

Floating Offshore Wind in Scotland

Immediate Priorities to Accelerate
the Scottish Supply Chain

**CROWN ESTATE SCOTLAND
SOWEC**

05/07/2021



Document Details

NIRAS Project Number	81400059
NIRAS Contact Name	D. Still
Document Title	Floating Offshore Wind in Scotland: Immediate Priorities to Accelerate the Scottish Supply Chain
Client	Crown Estate Scotland, SOWEC
Client Contact Name	Jalissa Zupo

The following personnel are designated contacts for queries relating to this document

Name	Role	Telephone	Email
Jim Kersey	Project Director	+44 (0)7544 359831	jke@niras.com
Davy Still	Project Manager	+44 (0)7955081388	dast@niras.com

Document Issue Log

Version / Issue	Comment	Date	Author	Checked by	Approved by*
1	Draft	29 th Apr 2021	DAST, JKE	TNO	JKE
2	Draft	20 th May 2021	DAST, JKE	TNO	JKE
3	Draft	27 th May 2021	DAST, JKE	JKE	JKE
4	Draft	9 th June 2021	DAST, JKE	JKE	JKE
5	Draft	5 th July 2021	DAST, JKE	JKE	JKE

Third Party Disclaimer

This report has been prepared by NIRAS Group (UK) Ltd on behalf of the specific Client, and is intended for use solely by the Client as stated in the agreement between NIRAS Group (UK) Ltd and the Client. NIRAS Group (UK) Ltd has exercised due and customary care in compiling this report, but has not, save where specifically stated, independently verified third party information. No other warranty, express or implied, is made in relation to this report. This report may not be used or relied upon by any other party without the express written permission of the Client. Any communications regarding the content of this report should be directed to the Client. NIRAS Group (UK) Ltd assumes no liability for any loss or damage arising from reliance on or misuse of the contents of this document, or from misrepresentation made by others.

This report has been prepared within the NIRAS Group (UK) Ltd Quality Management System to British Standard EN ISO 9001 2015



NIRAS Group (UK) Ltd
St. Giles Court, 24 Castle
Street
Cambridge CB3 0AJ, UK

Reg. No. 1250443
England & Wales

T: +44 (0)1223 803750
www.niras.com/uk

Table of Contents

1. Introduction	3
2. Methods.....	3
3. Background.....	4
3.1 Floating Offshore Wind Policy Landscape in Scotland	4
Offshore Wind Policy Statement.....	4
Seabed Leasing	5
Other Key Reports.....	5
4. Accelerating the Floating Offshore Wind Supply Chain.....	7
4.1 A Summary of National and UK-level Support for the Supply Chain	7
4.2 Evaluation of the Supply Chain Support	9
Signposting the Scottish floating offshore wind supply chain.....	10
Getting new entrants into the floating offshore wind supply chain	10
Support for the existing supply chain.....	11
Intermediate Projects	12
Re-assurance for the Supply Chain.....	12
Development of strategic infrastructure	13
Government investment.....	15
Private investment	15
5. Opportunities	16
5.2 Leasing Targets	16
5.3 Intermediate Scale (pre-commercial) Projects	16
5.4 Ports	16
5.5 Funding for Support Programmes.....	16
6. Conclusions.....	18
6.1 Keeping Scotland at the Forefront of Floating Offshore Wind	18
Appendix A - Consenting Framework.....	20



Tables

Table 4.1 Examples of Offshore Wind Supply Chain Mechanisms 8
Table 6.1 Priority Opportunities..... 18

1. Introduction

- 1.1.1 Scotland is currently at the forefront of floating offshore wind. The nation is home to the world's first floating offshore wind farm, Equinor's 30 MW Hywind Scotland, with a second, the 50 MW Kincardine project, currently under construction.
- 1.1.2 Looking to the future, floating offshore wind in Scotland has enormous potential. Scotland's unique deep-water profile and high, consistent wind resource means that its waters are ideally suited to floating offshore wind. This, combined with Scotland's ambitious climate targets and a positive policy landscape for renewables, means that Scotland could pave the way for floating offshore wind globally.
- 1.1.3 A recent report by the Offshore Renewable Energy Catapult "Initial Predictions for Offshore Wind Farms in the ScotWind Leasing Round, March 2021" suggested that under certain scenarios, 97% of the current ScotWind round could be floating.
- 1.1.4 In its Sept 2018 report "Macroeconomic benefits of floating offshore wind in the UK", Crown Estate Scotland estimated that floating offshore wind "could support 17,000 UK jobs and £33.6bn of GVA". The report went on to say that "with the appropriate supportive actions, we believe the UK can deliver annual UK export value of at least £230m by 2031 and £550m by 2050".
- 1.1.5 If correct, this represents a huge opportunity for Scotland and a key phrase in the above is "appropriate supportive actions" i.e. what can Scotland do to realise this potential, at home and abroad?
- 1.1.6 The purpose of this report is to identify immediate priorities to ensure Scotland's floating offshore wind potential can be realised. The focus of this report is on supply chain improvements, which can facilitate Scottish job creation; but it also covers a range of other barriers, which have the potential to indirectly affect the supply chain, and makes recommendations for their removal. The recommendations made in this report are primarily aimed at Scottish Government and its agencies, in addition to Crown Estate Scotland in its role as the manager of the seabed. However, there is also a key role for industry to work collaboratively with these bodies to maximise return from any opportunities identified in this report. This report has been funded by Crown Estate Scotland and delivered through the Scottish Offshore Wind Energy Council ("SOWEC") Innovation Workstream

2. Methods

- 2.1.1 The approach to this report consists of two main elements:
 - (1) A review of key policy documents. The purpose of this exercise was to source policies currently in use to support the floating wind supply chain.
 - (2) Engagement with key stakeholders, including representatives from Government, industry, floating wind research centres, and industry support groups. For each stakeholder, interviews were conducted to obtain feedback – the key question being "What needs to be done for the Scottish supply chain to accelerate floating wind in Scotland?".

3. Background

3.1 Floating Offshore Wind Policy Landscape in Scotland

3.1.1 In Scotland, the key floating offshore wind policies set by Scottish Government and its agencies are provided for in the Offshore Wind Policy Statement and the Sectoral Marine Plan, which is set to be implemented by Crown Estate Scotland's ScotWind leasing programme. Scotland's offshore wind ambitions are tightly linked with its statutory climate targets, with a headline commitment of net zero emissions by 2045¹. In addition, BEIS provide supportive policies at the national level, primarily through the Offshore Wind Sector Deal and the Contract for Difference scheme. The current status of Scottish policy for floating offshore wind is explored further below.

Offshore Wind Policy Statement

3.1.2 The Scottish Government consulted on the Offshore Wind Policy Statement ("OWPS") and published the consultation responses in October 2020. The OWPS is set within the Scottish ambition to be net zero by 2045.

3.1.3 Most respondents were supportive of the OWPS but many called for a move to annual Contract for Difference ("CfD") auctions rather than every two years. Respondents also called for an enhanced role for floating offshore wind within the CfDs.

3.1.4 On 6 October the UK Government announced its Build Back Greener plans to deliver 1GW of floating offshore wind by 2030, as part of the wider ambition of reaching 40GW (up from 30GW) of offshore wind by 2030. Following this announcement, the UK Government committed to floating offshore wind being treated as a distinct technology within the CfD, with a different administrative strike price, from fixed bottom offshore wind.

3.1.5 Other major themes in the responses to the OWPS were related to support for local supply chains and reform of the network charging regime. A start has been made on the former; Scottish Government already has targets for local content and the ScotWind application process has a requirement for an accompanying supply chain statement. Network charging rates were seen as an issue to address, as renewables in Scotland were further from the centres of demand and hence attract higher charges.

3.1.6 The cost implications of regulatory commitments and policy mechanisms were also cited as in need of review and suggestions for improvements to grid infrastructure were also put forward. The grid operators are now planning subsea interconnectors between Scotland and England and, interestingly, the latest interconnector proposal between England and Belgium is being put forward as a multi-purpose interconnector that would give other users access for exporting electricity. This could pave the way for a significant change for offshore wind farm operators in terms of the configuration, cost and use of export cables. The market for renewables Power Purchase Agreements is also thriving and other markets for offshore wind electricity are emerging e.g. hydrogen production, power for oil and

¹ <https://www.legislation.gov.uk/asp/2019/15/enacted>

gas platforms etc. The market for offshore wind electricity is undergoing change and the policy and regulatory context needs to reflect this.

- 3.1.7 Many consultees wanted to see an ambition that went beyond the Scottish policy of 8GW. The adopted Marine Sector Plan identifies 10GW of offshore wind potential through fifteen plan options ("POs"), so going beyond the 8GW may be possible. This would require widespread development across the POs and the necessary investment by developers. Some POs may be more in demand than others. Policy and regulatory certainty play a key role in decision making by developers, as they help to define the investment required, whether they are already established in the market or are a new entrant to the sector.

Seabed Leasing

- 3.1.8 While the Sectoral Marine Plan identifies areas of seabed considered suitable for future development, Crown Estate Scotland, in its role as manager of Scotland's seabed, is responsible for administering the leasing system. CES will be able to lease areas of seabed located within the identified POs.
- 3.1.9 In June 2020 Crown Estate Scotland launched its first cycle of ScotWind leasing. Applications opened in January 2020 but a review was announced in February 2021 in response to the new market dynamics of the offshore wind sector following the result of The Crown Estate's recent auction for sites in waters around England and Wales. The review was completed in March 2021 but, as a consequence the application deadline for ScotWind leasing have been extended.
- 3.1.10 The outcome of ScotWind is, therefore, not yet known; but based on the POs identified in the SMP, initial predictions for the next ScotWind leasing round indicate that floating offshore wind has the potential to dominate (ORE Catapult, 2021).

Other Key Reports

- 3.1.11 In January 2019, Martin Whitmarsh published a supply chain review that was commissioned by the Offshore Wind Industry Council ("OWIC"). One of the review's observations was:

"...to achieve the growth required in offshore wind, we must convince many more UK businesses to commit to the sector and build the supply base required to support the industry going forward."

- 3.1.12 Amongst a range of recommendations, several were made on market conditions i.e. actions to develop the demand for low carbon energy. More actions on the demand side could stimulate the expansion of demand and hence attract more companies to participate. The market condition actions suggested included:

- **Government should announce more ambitious targets to migrate from fossil fuels and tax carbon emission.** The first is being addressed e.g. Government action to accelerate the ban on sale of new petrol and diesel cars from 2035 to 2030. This will help shift the focus of renewable energy production from just grid supply to other, growing sectors. Also, the UK Government announced on 20th Apr 2021 that it will "...set the world's most ambitious climate change target into law to reduce emissions by 78% by 2035 compared to 1990 levels..." by the end of June. For the first time, the budget includes the UK's share of international aviation and shipping emissions

- **Government/Ofgem should ensure that consumers have visibility and choice of low carbon generated electricity in the retail market to stimulate the market for greater low carbon electricity generation.** Many energy suppliers (small, medium and large) are now claiming to supply energy from renewables. Consumers need to be given confidence that the supply is truly from renewables. Expansion of supply will need to anticipate and follow this demand
- **Domestic energy providers are required with each bill, and on their home page, to clearly advertise the mix of electricity production between zero emission and carbon emitting sources.** This would help build consumer confidence
- **Accelerate the migration of "time of use" tariffs, smart meters and encourage consumers to "sell-back" at peak times.** A greater penetration of electric vehicles into the transport sector could unleash a storage opportunity that could benefit both consumers, suppliers and grid operators.

3.1.13 In October 2020 the Committee on Climate Change presented a progress report on reducing emissions in Scotland to the Scottish Parliament. It concluded that:

"the Scottish economy has decarbonised more quickly than the rest of the UK, and faster than any G20 economy since 2008. Emissions have fallen rapidly while the economy has grown. However, the vast majority of emissions reductions have been limited to the power sector. The power sector has contributed to two-thirds of the total fall in emissions in Scotland from 2008 to 2018. Renewable generation has almost tripled and unabated fossil-fuelled generation has fallen by 70%, including the closure of Scotland's last coal-fired power plant in 2016. Emissions from all other sectors outside of electricity generation have fallen by just 14% over the same period. Scotland missed its annual emissions target in 2018, and prior to the COVID-19 pandemic it was not clear that Scotland was on track to meet its legislated target for emissions reductions in 2020. The impact of the lockdown means that the 2020 target will almost certainly be met, but the key structural changes that will drive emissions reductions in sectors outside of electricity generation have not yet been achieved."

3.1.14 This shows that good progress is being made in the energy supply sector. The report put forward a series of recommendations to support the delivery of Net Zero by 2045, as well as climate adaptation and resilience. The report goes beyond the energy supply sector and considers actions to stimulate the demand for low carbon energy e.g. in the transport and heat sectors.

3.1.15 Scottish Renewables published a renewable energy manifesto ahead of the May 2021 elections. A range of recommendations across the environment, economy and communities include:

- Develop a Renewable Energy Economic Plan to aid a green recovery and help Scotland lead the world in renewable energy
- Utilise trade and investment powers to promote Scotland's renewable energy skills and technologies to nations seeking a green economic recovery
- Facilitate a just transition for Scotland's oil and gas professionals, supply chain businesses, tradespeople and public servants and remain committed to delivering the Green Jobs Fund and National Transition Training Fund

- Establish a Renewable Energy Skills Centre of Excellence to ensure that training and professional development remains relevant to the new innovations and emerging technologies needed to power Scotland's net-zero journey

3.1.16 The above illustrates the significant amount of policy development work to support floating offshore wind that has occurred in Scotland. The remainder of this report looks at what is being done, and what could be done for the supply chain, for Scotland's floating offshore wind opportunities to be realised.

4. Accelerating the Floating Offshore Wind Supply Chain

4.1 A Summary of National and UK-level Support for the Supply Chain

4.1.1 Several national and UK-level support mechanisms are in place to support the offshore wind supply chain, improving local content and cost reduction and some of these have been developed specifically for the floating offshore wind sector.

4.1.2 The Offshore Wind Sector Deal set out a suite of targets and commitments from both the sector and government aimed at delivering benefits to the UK economy from the ongoing deployment of offshore wind. This included a target to increase UK content in domestic offshore wind projects to 60%.

4.1.3 As stated, the UK Government has recently consulted several amendments to the existing CfD scheme. This included a proposed policy to distinguish between floating offshore wind and fixed bottom wind. Floating offshore wind will compete against other less established technologies in Pot 2. To qualify, all turbines within the offshore wind farm will need to be floating and situated in offshore water depths of at least 45 metres. This is a necessary intervention, both in view of the 60% target and to account for the higher cost associated with the less well established floating offshore wind technology. This change has been broadly welcomed by the offshore wind sector, as it ensures that a high capacity of offshore wind can continue to secure a CfD at an affordable cost, while providing a potential route to market for higher cost floating technologies. However, it is not yet clear whether this will filter through to improved local content.

4.1.4 At the leasing stage, Crown Estate Scotland now requires ScotWind applicants to provide a Supply Chain Development Statement prior to lease. Applicants must meet at least 25% of their commitments contained within. This will provide a visible pipeline for supply chain companies and their investors.

4.1.5 Following the agreement of the Offshore Wind Sector Deal, the Scottish Offshore Wind Energy Council ("SOWEC") was formed in 2019. SOWEC has been setup to maximise economic benefit, under the following workstreams: Developers; Skills; Supply Chain and Clusters, Innovation and Barriers to the Deployment of Projects and Route to Market.

4.1.6 SOWEC supports the local supply chain through the development of regional clusters – collaborations between developers, regional supply chain, public sector and education bodies. Of particular relevance to the development of floating offshore wind is the DeepWind supply chain cluster, which is now the largest offshore wind representative body in Scotland, with over 560 members drawn

from industry, academia and the public sector. Its main purpose is to help its members achieve greater benefit from the current and future development of offshore wind in the UK and internationally. As the name suggests, it specialises in fixed and floating offshore wind in deeper waters. Another highly relevant cluster is the floating offshore wind sub-group, with over 200 members.

Several more supply chain support mechanisms and competitions are captured in Table 4.1.

Table 4.1 Examples of Offshore Wind Supply Chain Mechanisms

Organisation	Activities
Offshore Wind Growth Partnership	Runs various funding competitions to support the offshore wind supply chain. The latest announcement launched £4.2m in grant funding and tailored business support for UK offshore wind supply chain companies.
Offshore Wind Innovation Hub	Developed a series of innovation roadmaps, one of which is focussed on substructures and floating offshore wind in various topics such as manufacturing of current floating offshore wind concepts, mooring systems and consolidation in the number of designs
ORE Catapult	Runs a number of offshore wind support programmes including the Launch Academy and Fit 4 Offshore Renewables, to bring technology and business support under one roof. It has helped several companies e.g. a German specialist remote monitoring company, Ventus Engineering GmbH, who to set up a Scottish office.
ORE Catapult Floating Offshore Wind Centre of Excellence	Established to develop an internationally recognised initiative to reduce the cost of energy from floating wind. The Centre will accelerate the build-out of floating farms, create opportunities for the UK supply chain and drive innovations in manufacturing, installation and O&M. The CoE is a collaborative programme with industry, academic and stakeholder partners.
Scottish Government in Partnership with the Carbon Trust	£1M Floating offshore wind Technology Acceleration Competition
BEIS	Offshore wind manufacturing investment support scheme: investment programme

Organisation	Activities
	This scheme supports the delivery of manufacturing investment in the offshore wind supply chain
BEIS	As part of the Budget 2021, BEIS announced the launch of a £20 million programme to support the development of floating offshore wind technology across the UK

4.2 A Summary of Existing Industry Activity

- 4.2.1 A range of industry led activities also seek to accelerate the supply chain, specifically for floating offshore wind. Significant development and investment activities are ongoing within a number of the major ports / fabricators in the UK aimed at offshore wind and floating offshore wind specifically. Notable projects include Cerulean Winds who have recently appointed US company National Oilwell Varco (NOV) as the first of its delivery partners for the fabrication of its proposed integrated 200-turbine floating wind and hydrogen development off the coast of Scotland. A developer working on a 200MW floating project with high local content and who is seeking to develop the project outside of ScotWind, was interviewed as part of this study.
- 4.2.2 The Floating Offshore Wind Centre of Excellence (“FOW CoE”) is currently delivering a major project on Strategic Infrastructure and Supply Chain Development for FOW. This will make specific recommendations for infrastructure and supply chain developments across the UK, based on the industry’s anticipated need.
- 4.2.3 Supply chain progress is also being made indirectly through innovation and cost reduction programmes. A range of innovation programmes are underway within the industry supporting the development of new technologies and approaches to reduce the cost of floating offshore wind. Two examples are FOW CoE and the Carbon Trust Floating Wind Joint Industry Project (“JIP”).
- 4.2.4 The FOW CoE is a £2m annual programme of innovation and enabling projects to accelerate the commercialisation of floating offshore wind, working across technology, development and consenting, supply chain and policy.
- 4.2.5 The industry funded Carbon Trust Floating Wind JIP is a technology focused innovation programme addressing specific technical challenges the industry faces;
- 4.2.6 To address cost reduction the FOW CoE has recently delivered a Floating Offshore Wind Cost Reduction Pathways study which outlines the potential for Floating Offshore Wind Cost to reduce costs to the point it reaches subsidy free. This highlights the role of both scale of deployment and innovation in reducing costs. A follow on study is underway to explore the innovation element of this in more detail, and allow future innovation activities to target areas of maximum impact in terms of cost reduction.

4.3 Evaluation of the Supply Chain Support

- 4.3.1 There has been a rapid development in support for floating offshore wind in Scotland at several levels. The purpose of this section is to evaluate the supply

chain support provided through national and UK policies (described above) and through other direct and indirect mechanisms identified during interviews with stakeholders. As part of this evaluation, support mechanisms have been categorised under the following eight themes, which have become apparent during the undertaking of this report. Throughout this section, recommendations are made in instances where improvements have been identified.

1. Signposting the Scottish floating offshore wind supply chain
2. Getting new entrants into the supply chain
3. Support for existing suppliers
4. Intermediate Projects
5. Re-assurance for the Supply Chain
6. Development of strategic infrastructure
7. Government investment
8. Private investment

Signposting the Scottish floating offshore wind supply chain

- 4.3.2 When procuring goods and services, offshore wind farm developers need to know what the Scottish supply chain can offer. Given that the floating offshore wind sector could grow substantially, it is likely that the current supply chain companies could grow with it and that new entrants, from related sectors, could seek to supply the market. Either way, developers and their main contractors will need to know about the supply chain companies and their capabilities and be confident that they can supply the goods and services required.
- 4.3.3 Developers already carry out road shows to engage with the supply chain and explain their requirements but another complementary way to achieve this is through a comprehensive supply chain guide or map that covers facilities, services, major components and sub-components. There is a website that contains information about the Scottish offshore wind supply chain <https://osw.directories.scot/>. This link is on the SOWEC website and contains information about a range of providers. However, it is not focused on floating offshore wind, is not prominent and can be difficult to navigate.
- 4.3.4 There is a major opportunity to re-design these signposting approaches and make them more prominent, accessible and useful for decision making, giving a comprehensive display of what the Scottish floating supply chain is capable of providing. This could include consolidation of other existing supply chain portals, currently implemented by developers, into a centrally curated register of suppliers.

Getting new entrants into the floating offshore wind supply chain

- 4.3.5 All new entrants to any market face barriers but, given the novelty, scale of opportunity and complexity of floating offshore wind, it has several important features that should be addressed.
- 4.3.6 Some sectors of the current offshore wind supply chain are already well placed to supply the floating wind industry e.g. ports, H&S providers, consultancy, vessels etc, as the services translate well. However, other sectors face tougher challenges, such as specific component manufacturers, and may need more support.
- 4.3.7 Some of this is being addressed through various plans. For example, Scottish Government has committed significant funding to the oil and gas transition plan. However, much of this is currently being utilised to “push” the oil and gas supply chain into offshore renewables. Instead, there may be an immediate opportunity

to repurpose this same funding to create an offshore renewables industry “pull”. Progress is also being made on attracting oil and gas individuals to take up a career in the sector (e.g. the Offshore Wind Sector Deal) but, it is critical that relevant skills from the oil and gas industry are taken up by the floating supply chain before any knowledge loss occurs. Furthermore, industry should be actively seeking out local O&G supply chain businesses to take advantage of subsea expertise.

- 4.3.8 Consideration also needs to be given to attracting manufacturers/contractors to Scotland. For instance, there is a lack of Scottish (or even UK) based Tier 1 organisations actively involved in the industry. If the Tier 1 contracts go abroad, it’s much harder for the lower levels of the supply chain to engage (irrespective of competence). One option would be to use the presence of large engineering contractor(s) based in Scotland, that can act as the overall contractor for the large range of contracts required for an offshore wind farm, sub-contracting the various elements. This could enable developers to expedite the procurement process and the large contractor to build a local supply chain. Consideration should be given to identifying such a contractor and the actions required to attract/establish them to Scotland.

Support for the existing supply chain

- 4.3.9 Given the scale of the opportunity for Scotland from floating offshore wind, more support could be given to more companies. The objective here should be to have as many Scottish companies as possible engaged in the floating offshore wind supply chain, as it is a national priority.
- 4.3.10 As described in Table 4.1, there are a range of support programmes for offshore wind, including for floating. Taking one as an illustration, Fit4Offshore (F4OR) is an ORE Catapult programme and is “*a journey of business improvement and sector specific capability building. It uses a proven process which typically takes 12 to 18 months. The F4OR Team will support you through each step, but F4OR will demand commitment and drive from your senior management team.*” To be eligible, companies need to be established businesses with 10 or more employees or with a turnover of £1 million and upwards. This is very valuable support for larger supply chain companies. The results of the latest regional programme have just been announced, bringing the total number of companies being supported through the Programme to 53.
- 4.3.11 However, F4OR is a UK wide programme, not just for Scotland, and applicants have to meet the above criteria, which may be difficult, for small-scale, newer potential floating offshore supply chain member.
- 4.3.12 Whilst F4OR appears to be applicable of a broad range of organisations, long-term funding for F4OR has not yet been secured, and it does not currently offer ongoing support. Our interviews found that limited funding was a recurring theme. To take another example, the DeepWind cluster has over 500 members, yet only has one manager for the cluster. A larger team supporting the supply chain could help to more effectively exploit the opportunities.
- 4.3.13 We spoke to an innovative Scottish company that could potentially supply a major component of a floating offshore wind farm in the future and that appeared to have good potential for growth. It appeared to be a likely candidate for support but had received little. It is possible that others are also missing out. During interviews it has become apparent that missed funding opportunities could be a result of resourcing within the clusters.

- 4.3.14 If Scotland is to match the scale of the floating offshore wind opportunity to the supply chain, then support programmes will need to be well resourced, comprehensive, ongoing and effective. Matching this support to the specific requirements of the sector will be key to success and input from the sector and the supporting clusters to the design and implementation of any programme should be encouraged.

Intermediate Projects

- 4.3.15 It is possible that greater confidence could be built into the supply chain through intermediate/stepping stone projects before the outputs from the first round of ScotWind go into construction. For example, the Draig y Môr project in Wales is at the early stages of planning but, if realised, it would provide pilot opportunities for the supply chain to develop through de-risking technologies and developing solutions that are scalable for industrial deployment. There is potential for similar opportunities in Scotland but the mechanisms for a seabed lease to be awarded to projects are limited to ScotWind (if above 100MW) and through the electrification of oil and gas projects (if below 100MW). In our interviews we found there was an appetite to develop smaller scale projects (i.e. below 100MW) outwith these parameters. Alternative mechanisms could be explored, which give substantially increased priority to projects that can commit to developing the Scottish supply chain e.g. a requirement to include much higher levels of Scottish content than already indicated under ScotWind. If taken forward, within a requirement to include higher levels of Scottish content, developers should also be encouraged to take advantage of existing local subsea expertise e.g. from the oil and gas industry.

Re-assurance for the Supply Chain

- 4.3.16 At a more strategic level, the right signals to the supply chain would also provide increased confidence for existing suppliers and new entrants. In the context of national policy, this means converting high level policy statements into tangible GW targets and plans that are specific to floating offshore wind.
- 4.3.17 Re-assurance could also be provided in relation to the leasing process in Scotland. It is 10 years until likely ScotWind build out and it is unknown if and when the next leasing round will be. This likely build out time for ScotWind should be challenged and more certainty should be provided on future leasing rounds. The Round 3 Extensions has served to 'fill the gap' for the supply chain and a similar approach could be applied in Scotland.
- 4.3.18 A nation's consenting requirements can also have a large effect on the implementation of offshore windfarms and thus confidence within the supply chain. In particular, uncertainty within the consenting framework has the potential to introduce significant delay to project development.
- 4.3.19 In Scotland, the issue of uncertainty often relates to the environmental effects of a project, rather than the consenting framework itself. Indeed, in comparison to other countries (e.g. USA), Scotland's consenting framework can be considered to be relatively straight forward. Scotland currently operates a 'one-stop-shop' approach to consenting, which is managed by Marine Scotland Licensing Operations Team. Under this approach, consents and approvals for which the Scottish Ministers are the competent or regulatory authority are handled simultaneously, where requested. This creates a simple process which aims to reduce the burden on applicants, stakeholders and regulators alike. However, recently, there have been calls for the consenting framework to be speeded up. An overview of the consenting framework in Scotland is provided in Appendix A.

- 4.3.20 Within this framework, uncertainty exists in relation to the effect of offshore wind farms on a number of protected species and sites.
- 4.3.21 One of the highest bars to pass in the decision-making process is set by the Habitats Regulations - a suite of UK regulations used to protect important wildlife sites, known as 'European Sites', and their protected 'features' (e.g. birds, habitats, marine mammals). These regulations require the decision maker to ascertain "beyond all reasonable scientific doubt" that a project will not alone or in combination with other plans and projects adversely affect the integrity of any European Site. The regulations are transposed from European directives but remain operable post-Brexit².
- 4.3.22 Several UK windfarm decisions have suffered major delays and, in some cases, declined applications due to uncertainty associated with environmental information provided in support of this obligation (e.g. offshore - delay to Neart na Gaoithe; onshore - Mynydd y Gwynt, Llanbrymair). The most recent example comes from the BEIS Secretary of State's decision to delay his Hornsea Three Developmental Consent Order decision due to the uncertainty expressed by his statutory advisors on the level of impact the project would have on a kittiwake (a species of seabird) protected by the Flamborough and Filey Coast Special Protection Area.
- 4.3.23 Uncertainty associated with marine ornithology has also recently been recognised within the Scottish Government's Sectoral Marine Plan. Due to a level of uncertainty identified about potential impacts to seabirds, the Sectoral Marine Plan contains a requirement for a significant level of survey work and assessment to be completed prior to a final decision on some Plan Options. This has the potential to delay development, potentially by some years where longer-term data sets and detailed analyses are required and it is also possible that developments could fail to be realised if prospective developers are deterred by the associated uncertainty or the extensive evidence gathering requirements and/or the risk of adverse findings in the eventual conclusions.
- 4.3.24 Several research initiatives have been set up to improve our understanding of the environmental risks of offshore wind in the UK e.g. COWRIE³, SOSS⁴, ORJIP⁵ and OWSMRF⁶, OWEC⁷. It is likely that the results of these will help to address some of the environmental uncertainties associated with large scale deployment of floating wind (e.g. seabird collision); however it may be that the focus of future initiatives could be steered further to address environmental issues specific to the floating offshore wind industry.

Development of strategic infrastructure

- 4.3.25 A key infrastructure sector for floating offshore wind is ports. A range of port and harbour facilities will be required to support floating offshore wind e.g. to accommodate crew transfer vessels (CTVs) etc for O&M but it is likely that only a few in Scotland will be suitable for the location of major

² <https://www.legislation.gov.uk/ukdsi/2019/9780111176573>

³ https://www.offshorewindfarms.co.uk/pages/cowrie/cowrie_explained/

⁴ <https://www.bto.org/our-science/wetland-and-marine/soss/projects>

⁵ <http://www.orjip.org.uk/>

⁶ <https://jncc.gov.uk/our-work/owsmrf/>

⁷ <https://www.thecrownstate.co.uk/en-gb/what-we-do/on-the-seabed/energy/offshore-wind-a-sustainable-future/>

manufacturing/fabrication, layout, assembly, launch and tow out facilities and support services. For instance, a 500MW floating offshore wind farm using 15MW wind turbines would require 33 very large floating platforms made of steel and/or concrete. If 10GW is realised through the first round of ScotWind and the majority is floating, over 600 very large floating platforms could be required, over a relatively short period. These would need to be procured, designed, assembled, manufactured, fitted with a wind turbine, launched and towed out to their location, maybe 100km offshore; a major undertaking.

- 4.3.26 Such an undertaking would require strategic development of a major traditional port(s) facility. Arup's Sept 2020 report "Ports for Offshore Wind" contained various analyses relevant to floating offshore wind. The main one was for the development of strategic port infrastructure that could compete with other European ports. Our interviews have found that some stakeholders believe that an effective strategy would be to advocate one existing port as the primary port for investment. A variation of this model, also supported by some who were interviewed, is a port acting as a 'super-fabricator' being fed by satellite fabrication ports in nearby locations. This could have the potential to create sizeable opportunities for the local supply chain, developing a floating offshore wind cluster.
- 4.3.27 Another aspect of this approach that could be explored is the development and funding of hub/clusters set up to develop floating wind components. Scottish made components developed in key locations could feed directly into the local supply chain and be further developed for export to meet demand in other countries.
- 4.3.28 Under any strategy, cooperation will be required between ports within a certain location and across the Scottish port sector in general, to ensure that both strategic and more locally focused development is appropriate. The efficacy of Government support for the timing and extent of this strategic port infrastructure investment will be a critical success factor for Scotland and floating offshore wind. Scottish Government could facilitate cooperation between ports that are likely to be strategic and across the ports sector in general and then seek to support the implementation of agreed actions, based on the agreed business plans from the ports sector.
- 4.3.29 Another key sector is transmission. The current approach to designing and building offshore transmission was developed to de-risk the delivery of offshore wind by leaving developers in control of a project arrays transmission assets to bring the energy onshore. However, in the context of Scotland's floating offshore wind potential, construction of individual point to point connections for each wind farm may not provide the most efficient approach, particularly in view of the likely remote offshore locations of floating offshore wind projects. Furthermore, point to point transmission has recently become a major barrier to delivery given the considerable environmental and local impacts, particularly from the associated onshore infrastructure required to connect to the national transmission network. For example, the BEIS decision to grant developmental consent to Norfolk Vanguard has recently been quashed by the High Court due to cumulative onshore impacts.
- 4.3.30 In their 2020 report to Parliament, the Committee on Climate Change called for government to develop a strategy to coordinate interconnectors and offshore networks for wind farms and their connections to the onshore network and bring forward any legislation necessary to enable coordination. In response, BEIS is undertaking an Offshore Transmission Network Review. The Scottish Government is on the project board for this work.

4.3.31 Whilst the outcome of this review is not expected until later this year, it is expected that multi-purpose interconnectors (MPI) are likely to feature as they are currently gathering momentum. Instead of individual wind farms connecting one by one to the shore, MPIs would allow clusters of offshore wind farms to connect all in one go, plugging into the energy system of the UK and neighbouring countries. In this context, MPIs have the potential to generate significant cost savings for floating offshore wind projects, and it is in Scotland's interests to ensure MPIs make their way to Scottish Waters.

Government investment

4.3.32 In order to participate fully in the UK offshore wind market with a potential GVA of over £30bn and 17,000 jobs requires substantial investment in Scotland. The Scottish Government is supporting investment in the floating offshore wind sector e.g. Highlands and Islands Enterprise investing more than £8M in Nigg. However, a key question is "Overall is this investment at the right scale?". Whilst the Scottish Government does not have the resources to invest directly across the supply chain, it does have the ability to invest strategically in order to reduce the investment risk that private investors perceive. If this ratio is met, it could unlock much more private sector investment and benefit not just those that are the recipients of strategic investment but also the associated supply chain.

4.3.33 Although each fund has qualifying criteria, Scottish Government could re-examine the basis for its investments in offshore wind, in order to maximise the overall support, public and private, that organisations may require. To match this, the private sector needs to continue to identify and put forward opportunities for government investment that have a good business case. The importance of a good business case is emphasised here as it is critical to ensuring that investments made maximise on their returns.

Private investment

4.3.34 Scotland could seek to marshal and focus Scottish private sector investment for floating offshore wind. Many of these investments could be attractive to various investors e.g. insurance and pension funds, if the risk profile is acceptable, as they are long term investments with government support i.e. CfDs. Could the Scottish investment community develop new financial and investment products that are suitable for floating offshore wind?

4.3.35 SOWEC is currently carrying out an offshore wind strategic investment assessment with the intention of making "recommendations for immediate action through investment, including detailing means to support investor confidence, to support the industry in Scotland and to maximise economic value." This will be an important study for potential investors in floating offshore wind.

5. Opportunities

5.1.1 Through a series of interviews and discussions with stakeholders, a number of key opportunities to accelerate the floating offshore wind supply chain have emerged. These opportunities have been identified in view of the above evaluation exercise and the consistent themes taken from our discussions with key stakeholders.

5.2 Leasing Targets

5.2.1 Through the SMP and ScotWind, Scottish Government and Crown Estate Scotland has created a positive environment for renewables, which will support floating offshore wind. However, in order to build on this, credible and tangible targets, specific to floating offshore wind, should be incorporated into the leasing process. Specifically, the floating offshore wind opportunity in Scotland could be met with targets set by Scottish Government for floating offshore wind generation for ScotWind and subsequent leasing rounds. Setting dates for subsequent leasing rounds would also provide clarity to the industry; clarity that would give the supply chain the confidence it requires to grow.

5.3 Intermediate Scale (pre-commercial) Projects

5.3.1 In comparison with fixed bottom technology, floating offshore wind technology is still in its early stages and needs to be de-risked. To take this forward, smaller scale projects in suitable locations could act as stepping stones to the much larger market. These could facilitate the supply base to expand and could be a key enabler ahead of a potentially much larger floating offshore wind rollout following ScotWind, particularly if Scottish content is prioritised. To achieve high content levels, participating developers in any stepping stone projects should be encouraged to actively seek out local supply chain businesses (including oil and gas), to take advantage of subsea expertise. However, as discussed earlier, mechanisms for intermediate scale projects to obtain a lease are currently limited.

5.4 Ports

5.4.1 Having the right port facilities in place will facilitate floating offshore wind technology development and give the right signals to the offshore wind supply chain. Strategic action for Scottish ports and their potential to deliver Scottish floating ambitions is urgently required. Scottish Government and the port sector must work to deliver a strategic approach to Scottish ports long before construction begins on ScotWind projects. Full consideration should be given to different strategies, including (but not limited to) inward investment for the priority ports, in addition to those that can host specific technology development projects that feed directly into the Scottish supply chain. Under any strategy partnership opportunities should be explored. Cooperation with the ports across the Scottish port sector is key to ensuring that both strategic and more locally focused development is appropriate. The role of industry in this planning exercise should be encouraged, as its success will depend on join up between the strategy and port sector business planning activities.

5.5 Funding for Support Programmes

5.5.1 Scottish organisations hoping to participate in the supply chain face a number of entry barriers, including access and market certainty. Support for potential new supply entrants is available through the clusters that have been developed

through SOWEC. However, capacity within the clusters is limited and opportunities to add additional resource to these groups should be investigated.

6. Conclusions

6.1 Keeping Scotland at the Forefront of Floating Offshore Wind

6.1.1 Scotland is currently at the forefront of floating offshore wind development, but far greater opportunities lie ahead. Scottish Government has provided a supportive policy environment to facilitate the growth of the industry but further actions relating to the supply chain are essential if the sector’s true potential is to be realised. Indeed, through a number of discussions with key stakeholders, this study has identified that the supply chain faces a number of barriers and uncertainties. In light of this, four clear opportunities have emerged (Table 6.1):

Table 6.1 Priority Opportunities

Opportunity	Organisation	Timeframe
Credible and tangible targets, specific to floating offshore wind, should be incorporated into the leasing process and clarity should be provided on future leasing rounds beyond ScotWind. This would provide increased certainty to those already in the supply chain and those seeking entry for ScotWind.	Crown Estate Scotland and Scottish Government	This opportunity must be implemented in the short-term to give the ScotWind supply chain increased certainty
Strategic action for Scottish ports and their potential to deliver Scottish floating ambitions is urgently required. Scottish Government and the port sector must work to deliver a strategic approach to Scottish Ports long before construction begins on ScotWind projects. To enable this Scottish Government should facilitate cooperation between ports that are likely to be strategic and across the ports sector in general and then seek to support the implementation of agreed actions, based on the agreed business plans from	<p>Scottish Government in consultation with the ports sector</p> <p>Scottish government to lead 'Floating wind strategic ports plan'</p> <p>Port sector to build and feed in relevant business plans</p>	Within two years

Opportunity	Organisation	Timeframe
<p>the ports sector. To this end, it is recommended that a Floating Wind Strategic Port Plan is drafted and consulted on in the next two years.</p>		
<p>The potential for Scottish stepping stone projects that give substantially increased priority to Scottish content should be examined by Crown Estate Scotland. If the potential is there, it would also allow lessons to be learned ahead of ScotWind buildout, especially with regard to the floating offshore wind supply chain.</p>	<p>Crown Estate Scotland to examine approaches to potentially facilitate stepping stone projects</p> <p>Participating developers should be actively seeking out local supply chain businesses (including oil and gas), to take advantage of subsea expertise</p>	<p>Within the next 10 years, ahead of ScotWind</p>
<p>Business support for Scottish floating offshore wind supply chain should be maximised through appropriate programmes and resource allocation within the clusters. As this report has identified, funding limitations are a key constraint; a review is required that focuses on the availability of current funding mechanisms and new models for the future. The Enterprise Agencies could undertake such a review, and this needs to take place within the short term to allow time for the outcomes to be implemented ahead of ScotWind.</p>	<p>Scottish Enterprise, Highlands and Islands Enterprise</p> <p>Supply chain current and future participants, along with the supporting clusters, to input into the design and implementation</p> <p>Private industry and/or public funding thereafter</p>	<p>This opportunity must be implemented in the short-term to give the ScotWind supply chain increased support</p>

Appendix A - Consenting Framework

- A.1.1. A number of onshore and offshore regulatory consents are required for the construction and operation of an offshore windfarm.
- A.1.2. Under the Marine Scotland Act 2010 the Scottish Ministers are responsible for marine licensing and enforcement in the Scottish inshore region (out to 12 nm). This includes the waters of every estuary, river or channel, so far as the tide flows at mean high water spring tide. Under the Marine and Coastal Access Act 2009 Scottish Ministers also have responsibility for licensing and enforcement in the Scottish offshore region (12-200 nm).
- A.1.3. In addition, consent from Scottish Ministers under s.36 of the Electricity Act 1989 is also required for generating stations above 1 megawatt (MW) capacity in Scottish inshore regions and above 50 MW in the Scottish offshore regions.
- A.1.4. Several other receptor specific licences (e.g. Basking Shark Licence) may also be relevant but the requirement of these are dependent on the nature of the development site.
- A.1.5. Marine Scotland Licensing Operations Team (MS-LOT) operates a one-stop-shop for the majority of marine consents and approvals relating to Marine Renewables.
- A.1.6. Onshore consent, including where the transmission cable landfall is, is awarded by the relevant local planning authority (LPA), and is applied for under the Town and Countryside Planning (Scotland) Act 1997.
- A.1.7. Much of the information used in support of the applications made for the above consents and permissions will come from an Environmental Statement (ES), which is produced by a developer under the various Environmental Impact Assessment regulations⁸. In addition to this, the developer will almost invariably be required to produce environmental information to allow the relevant competent authority to undertake a Habitats Regulations Assessment for the project.
- A.1.8. Due to the design characteristics of floating offshore windfarms, EIA and HRA topics are likely to focus on ornithological impacts from the array (e.g. collision risk to seabirds), and in certain areas, the implications of the cable route on protected subsea benthic habitats.

⁸ The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) Regulations 2007