three strategic horizons (Annex A).[1]

    - Horizon 1: Invest to improve the productivity of today's technologies and supply chains to ramp-up onshore and offshore deployment (deliver Clean Energy 2030 Mission).
    - Horizon 2: Invest to develop the supply chain and skills base needed to secure market share of today's industry (capitalise fully on the IGP opportunity)
    - Horizon 3: Invest in future technology and product leadership to drive an enduring growth industry, manufacturing, deploying, replacing and recycling UK manufactured products (deliver UK Growth Mission)

7. By acting to realise the opportunities across multiple timeframes functions it becomes possible to create integrated industrial ecosystems capable of serving multi-generational industries. To this end, there needs to be an ongoing focus on ensuring the enabling capabilities are also invested in, e.g. a workforce with the applied, industrial skills needed and an integrated, whole life-cycle supply chain.

Anchoring industries through 'connected pathways', from research to deployment

8. Experience from other sectors has proved that to have maximum impact it is critical that the implementation of interventions to create these ecosystems are anchored in **end-to-end, connected pathways from breakthrough research to industrial adoption**.[2] Without long-term product leadership, supported by a deep connection to the research and innovation base, manufacturing assets can be short-lived as products fail to keep up with advances in technology and facilities become home to transient jobs.

9. By establishing **Connected Pathways** through research and innovation, validation, demonstration and deployment, the wind industry could sit alongside automotive, defence, and aerospace as multi-generational national manufacturing successes.

10. The 'connected pathway' for offshore wind is illustrated at Annex B & C. This highlights the opportunity to:

    - Build and scale **targeted research programmes and capabilities** through existing mechanisms (e.g. SuperGen hubs) to ensure next-generation products and services are technologically superior to competitors' and subsequent manufacturing investments are 'stickier'.

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[1] Horizon 1: Act to deliver growth in the short-term and or address an urgent need; Horizon 2: Invest to drive future growth over the mid-term; Horizon 3: Create the conditions for industrial impacts and outcomes over the next 10 years plus.

[2] Connected pathway to industrial opportunity – the giga factory example. Recent industrial success in the development of battery technology and supply chains demonstrates the effectiveness of our 'connected pathways' approach. The 7 year, £610m Faraday Battery Challenge and £1bn Automotive Transformation Fund programme supported leading R&D (TRLs 1 through 9), including the Faraday Institution (TRL 1-3), major Innovate UK CR&D programme, and the £160m UK Battery Innovation Centre provided manufacturing prototyping capabilities. This has seen both the 2GW AESC plant expanded to 32GW and the commitment from Agritas (a TATA company) to build a world leading Gigafactory in Somerset. Critically, all of this is supported by a comprehensive skills development programme to create a future workforce with the right industrial skills at the right time.

- **Expand the sub-scale 'pull through' of technology** by investing in the capabilities and innovation programmes of RTOs (e.g. Catapults).
- **Complete the connected pathway** by investing in first-of-a-kind facilities to demonstrate and derisk product, manufacturing and validation technologies **at full industrial scale** for each priority technology family (blades, floating sub-structures, cables, towers, electrical equipment). This is **currently a gap. Investing in full scale industrialization capabilities is** critical to the **creation and retention of knowledge and IP, and to anchoring a future manufacturing industry in the UK.** Annex D presents an outline mission card for UK Floating wind

11. The need for an industrial intervention is pressing as the opportunity is on a burning platform. Any decision-making delay immediately starts to erode the foothold that UK industry can obtain in floating offshore wind in the Celtic Sea as the supply chain needs to be moving now to secure FID[3] by 2028.

    With this proposition for the Industrial Strategy we are directing the UK government's attention to the example set by their successful industrial strategies for aerospace and automotive. In these sectors, Connected Pathways for research and innovation have been developed as the primary vehicle for strategic collaboration between government and industry. The government has determined that to preserve the large numbers of high-tech jobs and export earnings from these industries, R&D programmes running at around £200 million per year are required. Ad hoc deals are then used to fund or incentivise investments in new factories or production lines, enabled through dedicated Energy Transition Innovation Centre(s). We have the same scale of opportunity in offshore wind but face the chicken-and-egg problem of not yet having a large enough industry to justify aerospace-level public partnering but having close to zero prospect of attracting that scale of industry without the commensurate level of support. We are deeply concerned that without a much greater level of commitment, via a dedicated industrial strategy, our supply chain will not grow sufficiently to meet our ambitions, deployment will fall short of policy goals, prices will rise, the employment potential will be largely missed and public support will disappear.

Q: What more can the Government do to encourage greater domestic supply chain investment in the energy industry by 2035, including through the Contracts for Difference scheme?

Q: Does the UK have the supply chain capacity to deliver the required energy infrastructure by 2035, including an expanded electricity network?

In addition to support for the Connected Pathways approach advocated above, there is an urgent need for big-picture thinking at the heart of government. For example, the sector would benefit greatly from having one or more UK manufacturing champions: apex manufacturers play essential public roles in the aerospace, automotive, defense and pharmaceutical industries. The UK understood this when it partnered with Samsung to develop an offshore wind turbine for UK manufacture in the early 2010s. Unfortunately that effort foundered due to unforeseeable developments in South Korea. However, the global turbine OEM landscape is ripe for this approach once again but the current window of opportunity may soon close.
We could also borrow from other sectors and other countries by supplementing our annual CfD auctions for renewables with larger single projects at sufficient scale to catalyse major infrastructure and supply chain investments. This Hinkley-style approach would create space to

[3] FID is the point where major equipment orders are placed, and contracts executed for the engineering, procurement and construction stage of a project

grow or attract a UK-based turbine with GB Energy perhaps being in a good position to lead on such an initiative.

This scale of effort is beyond the current machinery of government. The broad and deep teams of officials that ensure wise national choices for automotive, aerospace and other sectors, simply do not exist for offshore wind because there has been no need for them up until now but without them we are likely to continue to fall short of our economic potential. However, successive governments have built OREC and HVMC into organisations with deep knowledge, capabilities and insights in all aspects of offshore wind and manufacturing and we are able, and more than willing, to help.

Additional responses:
Q: To what extent would growing the domestic supply chain bolster UK energy security?

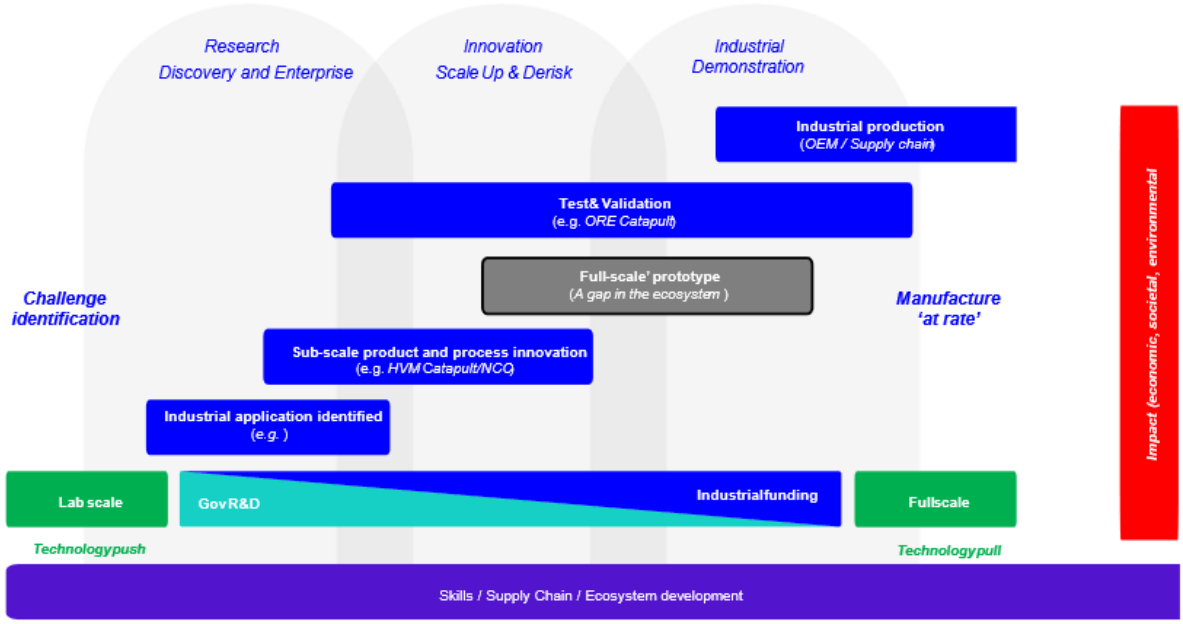
In OREC's response to the 2023 ESNZ Call for Evidence 'Keeping the power on', we presented our analysis that dispatchable offshore wind would be approximately half the cost of dispatchable nuclear power. Offshore wind costs have since risen but not so far as to overturn offshore wind's cost advantage (and nuclear costs may also have risen). The Royal Society similarly concluded in 2023 that adding any nuclear generation to an electricity mix based solely on dispatchable low-cost renewables would raise electricity prices for consumers. Therefore, as we noted in our earlier response '*offshore renewables, especially offshore wind, are sufficient to provide the primary energy for affordably supplying the vast majority of our energy needs, including the need for short-term and seasonal matching of supply and demand'.* This path would be fundamentally more energy-secure than other options because, with mainly renewables in the energy mix, we would not be dependent on foreign powers to supply us with fuel.

When it comes to key technologies the energy security advantage remains with offshore wind. The UK is capable of supplying most, if not all, key components for offshore wind. Along with the UK's ambitions around foundation industries such as materials, we can create a secure and sovereign energy sector, one which has greater control on (quality) materials, products, manufacturing, distribution and generation.

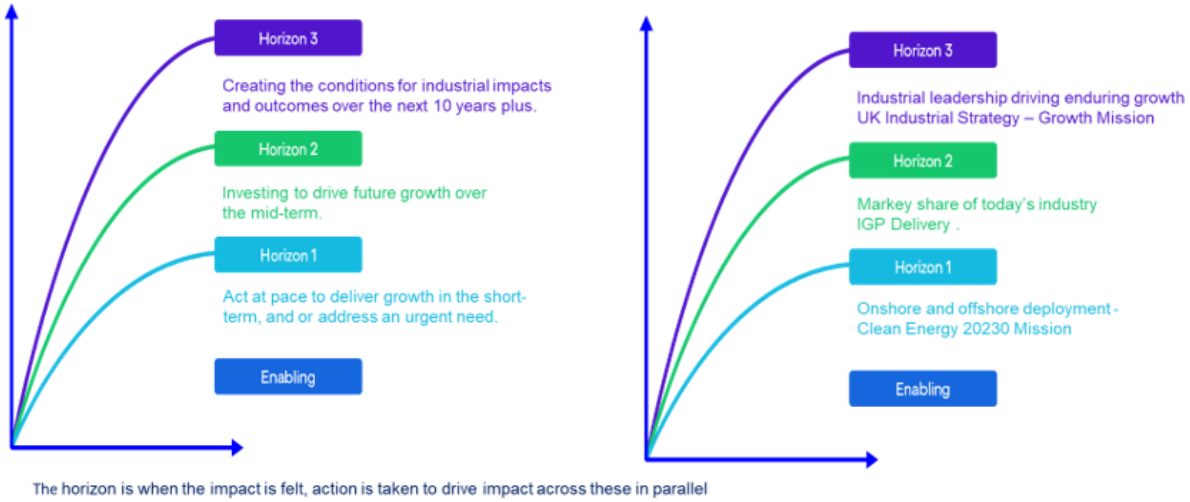
Sovereign supply chains including those in offshore wind are insulated from market and access shocks which the UK currently has little control over. Through underlying capabilities across engineering and manufacturing the UK can develop our own e.g. turbine supply chain. The forthcoming Industrial Strategy presents the opportunity for this to be a reality.

Q: What are the key concerns with respect to the availability of raw materials in the supply chain and how might those be addressed?
We reiterate our response to 'Securing the domestic supply chain', that sustained innovation programmes can address dependency on rare or costly materials. In the DESNZ-supported JOULE programme the combination of knowledge and capabilities of OREC and the High Value Manufacturing Catapult has progressed the application of composites to turbine components, in concert with UK manufacturers. Similarly we have developed a deep research partnership with a UK manufacturer to develop drive train components that eliminate the need for rare-earth materials.

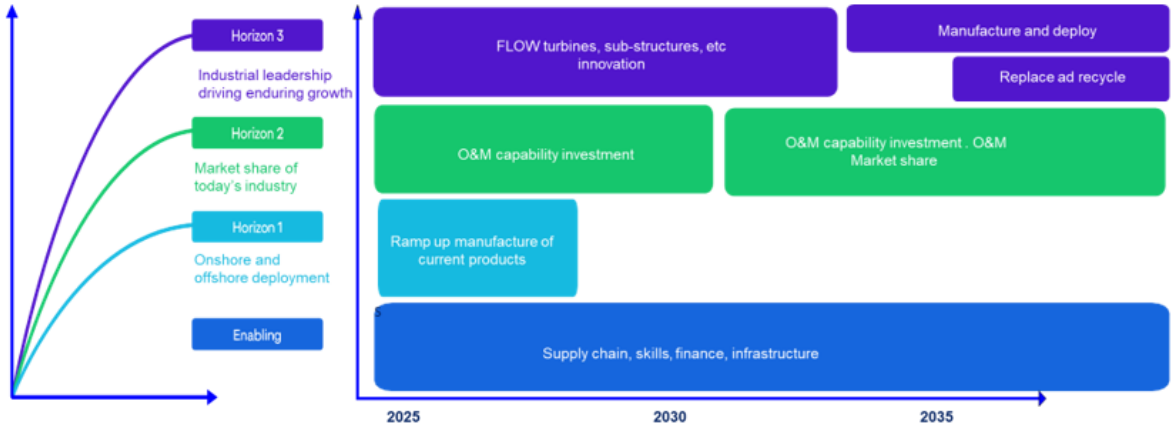
Annex A: Connected Pathway for Wind



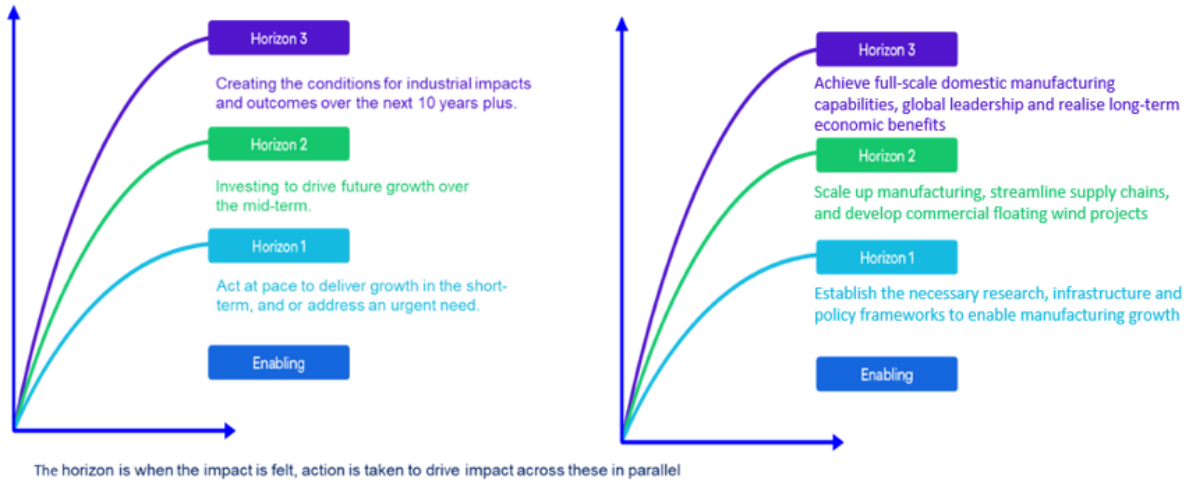
Annex B: Three horizons



The horizon is when the impact is felt, action is taken to drive impact across these in parallel



Annex C: Three Horizons – Floating Wind example



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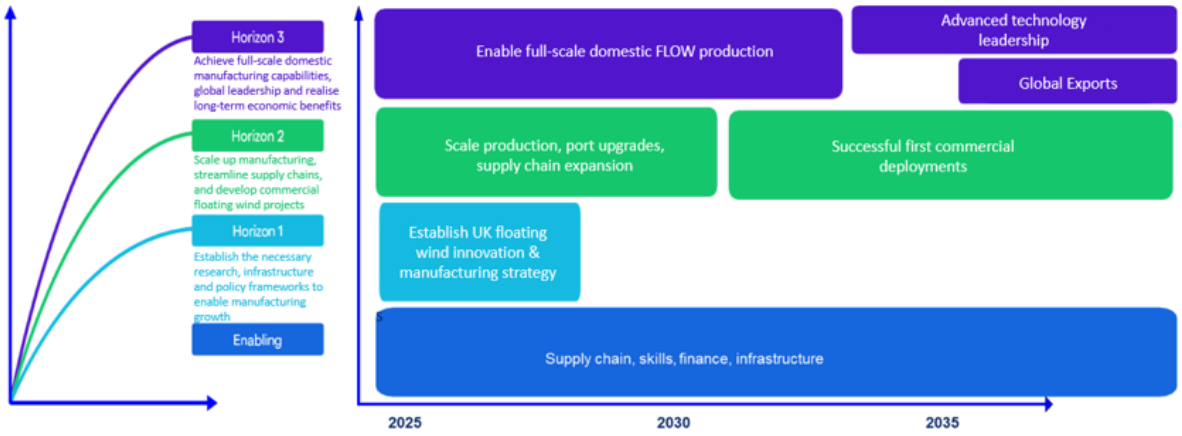

Annex D: Floating wind Mission Card