
Offshore Wind Policy Statement Consultation Analysis



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Executive Summary

The Scottish Government conducted a consultation on the Offshore Wind Policy Statement (OWPS) from December 2019 to April 2020. The responses received will play a vital role in supporting the Scottish Government (SG) to understand a range of views on the ways in which both fixed and floating offshore wind technologies can contribute to net zero by 2045, and the economic benefits to Scotland of commercialising offshore wind.

A total of 48 respondents took part in the consultation. Most (42) came from organisations; 6 were submitted by individuals. This report presents the range of views expressed and trends amongst responses. Respondents' responses to the consultation, where permission for publication was granted, can be found on the Scottish Government's website.

Q1: Does the current pipeline and level of activity in the offshore wind sector in Scotland provide a sufficient platform upon which to build the greater contribution required to achieve our climate change goals?

A major theme was recognition of the importance of the OWPS in delivering climate change goals. Most respondents welcomed the policy statement, believing it would contribute to national targets. An equally prevalent theme was further actions or issues for the SG to address to achieve Scotland's climate change goals. Key concerns were around infrastructure and planning, including grid capacity.

Q2: Do you believe that the 2030 visions and aspirations described above are sufficiently ambitious?

Calls for more ambitious targets for offshore wind were most prevalent, specifically increasing them above 8GW by 2030. Second most prevalent was a call for the SG to go further and create a more ambitious vision to realise the targets set out in the OWPS.

Q3: What actions do you believe should be taken by the Scottish Government, UK Government and agencies in order to realise the full potential of Scotland's offshore wind sector?

Discussion of the Contracts for Difference (CfD) mechanism were most common, with many calling for a move to annual CfD auctions. Many also discussed floating wind in relation to amending the CfD mechanism. Another major theme centred on supporting local supply chains, urging the SG to ensure work is not exported overseas, arguing this would maximise the benefits to the Scottish economy.

Q4: What are the key regulatory and cost challenges facing the offshore wind sector?

Transmission Network Charging was the most frequently mentioned challenge facing offshore wind. Under the CfD framework, sites Scotland are seen to be penalised due to being furthest from the centres of demand, putting them at a competitive disadvantage and deterring investment. The second most common theme was the need to update or reform the existing regulatory regime. Some also highlighted the need for improved grid infrastructure to enable energy from offshore wind to be integrated into the network.

Q5: What more can the sector and other key stakeholders do to tackle these?

Most common was a request to review the cost implications of regulatory commitments and policy mechanisms to create a level playing field for the industry. The second most common theme was a variety of suggested improvements to grid infrastructure. Knowledge sharing, collaboration and co-ordination of advance planning between sectors and different marine users was encouraged.

Q6: What should the key Scottish priorities be in relation to Air Defence Radar, and towards radar mitigation more generally?

Discussion of the need for an overall strategy for air radar was most prevalent. Most respondents argued the existing case-by-case approach to resolve site specific issues is not sustainable, highlighting the need for a long-term solution and an overall strategy.

Q7: What more can the Scottish Government do, working with industry and other stakeholders, to address 'knowledge gaps' in environmental assessments for potential offshore wind developments?

A key focus of responses was the two-yearly Iterative Plan Review of the Sectoral Marine Plan and the Advisory Group which forms part of the review. A few made general comments in support of the Advisory Group, some queried the composition of the group and a small number asked for clarity on the role of the group in identifying knowledge gaps, and on its powers. The second common theme was the need for a collaborative approach with industry to address knowledge gaps and environmental concerns.

Q8: What steps can be taken to improve interactions between offshore wind and other marine sectors?

Responses most commonly focussed on the importance of dialogue between all users of the marine environment. Some highlighted this was essential for targets to be delivered. Some commented on existing bodies and approaches, explaining how these have been effective in establishing connections and encouraging discussions among stakeholders.

Q9: How could a competitive market framework that promotes the development of floating wind be developed whilst still retaining value for money for the consumer?

The dominant theme was the need for reforms to CfD to allow floating wind to flourish - there were calls for the creation of a separate 'pot' for floating wind to separate it from fixed-bottom projects, for a floating CfD, or to allow floating wind to compete in the innovation / developing technologies class. General comments in support of floating wind were the second most prevalent theme. Respondents commented that they would expect floating offshore wind to become cost competitive over time.

Q10: Considering the currently available literature and analysis, what do you consider a successful offshore wind industry in Scotland in the future would look like?

Comments that highlighted the local and national benefits of a successful offshore wind industry were most common. Much of this discussion focused on employment and economic benefits, often in relation to the local supply chain. Other positive impacts included diversification of Scotland's economy, less reliance on outsourcing and imports,

and enhancement of domestic skills and expertise. Many argued that success meant achievement of net zero emissions targets in Scotland and the UK.

Q11: What scale of deployment would you estimate or believe to represent a successful outcome, and why?

Across responses there was general discussion of the opportunities and challenges facing industry, and many did not make reference to a specific preferred scale of deployment. Beyond general discussion of scenarios, the second most common theme in responses was for Scotland to aim for a greater rate of deployment than 8GW by 2030.

Q12: What actions should industry and government take to address the issues described in this section and ensure the most positive future position for offshore wind in Scotland?

Calls for the SG to show ambition, develop a clear vision and develop an effective policy framework dominated responses to this question. Investment was the second most common theme in comments on action for government and industry. Areas highlighted for investment included workforce development, research and development and infrastructure, including port facilities. Another theme was the role of the SG in assessing the strengths, weaknesses, opportunities and threats facing the offshore wind sector.

Q13: What areas of the Scottish supply chain do we excel at, and what could we do better?

Project development expertise in the Scottish supply chain was the strength most frequently mentioned by respondents. For example, competence and expertise in engineering, environmental and development services were praised. Legal, environmental and financial consulting services were noted as assets to the Scottish supply chain by some respondents. The prevalent theme in discussion of areas for improvement was in long term or holistic thinking in future developments. Some requested long-term thinking in the investment into infrastructure development, particularly facilities and capabilities, as well as consideration of the full life cycle of projects instead of just the initial stages.

Q14: Where are the new areas that Scotland can develop and exploit a competitive advantage?

Offshore floating wind was the most frequently mentioned area of competitive advantage for development; the need for funding and further development of offshore floating wind was described. Some outlined specific skills or expertise to maximise supply chain advantage. Some called for industrial policies which enhance competitive advantage.

Q15: What are the main challenges a company faces when tendering for a contract?

Some described difficulties in accessing existing synergies or relationships between manufacturers and suppliers. Others highlighted the complex contractual arrangements between suppliers and manufacturers and the inherent risk and financial liabilities that discourage partnership working. A few mentioned state aid for companies based abroad.

Q16: Subject to procurement law, what more should government and its agencies do to assist the supply chain secure contracts?

Many urged for the development of a clear policy and regulatory framework to provide certainty for the supply chain. A prevalent action outlined by respondents was for the SG to better promote the local supply chain's networks and capabilities by initiating partnerships, ideally from early stages of developments. Government investment was outlined by some as an action that could assist the supply chain to secure contracts.

Q17: What are the key skills issues and gaps facing the sector over the coming years, in the short and medium term?

Many responses gave specific examples of roles or skills where gaps exist; Operations and Maintenance were commonly cited. A small number mentioned skills associated with deep-water capability, ports, and harbour logistics. Also prevalent were comments encouraging the transition of workers from existing industries - in particular, oil and gas.

Q18: What more should government and the sector do to build on the progress made in recent years?

One of the three common themes was a call for stakeholders to review the skills needed now and in the future. Another was for the SG to support and encourage synergies with the oil and gas sector, especially re-training individuals transferring to offshore wind. Support for those entering the offshore wind sector was the third common theme.

Q19: What can Scotland learn from the approach taken in other countries around the world in this area? Are there examples of best practice you can share?

Given a smaller number of responses and specific examples being given, only a few themes emerged. Some described models in other countries to develop offshore wind, and a small number called for mechanisms to ensure projects set a minimum threshold for using local supply chains, guaranteeing jobs and contracts for local populations.

Q20: What can the Scottish Government most usefully and feasibly do to build on the innovation support previously and currently available?

Most prevalent were comments on support, funding, or incentives, followed by discussion of the continued support of research programmes from the SG. This included appropriate models and oversight to encourage effective knowledge sharing and avoid duplications.

Q21: How can we support technologies and developments which reach a viable stage between leasing rounds and Contract for Difference (CfD) auctions?

Increasing the frequency of leasing rounds and CfD auctions was most frequently discussed. Comments on lease milestones called for flexibility and baseline validity in Environmental Impact Assessments for projects that are not successful in CfD auctions, to apply for leases between rounds and reduce the volume of stranded assets.

Q22: Where respondents believe that scope remains for innovation in fixed offshore wind, what areas should be prioritised?

The most prevalent theme was a request for the SG to prioritise lower tier suppliers and operations and maintenance activities. A minor theme was requests for the SG to prioritise asset management and life extension for projects.

Q23: What actions should be taken to address the key challenges facing the uptake of commercial scale floating in Scotland?

Collaborating with the UK Government and industry to develop a CfD framework to enable floating wind to compete for contracts was the most common action outlined. Funding support to develop pre-commercial floating wind projects was requested by some respondents. Collaboration with designers and supply chain workers to identify innovative approaches to reducing cost on a mass production was raised by some respondents.

Q24: What can be done, on the part of government and / or others, to strengthen and benefit from the synergies with a) hydrogen and b) the oil and gas sector?

Discussion of support to develop green or blue hydrogen was the most common theme. Another was that the SG's Hydrogen Action Plan should be coordinated with its approach to offshore wind. Comments on synergies within oil and gas related to the operation phase of projects. Respondents argued that synergies would arise from wider collaboration between sectors to share best practice. Another common theme related to skills transfer; retraining individuals for the offshore wind sector, drawing on best practice standards for operations, inspection and health and safety.

Conclusions

Much of the draft offshore wind policy statement was endorsed in principle. Key themes in the discussion include recognition of the importance of the OWPS in delivering climate change goals and many encouraged the Scottish Government to be ambitious when settling on a final target. They reflected on constraints such as infrastructure, planning and grid capacity and asked for the policy statement to set out a clear roadmap to enable detailed planning. There was significant discussion of Contracts for Difference mechanism, with many calling for a move towards annual auctions.

Respondents reflected on Scotland's competitive disadvantage arising from Transmission Network Charges. They called for enhancements to supply chain statements, the development of a fit-for-purpose regulatory framework, an improved grid infrastructure and an overall strategy for air radar. Knowledge sharing, collaboration and co-ordination of advance planning between sectors and different marine users was strongly encouraged.

Significant local and national benefits to Scotland from a flourishing offshore wind sector were described, such as the achievement of net zero emissions targets and the potential for a growing export market. Scotland's capacity in engineering, environmental and professional services were noted as strengths. In reflecting on workforce expansion, the scope for skills transitions from the oil and gas sector were highlighted. There were also calls for a review of workforce gaps to support long-term development. Respondents urged the SG to provide support, including funding and incentives to drive innovation.

Introduction

The Scottish Government conducted a consultation on the Offshore Wind Policy Statement (OWPS) from December 2019 to April 2020. It received 48 responses, which will play a vital role in supporting the Scottish Government (SG) to understand a range of views on the ways in which both fixed and floating offshore wind technologies can contribute to net zero by 2045, and the economic benefits to Scotland of commercialising offshore wind.

Scotland is recognised as having a world-renowned wind regime, supported by the Scottish Government through policy and the deployment of maritime technology. The recent consultation covered a broad range of issues across 24 consultation questions¹. These include Scotland's ambitions for offshore wind policy, barriers to the deployment of new technology, knowledge gaps, the future of the sector, economic opportunities in relation to supply and skills, and how the government can best support innovation.

The OWPS aims to amplify the opportunities that offshore wind presents, while being sensitive to the needs and interests of the marine environment, other vessels and maritime activities and wider factors like planning. It provides important context for Marine Scotland's draft Sectoral Marine Plan (SMP) for Offshore Wind. Both of these draft documents align with the Scottish Government's plans to achieve net zero carbon emissions by 2045.

Profile of respondents

A range of respondents took part in the consultation. Most responses (42 out of 48) came from organisations; 6 were submitted by individuals. The profile of organisations that took part in the consultation is as follows:

- Twelve energy companies or suppliers.
- Eight organisations from the wider energy industry, e.g. the supply chain or infrastructure.
- Eight membership associations providing the perspective of their industries.
- Four trade unions.
- Three Non-Departmental Public Bodies.
- Three environmental membership or campaign organisations.
- Two academic or research institutions.
- Two local authorities.

Approach to analysis and reporting

This report presents the range of views expressed and trends amongst responses. The analyst team applied a qualitative coding framework based on a review of the consultation questions and sample of responses.

¹ Two closed and twenty-two open ended questions.

There was significant repetition of views within and across responses to the 24 questions. To improve readability and avoid duplication, the report is structured around themes, aligning questions or common themes in comments.

While qualitative analysis of open-ended questions does not permit the quantification of results, we signify the weight of a particular view using the following framework. Where there are several themes, we have indicated which are the most common or prevalent across responses:

- 'The most common theme' or 'the most prevalent response'.
- 'Several' or 'many' respondents – a recurring theme, but not the most common
- 'Some' respondents – another theme
- 'A few' or 'a small number' of respondents – a minor theme

Comments made by one or two respondents which do not correspond to the themes presented in the report are appended for reference.

Of the 48 consultation responses, 30 were submitted via the Scottish Government's online consultation platform, Citizen Space. The remaining eighteen responses were provided in an alternative format, for example, a PDF document. Just over half (eight of the eighteen) alternative format responses contained information which did not align to specific questions. The analysts exercised judgement about the most relevant place to include this material for analysis purposes.

Respondents' responses to the consultation, where permission for publication was granted, can be found on the Scottish Government's website.

Report Structure

The Lines Between was commissioned to provide an independent and robust analysis of the responses to the consultation. This report is set out as follows:

- This section closes with a quantitative summary of the closed questions contained in the consultation. A full quantitative summary is appended.
- Chapter 1 presents analysis of responses to questions 1-3, around the current position of offshore wind in Scotland.
- Chapter 2 covers questions 4-9, which focus on barriers to deployment.
- Chapter 3 addresses questions 10-12, which consider the future of offshore wind
- Chapter 4 presents analysis of responses to questions 13-16, and the economic opportunities for the supply chain.
- Chapter 5 discusses responses to questions 17-19, which focus on the economic opportunities present in the skills-force.
- Chapter 6 presents analysis of responses to questions 20-24 about innovation and cost reduction.
- Conclusions are set out in Chapter 7.

Quantitative summary of closed questions

The table below present the results of the closed questions included in the consultation. Please see Appendix 1 for a full quantitative summary of the number of responses to all questions.

Question	Sample size		Number of respondents giving each answer			% among total respondents			% among those answering	
	Total	Total answering	Yes	No	Not answered	Yes	No	Not answered	Yes	No
Q1: Does the current pipeline and level of activity in the offshore wind sector in Scotland provide a sufficient platform upon which to build the greater contribution required to achieve our climate change goals?	48	29	10	19	19	21	40	40	34	66
Q2: Do you believe that the 2030 visions and aspirations described above are sufficiently ambitious?	48	27	10	17	21	21	35	44	37	63

1. The current position

This chapter presents an analysis of responses to questions 1, 2 and 3 which relate to the current position of offshore wind in Scotland.

A sufficient platform

Q1: Does the current pipeline and level of activity in the offshore wind sector in Scotland provide a sufficient platform upon which to build the greater contribution required to achieve our climate change goals?

Two fifths of respondents (19/48) answered 'no', one fifth (10/48) answered; 'yes', and the remainder (19/48) did not answer the question. Over three quarters of respondents (37 out of 48) provided explanatory comments, which form the basis of analysis set out below.

Support for the policy statement

A major theme across responses was recognition of the importance of the OWPS in delivering climate change goals. Most respondents welcomed the policy statement, believing it would contribute to national targets. For example, two respondents commented on Scotland's current performance in the offshore wind industry; suggesting the OWPS was bold, ambitious, and necessary to achieve Net Zero by 2045 targets. In this discussion two respondents also voiced support for the Sectoral Marine Plan.

Action to meet goals in relation to infrastructure and planning

An equally prevalent theme was further actions or issues for the Scottish Government (SG) to address to achieve Scotland's climate change goals. Key concerns were around infrastructure and planning, including grid capacity. For example, discussions included a need to augment grid capacity to utilise the full potential of offshore wind. A few respondents called for grid reinforcements as a holistic approach to facilitate investment.

Further seabed leasing rounds, or additional leasing of seabed rights, were described as necessary for the SG is to achieve the target of deriving at least 50% of Scotland's total energy needs from renewable sources by 2030. A need for improved transmission networks and changes to charging regimes were also described.

Some commented on the value of offshore floating wind, arguing that it would be essential in realising climate change goals, and the SG was urged to consider alternative technologies in addition to offshore wind, such as clean baseload generation and new nuclear technologies. The importance of streamlining consenting and Contracts for Difference (CfD) awards was discussed, as well as calls for CfD auction rounds to facilitate earlier deployment of offshore wind. Finally, there were a few comments urging the SG to develop and deploy blue and green hydrogen.

Calls for more ambitious targets

A common theme was calls for more ambition from the SG. Specifically, there were suggestions to raise the targets above the stated 8GW of offshore wind in Scotland by

2030 and 30 to 35GW by 2045. Many described Scotland's current capacity and argued that achieving net-zero emissions would require an increase in renewable power generation. Some respondents noted they welcomed the targets set by the UK Government (40GW by 2030) and suggested that the current pipeline in Scotland would not be sufficient in achieving targets. A few respondents called for targets in Scotland to align with the Committee on Climate Change targets of 75GW in the UK by 2050.

Action to meet workforce and supply chain development goals

A few respondents discussed offshore wind as an economic opportunity for Scotland but suggested the current pipeline would result in minimal benefits for Scottish workers. They called for training for Scottish workers to ensure projects can be delivered locally.

Meeting climate change goals and considering the wider environmental context

The key role for offshore wind in achieving Net Zero by 2045 was commented on by some respondents. A few respondents described particular environmental issues for the SG to consider, such as the protection of marine animals and biodiversity.

General comments about Scotland's renewables sector

There were some general comments about Scotland's renewables sector; most focused on the need to expand growth in all renewable sectors to meet the climate change goals.

Actions around mitigating the impact to wildlife

A few organisations signposted the SG to potential actions to mitigate the impact of the development of offshore wind on wildlife or the marine environment.

Suggestions that the current activity is insufficient to meet climate change goals

Some respondents requested a significant increase in the planned deployment of offshore wind and linked this to the opportunity to realise commercial scale floating wind projects. These views are discussed in more detail in question 11.

References to the Sectoral Marine Plan (SMP)

There were a few mentions of the SMP. For example, some encouraged the SG to continue considering the SMP alongside the OWPS, taking a holistic view.

Calls for more clarity

A small number of respondents called for more clarity in the final OWPS in relation to; challenges associated with connection and system costs, process for the Iterative Plan Review, future leasing rounds, project-level consideration of derogations under imperative reasons for overriding public interest (IROPI), and a clearer approach to key policy areas such as planning, environmental assessment, supply chain, networks and innovation.

Visions and Aspirations

Q2: Do you believe the 2030 visions and aspirations described are sufficiently ambitious?

One fifth of respondents 10/48 answered 'yes' to this question, almost two fifths 17/48 answered 'no', and the remainder 21/48 did not answer the question. Over three quarters of respondents (38) provided explanatory comments in response to this question.

Calls for higher deployment targets

Most prevalent across comments were calls for more ambitious targets for offshore wind, specifically increasing them above the 8GW by 2030. These views are described in more detail in the discussion of question 11, which asked respondents to describe their preferred deployment rate.

A demand for greater ambition

The second most prevalent theme was a call for the SG to go further and create a more ambitious vision to realise the targets set out in the OWPS. Most of these comments were focussed on the environment; respondents would like to see more ambition to ensure offshore wind development is sustainably managed to conserve and protect the marine environment, landscape and seascape while meeting the outlined targets.

A further two respondents would like to see a greater focus for Scotland to compete internationally. One suggested that by limiting its ambition, Scotland could miss out on the social and economic benefits of increased deployment across the UK.

Support for the visions and ambitions described in the policy statement

Many respondents voiced support for the 2030 visions and aspirations, which they described as 'realistic', 'sufficient', 'a huge opportunity', 'ambitious' and 'world-leading'. Some of these comments were general in nature and discussed the OWPS as a whole. Others supported specific elements of the aspirations, as presented in Appendix 1.

Scotland's potential gains from offshore wind were described by a few respondents. They observed the potential for increasing capacity in the local supply chain, job creation, export potential and the ability for Scotland to compete on an international scale.

Expressions of support with calls for action

Another common theme was actions to realise the visions and aspirations. A small number of respondents observed the visions would need to have appropriate action and implementation, but did not describe accompanying actions. Others did specify actions for the SG, for example a few suggested achievement of the visions would require infrastructure development and improvement.

Calls for specific timelines in relation to planning

Some respondents urged the SG to create clear timelines to ensure that the visions and aspirations can be realised. Linked to this, a small number called for the timely deployment of new projects. They stressed that appropriate and sufficient planning would be necessary to achieve targets.

Collaboration between industry and the Scottish Government

Some suggested that collaboration with industry would be essential to realising the visions and aspirations. For example, one respondent from the wider energy industry explained the importance in relation to the construction of sites due to the Draft Plan Option (DPO) areas currently available having constraints. Another would like collaboration to identify accessible sites for development. There were a few additional calls for an accompanying plan from the SG to outline how it plans to work alongside industry and stakeholders.

Welcoming the Scottish Offshore Wind Energy Council (SOWEC)

A small number of respondents described their support for the creation of SOWEC. These responses highlighted the benefits of having the council such as:

- providing coordination capabilities,
- accelerating the development of the offshore wind industry,
- providing a focus on not only achieving the targets but on wider related goals such as local manufacturing and supply chain.

Aligning with the SMP

Some respondents stressed that alignment with the Sectoral Marine Plan would be important to achieve the visions. Two respondents made a similar observation that if the SMP did not align, the SG would create a siloed approach to offshore wind planning. Another respondent welcomed the target around building knowledge and accessibility. They felt that there were knowledge gaps within the SMP regarding impact of identified risks and the effectiveness of corresponding mitigation measures.

Actions

Q3: What actions should be taken by the Scottish Government, UK Government and agencies to realise the full potential of Scotland's offshore wind sector?

There were 45 responses to question three. This question received the most responses of all the consultation questions, indicating this area was a key interest for stakeholders.

Contracts for Difference

Most prevalent in responses to this question were comments about the Contracts for Difference (CfD) mechanism. Many of these called for a move to annual CfD auctions. It was suggested this would support the ambitions laid out in the OWPS while providing security and certainty for offshore wind developers and supply chain in reaching those

targets. A few respondents noted that increasing auctions would reduce pressure on consenting timeframes and smooth out the delivery pipeline.

Many of these respondents also discussed floating wind in relation to amending the CfD mechanism, which is reserved to and operated on behalf of the UK Government. For example, a few suggested that the CfD should include a minimum quota for floating wind projects to offer certainty for the emerging floating wind industry. A small number of respondents stated their support for the proposals contained in the consultation about adapting CfD mechanisms particularly, offering floating wind its own 'pot'.

Supporting the Scottish supply chain

Another major theme centred on supporting local supply chains. Respondents urged the SG to ensure that work is not exported overseas. They argued this would maximise the benefits to the Scottish economy and offer employment opportunities within Scotland. Some specific points followed these general comments and these are outlined below.

A few trade unions provided similar responses which focused on the workforce. They urged the SG to develop a robust 'just transition' framework to support skilled workers' transitions to new jobs in the low carbon sector. There was also a request for a requirement on developers to contain a minimum quota for work, both employees and development, taking place in the UK.

Another point from trade unions was the request for requiring offshore wind developers to sign up to the Fair Work Framework as a condition of receiving CfDs and any other public funding.

Two respondents, both independent developers, requested a balance in favour of independent developers in the initial ScotWind leasing round. They described ways in which these types of developers offer positive outcomes for supply chains, for example, high local content and socio-economic enablers. A few suggested supply chain obligations should be careful and realistic so as not to impose too heavily on developers.

Regulations

Several responses focused on regulations. For example, some respondents suggested that regulations and policies should promote equity for all jurisdictions in the UK to ensure that Scotland is able to fairly compete in the offshore wind market. Two observed the importance of SG regulatory alignment with elsewhere in the UK.

Comments highlighted the higher transmission charges Scotland faces relative to projects located in the south of the UK, which place Scottish projects at a relative disadvantage. A few urged the SG to liaise with the offshore wind industry, network companies, environmental agencies, and other stakeholders to develop a transmission regime and provide suitable landing points for future connection developments to be viable.

Advocating for an effective and timely planning regime was suggested by some respondents. They called for consistent leasing, planning and consenting system leading to reduced timescales from development to deployment.

A small number called for the development of strategic export routes for new offshore wind power from Scotland, while supporting new approaches to network development and supporting new entrants to the market.

Collaborative working with industry

Some respondents commented on the need for collaborative working within industry stakeholders to maximise offshore wind potential. The primary call was for the SG to ensure a consistent and collaborative approach to identifying sites for development including suitable landing points for transmission, while protecting the marine environment.

Regular seabed leasing

Another prevalent theme was a suggested action for the SG and Crown Estate Scotland (CES) to ensure regular seabed leasing. There were calls to increase the scale and pace of deployment and provide clarity around the frequency of future ScotWind leasing rounds to maintain consistency in the supply chain. A few of these responses specifically called for leasing rounds every two years, supporting CES proposals, and of circa 10GW each. Other responses related to seabed leasing were as follows:

- A few respondents asked for a commitment to extend regular seabed leasing to 2050 to factor in the potential that all projects will not be developed successfully.
- There were a few calls for the identification and provision of a pipeline of new seabed sites for development through regular leasing rounds for offshore wind which would require a new approach to marine spatial planning.
- Two suggested the 10GW capacity cap creates a barrier to achieving ambitions. They called for clarity about how the cap impacted the leasing process.

Planning

There were multiple comments on the planning process, specifically on linking the SMP with the OWPS. Renewables UK's comments were echoed by other respondents; they reflected upon the introductory chapter of the consultation paper, where the Minister's intentions to make Scottish planning 'efficient and effective' were outlined. They highlighted that this will require a leasing, planning and consenting regime that is consistent and robust to ensure the right offshore construction projects are developed to reach and exceed the Scottish Offshore Wind Energy Council's (SOWEC) 8GW offshore wind target. A few respondents went further to call for clarity around how the roles of SOWEC and the SMP will be coordinated to ensure consistency.

Further to this, a few respondents suggested the planning process could also be made more effective through the Iterative Plan Review process which would allow more regular input from industry and stakeholders, and for the coordination of necessary research and survey work across DPO's. Another respondent suggested an increase in areas for development in the DPO areas in the SMP.

Another minor theme in these responses was that the marine planning process could be more aligned and integrated with the terrestrial planning process. One respondent

suggested this could “enhance cooperation and sharing of resources, as well as addressing common issues such as habitat protection and grid connections.”

Some respondents also warned the SG not to create an over precautionary framework for planning, suggesting that this would prevent the sustainable development of offshore wind at the rate that is necessary to reach net zero targets.

A few respondents noted uncertainty over cumulative ornithological impacts highlighted in the SMP as a potential barrier to development. They observed that many potential zones are subject to high ornithological constraint, significant additional research or survey work. It was suggested that addressing these constraints will be vital to providing sufficient pipeline for deployment in Scotland. Some respondents argued that ornithological impact assessments should be consistent across the UK. A few supported collaboration and knowledge sharing between Marine Scotland, Marine Scotland Science and BEIS to further explore a UK wide approach.

Collaborative working with environment and marine stakeholders

There were many calls for collaboration across sectors to safeguard the environment. In this discussion, a small number of respondents urged for a coordinated and collaborative approach to managing access and marine use for multiple sea users. They highlighted that the cross-sector consultation approach to SMP could lead to more robust resolutions, such as agreed common compensation policies. The SG’s role in leading this approach while also overseeing the delivery of offshore wind deployment targets was described. Two called for a strategic level approach to Marine Spatial Planning and the Habitats Directive derogation process across all UK jurisdictions and within industry.

Decarbonisation

Some urged the SG to focus on the potential for Carbon Capture and Storage (CCS) and Hydrogen to achieve net zero. A small number left detailed comments explaining how these methods would work and why they are necessary. A few respondents called for the development of offshore grids in relation to decarbonisation. Views on offshore grids are explored in detail at analysis of responses to the following question.

Specific UK government actions

Specific actions for the UK government to take, primarily in relation to the CfD scheme, were shared by some respondents. For example, a few called for the UK Government to support Scotland’s offshore wind sector by revising the scheme, providing yearly auctions, and providing separate allocations for offshore floating wind.

Address environmental / wildlife concerns

There were some comments encouraging the SG to address environmental and wildlife concerns. These themes were all singular responses and are outlined in Appendix 1.

2. Barriers to deployment

This chapter presents an analysis of responses to questions 4 to 9 of the consultation. These address technological and administrative barriers to deploying offshore wind.

Regulatory and cost challenges

Questions 4 and 5 asked respondents to reflect on the regulatory and cost challenges and how these could be overcome. While there was some overlap in responses to the questions, for clarity these have been analysed and reported on separately.

Q4: What are the key regulatory and cost challenges facing the offshore wind sector?

Almost three quarters (35/48) provided substantive responses to this question. A small number referenced, repeated or expanded their responses to questions 2 or 3.

Transmission Network Charging

Transmission Network Charging was the most frequently mentioned challenge facing offshore wind. Under the CfD framework, sites in Scotland are seen to be penalised due to being furthest from the centres of demand, putting them at a competitive disadvantage and deterring investment. Comments ranged from brief statements highlighting this issue to a small number of very detailed responses discussing the impacts of this; these have been signposted to the SG for review.

Reform of the existing regulatory regime

The second most common theme was the need to update or reform the existing regulatory regime. A small number made a similar comment that developments in the offshore industry will require regulatory regimes that are fit-for-purpose and designed to deliver the scale required, in a timely manner, and at the lowest cost. Beyond this, respondents made specific points including:

- Calls to review the costs of regulatory requirements e.g. supply chain statements and contributions to a Marine Conservation Fund, ensuring a level playing field.
- Suggestions that more frequent CfD auctions (e.g. annually) would better support 2030 goals and smooth out the delivery pipeline.
- Support for the UK Government's proposals to create a separate definition and administrative strike price for floating offshore wind and to move fixed-bottom projects to a separate pot in an amended CfD framework.
- A reference to the fact that onshore solar and wind projects becoming re-eligible to bid for funding could deter investment in Scotland's offshore wind sector.

- A detailed response around the development of the National Planning Framework 4, which also expressed concerns whether regulatory and planning frameworks ensure national and strategic needs and views are being considered.
- The need for a regulatory framework which considers the social, economic, and environmental impact of investment decisions on grid reinforcements, rather than the current narrow focus of these decisions.
- A regulatory overhaul considering barriers to competitiveness (e.g. Offshore Transmission Owner (OFTO) frameworks) and changed demands such as energy storage and system resilience.
- Increased regulatory burden and executive powers to enforce of existing laws and fines to reduce the impact on birds and bats.

Grid infrastructure

Some respondents highlighted the need for improved grid infrastructure to enable energy generated by offshore wind to be integrated into the network. Again, these comments varied from general calls for improvements to specific points including:

- The need for a clearer vision of grid provision and associated charges.
- Challenges around gaining public support for an expanded network.
- Ensuring that regulation encourages and does not discourage grid strengthening.
- A note that many ScotWind bids may not obtain grid connection agreements until the end of the decade which could delay progress to 2030 targets.
- Support for Ofgem’s commitment to work with others to develop a more integrated approach and a call for the development of offshore “transmission hubs”.

Role of local supply chains

A variety of comments were provided in relation to supply chains. These included potential conflict between proposals to implement supply chain requirements (as part of ScotWind leases) and the ability of local supply chains to deliver on these, supply chain competitiveness and the importance of the skills and experience in the existing supply chain around Aberdeen. One commented that the supply chain would be impacted by future projects in Scottish waters requiring fewer UK manufactured vessels.

Environmental regulations

Another theme in responses was environmental regulations. General comments focussed on balancing developments with environmental regulations. A small number noted challenges around DPOs which are subject to ornithological risk. Two called for a consistent UK approach to the assessment of impacts on ornithology, while two noted a rigorous approach and more evidence is needed to maintain positive perceptions of the industry. One argued for reduced conservatism in assessments.

Delivering cost reductions to meet CfD price commitments

Some highlighted the challenge of delivering cost reductions to achieve the lower costs committed to in CfD. Respondents noted this required cost reductions at all stages of a project, putting pressure on the supply chain to lower costs which may not be sustainable in the longer-term. One reflected this is a particular challenge for supply chains which are furthest from the demand for their expertise.

Geographical challenges

Another theme related to the cost of overcoming Scotland's location and geography. Respondents discussed increased costs due to the harsher, remoter environments for floating wind, stormier sea conditions, and the smaller working windows these permit – all of which exist throughout project lifespans. Another mentioned more prohibitive planning restrictions in Scotland, while a detailed comment was provided in relation to negative consequences of Crown Estate Scotland setting up ScotWind.

Other comments

A small number mentioned barriers to the growth and commercialisation of floating wind. One noted the associated costs, another a lack of support and one called for a strong focus on floating wind if Scotland is to maintain its lead in developing it.

Hydrogen was mentioned by a few respondents. One noted developing renewable hydrogen is key to the long-term success of offshore wind, and another that long-term support is needed to realise Scotland's potential in leading hydrogen production. One argued offshore "transmission hubs" could benefit from technologies such as hydrogen.

Q5: What more can the sector and other key stakeholders do to tackle these?

Substantive responses to this question were provided by 36 respondents.

Regulatory commitments

Most frequent across comments was a request to review the cost implications of regulatory commitments and policy mechanisms to create a level playing field for the industry. Some cited supply chain statements and the Marine Conservation Fund as examples of mechanisms having a detrimental impact on Scottish projects which compete on price. A few reiterated calls to reform CfD with separate pots for floating and fixed wind or technology specific CfDs. Other comments included: easing regulatory restrictions to allow further offshore transmission facilities; changes to the OFTO framework; and, a request for monitoring the success of Scottish projects in CfD auctions.

Infrastructure

The second most common theme was a variety of suggested improvements to grid infrastructure. Two made a similar comment calling for the SG to work with stakeholders to develop a robust and efficient transmission system and find suitable landing points for future connections. Other requests included the need for an informed, evidence-based approach to interconnection methods. Two organisations responsible for energy

distribution provided very detailed submissions which have been signposted to the SG for review, arguing for a more strategic approach to infrastructure development.

Collaboration between marine users

Knowledge sharing, collaboration and co-ordination of advance planning between sectors and different marine users was encouraged. This was seen to reduce potential conflicts of interest and help identify solutions to common problems. Individual comments included support for various forums, such as the fisheries sub-group within SOWEC, and for Government engagement with these. Two highlighted ongoing challenges with the fishing industry, despite attempts to work co-operatively.

Environmental considerations

Actions to overcome environmental challenges were raised by some. Particular points included: a suggestion that planning and approval processes for offshore and onshore wind should be combined and based on a fuller understanding of public preferences; discussion of Strategic Environmental Assessment and Habitat Regulation Appraisal for the Sectoral Marine Plan; a call for departments and delivery bodies in Scotland to be adequately resourced with experienced staff; and, a proposal for market mechanisms that encourage component reuse. There was also support for project level mitigation and post-construction monitoring data, and for a strategic approach to site surveys of DPOs.

Reform of Transmission Network Charging

In addition to the strength of feeling evident in responses to question 4, some respondents called for reforms of Transmission Network Charging. They encouraged the SG to engage with Ofgem and other stakeholders as part of the review process.

Supply Chain

Some made comments focussed on strengthening supply chains. There were requests for projects to use local supply chains and stop awarding work overseas, and for secure investment. One highlighted the Offshore Wind Growth Partnership as an important way to strengthen local supply chains. Another asked for clarification around the local content supply chain requirement compared to the ability of local supply chains to deliver on this.

Reduced lead times alongside robust planning

There were calls from some respondents to ensure that projects progress in a timely manner and that development timescales are reduced, while also ensuring that robust planning processes are maintained. They reflected this was necessary to overcome industry and supply chain concerns and to achieve emissions targets.

Expansion of existing plans

A minor theme was to build on existing plans. Two respondents called on existing sites to be developed, one for new accessible sites to be found and one called for more ambitious grid solutions with hub connections around Scotland to enable expansion.

Licensing and consent

Another minor theme was licensing and consenting processes. One called for transparency in the leasing and licensing process in the National Marine Plan, and one for Marine Scotland to commit to a more streamlined consenting regime. One called for the consenting process to be improved, building on lessons for previous rounds. In a detailed comment, one respondent highlighted the different timeframes for Crown Estate Scotland leases for cables (12 nautical miles) and offshore wind (200 nautical miles).

Other comments

Improving workforce protection was raised by a few respondents. They called for more collaborative health and safety reporting, for offshore wind clusters to recognise trade unions, and a secure share of the supply chain for indigenous firms. The desire for increased frequency of CfD auction rounds was raised by a small number. One also called for reforms to CfD to ensure it reflects the total added value of Scottish and UK supply chains and the other for increased frequency of Crown Estate Scotland leasing rounds to provide new seabed sites for development.

Radar

Q6: What should the key Scottish priorities be in relation to Air Defence Radar, and towards radar mitigation more generally?

One third (16/48) provided explanatory responses to this question.

The need for an overall strategy

Most prevalent in responses to this question were discussions around the need for an overall strategy for air radar. Most respondents argued the existing case-by-case approach to resolve site specific issues is not sustainable, highlighting the need for a long-term solution and calling for an overall strategy with senior ministerial support.

A few respondents made the same specific request, highlighting the need for a national strategic approach which capitalises on opportunities arising from airspace architecture reviews and advances in civil air traffic management (ATM) technologies.

Engagement with MOD and OWIC

The second most common theme was discussions around the need to engage with the strategy development being undertaken by the UK Ministry of Defence (MoD) and OWIC (Offshore Wind Industry Council). Most of these comments urged the SG to remain engaged with, and supportive of, this initiative, with one giving a more detailed response suggesting how the SG could engage.

Aviation 2030

Some noted the Aviation 2030 task force formed by the Minister for Energy, Connectivity and the Islands and stated this was a positive step towards addressing air radar issues. A

few felt this group's outputs could support the SG proposals for a UK wide strategy as part of the MoD/OWIC initiative mentioned above.

Technological developments

Another theme in responses was the potential to take advantage of technological developments. As described above, a few noted the importance of capitalising on advances in air traffic management technologies. In addition, respondents mentioned future Communication, Navigation and Surveillance (CNS) infrastructure and the need for continued funding to develop and test mitigation solutions. There were also calls to further investigate the potential benefits of the Single European Sky programme.

Other comments

The importance of active dialogue with stakeholders was a minor theme. Respondents noted the need for cooperation between the industry and military and civil aviation authorities, air traffic control, and the value of working with UK bodies.

Work by the UK Department for Transport (DfT) was mentioned by a small number, who argued it has been reluctant to engage or push for surveillance practices to evolve, and that they should now provide greater leadership in supporting strategic mitigation.

A few commented on the role of other stakeholders. These included two calls to transition to self-management by aviation stakeholders, and one suggestion that regulators should make sure that all radar users can easily see turbines and infrastructure, with developers providing any mitigation.

Environmental and planning barriers

Q7: What more can the Scottish Government do, working with industry and other stakeholders, to address 'knowledge gaps' in environmental assessments for potential offshore wind developments?

Just over half (26/48) provided a response to question 7.

Iterative Plan Review of the Sectoral Marine Plan

The most common theme in responses to question 7 related to the two-yearly Iterative Plan Review of the Sectoral Marine Plan. Comments on this theme frequently referred to the Advisory Group which forms part of the review. A few made general comments in support of the Advisory Group. The composition of the group was queried – suggestions for including developers and their consultants, legal advisors, and academics were noted. A small number asked for clarity on the role of the group in identifying knowledge gaps, and on its powers. Two suggested a specific working group to address ornithological constraints to feeds into the Advisory Group.

Some made general comments in support of the Iterative Plan Review, stating it is a suitable vehicle to address environmental constraints. Others noted specific issues around the process, calling for clarity on how the review will identify and address gaps and ensuring the rolling programme does not have a detrimental effect on ongoing projects

due to 'changing the goalposts'. One suggested the review should be confined to currently constrained and new DPOs (Draft Plan Options); another asked for clarity over whether individual projects will be autonomous in their decision making.

A collaborative approach

The second most common theme was the need for a collaborative approach with industry to address knowledge gaps and environmental concerns. Responses in this theme varied, but included: calls for industry wide collaboration, including opening up working groups to wider industry representation; for a strategic approach to site surveys which are co-ordinated and delivered centrally; hopes to engage more with the ScotMER workstream; alignment between Crown Estate Scotland and the SG; working with regulators and SCNBs (Statutory Nature Conservation Bodies) to address uncertainty in certain DPOs; and, consulting universities and the supply chain in North East Scotland.

Cross-country connections

Connections with UK and European Governments and organisations were discussed by some respondents. A few gave a similar response asking the SG to collaborate with UK initiatives which could provide input into Scottish assessments. Others highlighted European knowledge, specifically WindEurope and countries with established or growing offshore wind sectors such as Norway and Germany. There were also calls for clarity on cross-border working given different consenting regimes, especially given potential differences in environmental protection standards between the UK & Europe.

Gaps should not delay developments

Another theme was that knowledge gaps should not hinder development. Most made the same point that, while knowledge of the impact on bird ecology has increased, the need for ongoing research to address continuing gaps should not prevent or stifle development decisions. Related to this, a few commented on the need to identify when the evidence base will be considered sufficient to allow consent to be given to DPOs currently under high ornithological constraint. Another welcomed the opportunity to reduce the level of precaution in assessments through collecting further evidence.

Examples of good practice

Specific examples were shared by some respondents. These included: work by Marine Scotland, specifically the Scottish Marine Energy Research programme (ScotMER) as a source of new learning and Offshore Renewables Joint Industry Programme (ORJIP); the CORPORATES process pulling together stakeholders to share knowledge and identify gaps; the Offshore Wind Sector Deal Barriers to Growth group and SOWEC as useful mechanism to encourage coordination; EOWDC developers committing to environmental research; and the use of the dtbird© system in the Kincardine floating array.

Clear timescales

Some called for clarity on the timescales for advice to be required. A few gave a similar response, asking for the development of a timetabled evidence gathering exercise which sets out how and when evidence will be available, and identifies further research gaps.

There was also a call for existing working groups to remain focussed to ensure no unnecessary delays to future deployment of offshore wind, and for a statutory timeframe for advice to ensure climate change ambitions are met.

Full and transparent assessments

Some highlighted the importance of full and transparent environmental assessments. These discussed the need for strategic environmental monitoring, full Environmental Impact Assessments and 'solid science', and linking this to UK monitoring. The challenges around ensuring the public have access to environmental data were also highlighted.

Other comments

A small number of respondents highlighted the importance of developing data depositories to share between marine users and stakeholders. This included a call for the independent collation and analysis of data collected by developers.

Q8: What steps can be taken to improve interactions between offshore wind and other marine sectors?

Thirty one respondents answered this question.

The importance of dialogue between marine users

The most prevalent theme in response to question 8 was the importance of dialogue between all users of the marine environment. Some respondents highlighted this was essential for targets to be delivered, and described the value of this dialogue – particularly early stage discussions - in establishing connections.

There were calls for the SG to provide greater support in fostering and coordinating this dialogue. This included suggestions for Government and regulators to take a pro-active lead in co-location discussions, for the creation of an Offshore Wind Development Advisory Group, and the convening of a cross-sectoral group where issues could be raised in a collaborative rather than adversarial forum.

Existing bodies and approaches

Some commented on existing bodies and approaches, explaining how these have been effective in establishing connections and encouraging discussions among stakeholders. Examples include: Innology's involvement in the Mersey Maritime cluster; the Seabed User & Developer Group (SUDG); the CORPORATES process; and respondent's own experience of working with the fishing industry. Others highlighted the potential facilitation role for local intermediaries and organisations, and called for the collation of lessons learnt from existing projects.

Effectiveness of marine planning

General comments on the effectiveness of marine planning were made by some. A few gave a similar response stating marine planning in Scotland has started slow and not yet affected decisions around the implementation of marine plans. As such they argued it

should be prioritised and implemented to improve interactions. There were also calls for greater clarity of priorities, and for a clearer and streamlined consenting regime.

Strategic review

There were calls from some respondents for a review to understand interactions between marine users and to create a holistic plan and strategy which helped to prioritise the role of marine users. Suggestions included a detailed study to explore interactions between new and legacy marine users and for a Scottish industrial strategy to manage interactions. A few highlighted the need for the SG to prioritise marine users so their environmental ambitions and commitments are met.

Alignment with marine policies and planning

Some highlighted the need to align offshore wind policy with other Scottish Government marine policies. Respondents felt this would assist the transition to greater deployment of offshore wind, and potentially develop more sustainable fishing practices.

Discussion around Carbon Capture

Carbon Capture was raised by a few respondents. These included calls for a more proactive Government role in the decarbonisation strategy, and for greater planning on how offshore wind can co-exist with carbon capture so the economic and decarbonisation benefits of both can be maximised. Two argued specifically for the identification of potential co-location 'sweet spots' for carbon capture, hydrogen and offshore wind.

Other comments

A few respondents highlighted opportunities for collaboration with the oil and gas industry. In particular they mentioned knowledge sharing, workforce transition, and mapping shared supply-chain services.

Contract for Difference (CfD) Framework and Innovation

Q9: How could a competitive market framework that promotes the development of floating wind be developed whilst still retaining value for money for the consumer?

Twenty eight respondents answered this question.

Reforms to the CfD scheme

The most common theme in response to question 9 was the need for reforms to CfD to allow floating wind to flourish. Four sub-themes were evident within these responses.

Most prevalent were comments arguing CfD needs to be reformed. The language used across responses varied, but there were calls for the creation of a separate 'pot' for floating wind to separate it from fixed-bottom projects, for a floating CfD, or to allow floating wind to compete in the innovation / developing technologies class. Respondents suggested these reforms would allow floating offshore wind to compete successfully

against fixed-bottom. Some also argued this separation was necessary to enable cost reductions which would accelerate commercialisation and maximise potential deployment.

Related to these proposed reforms, some specifically referenced their support of the recent UK Government / Business, Energy and Industrial Strategy (BEIS) consultation. Some made general comments in support of the CfD approach. Finally, two stated that changes to CfD should still require environmental obligations to be met.

Support for floating wind

General comments in support of floating wind were the second most prevalent theme, with some providing reasons for their support. These included:

- The larger wind resource available to floating wind and their ability to be deployed flexibly in deeper waters, generating greater potential than fixed wind;
- Opportunities to supply power and green hydrogen to other markets, as well as domestic power supply;
- Being less visually intrusive and with fewer significant environmental impacts;
- Potential to turn floating wind installations into safe havens for marine life;
- One detailed response has been signposted to the SG for review. It outlines the potential opportunities of floating wind, levels of investment to date and the role of niche markets as a spring board for the uptake of these technologies.

Cost-competitiveness

Respondents commented that they would expect floating offshore wind to become cost competitive over time. Some reflected that this could be achieved in a relatively short time or by 2030, as experienced with fixed-bottom. They suggested this could be achieved with support and if existing expertise from offshore wind and oil and gas is utilised.

A few referred to Scottish Renewables' 'Floating Wind: The UK Industry Ambition' paper, which highlights how cost reductions in floating offshore wind can be achieved with the right support in place. One mentioned the need for careful management of Administrative Strike Prices and ensuring 'competitive tension' in future allocation rounds.

Supply chain synergies

Another theme was the need to identify and take advantage of existing expertise and supply chain synergies with the oil, gas and tidal sectors. A few made a similar comment encouraging the SG to support mechanisms encouraging these synergies. One highlighted the potential for using the Oil and Gas Technology Centre in Aberdeen to develop technology, and the experience of Equinor in the floating wind field.

Need for a strategic plan

There were calls for the SG and industry stakeholders to develop a strategy or "roadmap to commercialisation" for offshore floating wind. This was seen as important in maximising

existing opportunities to increase the development and reduce the cost of offshore wind, as well as helping to protect the consumer.

Benefits to the consumer

Some commented on the benefits to the consumer – that offshore wind could deliver a new source of green electricity at a lower cost than other sources and would help retain value for money for the consumer. One noted the widest possible green energy generation base – including offshore wind – is needed to keep consumer costs down.

Other comments

A few respondents highlighted other challenges to creating a floating wind sector. These include the lack of a pipeline of offshore floating wind projects, the long timeframe from project inception to deployment, and that direct competition with fixed bottom wind is not feasible in the near term given the comparative immaturity of floating wind.

Subsidies were a minor theme. A small number argued for greater investment or sympathetic financial support to ensure enough work has taken place to enable wide-scale deployment of floating wind when needed. Conversely, one called for a debate on existing subsidies paid to energy companies who are not passing on cost savings to consumers.

3. The future position

This chapter presents an analysis of responses to questions 10 to 12 of the consultation. These address the future position for offshore wind in Scotland.

What the future looks like

Q10: Considering the currently available literature and analysis, what do you consider a successful offshore wind industry in Scotland in the future would look like?

There were 27 responses to this question.

Delivers national and local benefits

The dominant theme in responses was that a successful offshore wind industry would deliver local and national benefits. Much of this discussion focused on employment and economic benefits, often in relation to the local supply chain. Other positive impacts included diversification of Scotland's economy, less reliance on outsourcing and imports, and enhancement of domestic skills and expertise, which Scotland could ultimately export. A few described social benefits, such as positive impacts from the mitigation of climate change achieved by net zero emissions.

It is worth highlighting that some participants went on to describe how success could be achieved. This is covered in the analysis of responses to question 12, which asked about the actions industry and government should take to achieve Scotland's ambitions.

Achieves net zero ambition

Many respondents argued that success meant achievement of net zero emissions targets in Scotland and the UK; a few suggested these targets might be exceeded. In the discussion, one described the excellent conditions for floating offshore wind.

Maximises export potential

Several respondents suggested that success would include exporting from Scotland. For example, one called for key niches in the supply chain to be identified and exploited. Another envisioned Scotland serving the international market for floating offshore wind. In the discussion on this theme, one observed Scotland's favourable position in having greater scope to facilitate renewable energy production than other countries.

Linked to discussion of the global context, one respondent felt that success could result from first-mover advantage. Another suggested Scotland could develop a world leadership role linked to expertise in planning, consenting, impact mitigation and management.

Hydrogen production and wind farm models and

Production of clean hydrogen was referenced by some respondents in their discussion of a successful offshore wind industry. One described the value of a storable net-zero energy

carrier to the energy system that can decarbonise heating, peaking power generation, industry, heavy transport and shipping. This respondent suggested new windfarms should have electrolyser capacity; for existing windfarms to be retrofitted with this technology; and observed that in future, some windfarms might be built solely for producing hydrogen.

Another respondent observed that Aberdeen City Council has already developed some of the most significant hydrogen infrastructure in Europe, and this provides an excellent platform for the development of a true hydrogen economy. In this discussion, one highlighted that a successful sector would have a mix of floating and fixed bottom sites.

Environmentally sensitive approaches

Protection and preservation of biodiversity, marine life and other heritage or environmental obligations were raised by some respondents. One felt a Marine Nature Fund could support this ambition; another noted the important role of environmental monitoring and research; one reflected on the value of alignment with Scotland's National Marine Plan.

Competitive hub or base for the sector

Reference to hubs, centres of excellence or other site or knowledge clusters were found in a small number of responses. For example, one described the number of operational windfarms they expected in one site by 2045; Aberdeen City Council reflected on the potential for an offshore wind production hub in the area; another suggested hubs should have closer interactions with local research centres such as colleges and universities.

Synergies in research and policy

In contemplating success, a small number referenced the value of collaboration by all stakeholders including policy and research. One explained this would achieve efficiencies; another specifically reflected on removal of barriers to demonstration and deployment.

Fixed bottom capacity

A few observed that a successful industry would include fixed bottom capacity; one highlighted the UK's market share of fixed bottom capacity should be maintained.

The scale of deployment

Q11: What scale of deployment would you estimate or believe to represent a successful outcome, and why?

Twenty-nine respondents left comments at question 11.

General discussion of deployment

Across responses there was general discussion of the opportunities and challenges facing industry, and many did not make reference to a specific preferred scale of deployment. For example, one respondent called for an aspirational vision; another explained they did not have a fixed view on a precise rate of deployment; one urged for a rate of deployment which maximises the opportunities to meet Scotland's net zero target.

There was some discussion of the ongoing work by the SG to quantify Scotland's contribution to the UK wide target; reflecting this, one respondent welcomed opportunities to input into any future reviews on the scale and timing of deployment.

Deployment rates by 2030

The draft policy statement sets out several growth scenarios and explains that Scotland's offshore wind capacity could potentially exceed 8 GW by 2030. Beyond general discussion of scenarios, the second most common theme in responses was for Scotland to aim for a greater rate of deployment than 8GW by 2030. Within this group, a small number favoured 12GW, two respondents advocated for a rate of 8-10GW, one proposed a range of 10-15GW, and another suggested a rate of 16GW.

Some participants explained the levels of deployment they proposed were necessary to deliver the net zero ambition. One suggested their proposed deployment rate (12 GW) also offered economic benefits arising from the potential for Scotland to export energy.

Deployment rates by 2045 or 2050

A range of views were put forward about longer term prospects for deployment. Two respondents suggested that 30+GW by 2045 would be a successful outcome. In discussion of deployment by 2050, at the lower end of the scale, a few respondents advocated for a deployment rate of 20-25GW; a small number suggested Scotland should aim for 30-35GW; and one advocated for a broader range of between 30-40GW by 2050.

In discussion, many participants talked favourably of Scotland's capacity to make a substantial contribution to the UK-wide targets established by the Committee on Climate Change, reflecting an abundance of wind resources. Several referenced the appetite for development and expansion within the industry.

Opportunities and challenges

In looking to the future, some participants identified opportunities for Scotland to take advantage of including the potential for economies of scale. Many of these points are covered elsewhere in this report. There was repeated mention of economic benefits and Scotland's capacity for development of floating offshore wind capacity.

The challenge of establishing an effective pace of deployment was frequently referred to. Some described complex development processes involving a range of stakeholders; one urged for a more interventionist approach by government; one outlined the role for local government in 'collaborating with industry and infrastructure providers such as ports and harbours'. Others made general comments on the need for streamlining and effective planning to avoid bottlenecks. One highlighted the lengthy timescales from inception to deployment; noting the crucial role of targets for 2045 and 2050 to drive progress in the immediate future.

Other important challenges associated with future expansion of deployment include potential adverse impacts on Carbon Capture and Storage capabilities. One respondent explained deployment in this sector is expected to commence once the majority of offshore wind installations are in place; highlighting this will not be possible if portions of seabeds

are sterilized in the process of wind farm deployment. Two emphasised that greater levels of deployment must not be achieved at the expense of the natural marine environment.

Actions to ensure a positive future

Q12: What actions should industry and government take to address the issues described in this section and ensure the most positive future position for offshore wind in Scotland?

Thirty-two respondents left comments at question 12.

Leadership

Calls for the SG to show ambition, develop a clear vision and develop an effective policy framework dominated responses to this question. The level of detail in comments on this theme varied; for example one asked for greater government intervention in achieving ambition; another urged the SG to follow the examples set by Norway and Denmark, who offer financial support and use statutory powers to facilitate the growth of a local supply chain, increase corporate confidence in investment, and mandate research and development. Another suggested that the Government could enhance social and economic gains by directing the Scottish National Investment Bank to focus on climate change and establishing a publicly owned energy company.

In reflecting on leadership, one respondent called for clearer links between Scotland's offshore wind policy in the context of its broader Energy Strategy. Across responses there was discussion of opportunities for Scotland, particularly the capacity for developing floating offshore wind, which one described as a matter of global interest, noting Scotland must move quickly. One observed the commercialisation of floating offshore wind will allow increasing use of [Scotland's] deeper waters, which in turn will allow increased ambition for offshore wind. There was also reference to growth in other technologies associated with offshore wind, such as hydrogen and carbon capture and storage.

Within these comments there was reference to Scotland's deployment targets, echoing responses to question 11. A small number of respondents highlighted that Scotland had a solid platform for growth. For example, one noted the SG previously set a 2020 100% renewable electricity target which was a daunting/unbelievable target for those working for many years in the industry, they would like to see more stretching targets.

A few respondents urged the SG to ensure that development does not have an adverse effect on marine wildlife. There were also some calls for a pipeline, timeline or roadmap to accompany the policy or vision statement.

Investment

Investment was the second most common theme in comments on action for government and industry. Respondents highlighted areas for investment such as workforce development, research and development and infrastructure, including port facilities.

In this discussion, it was noted that the SG could deliver investment directly or indirectly, by providing loans or underwriting risk. One highlighted areas of investment for industry to

consider, such as projects in community support funds and support for the emerging Scottish Marine Environmental Enhancement Fund; another suggested effort and investment in environmental monitoring and research is required.

Assessment

Another prevalent theme across responses were references to the role of the SG in assessing the strengths, weaknesses, opportunities and threats facing the offshore wind sector. Examples of the issues to assess varied; one respondent asked for a forecast of labour needs, another called for a broader assessment of the entire development ecosystem, not just the construction phase. In commenting on the task of assessing challenges, a few highlighted specific issues with grid charges and grid access.

Cross sector engagement

The value of collaboration across government and industry was described by some participants. In this discussion, one respondent highlighted the importance of cooperation through the Sector Deal, OWGP and SOWEC; another noted the need for knowledge development and sharing between the main industries engaged in offshore wind R&D and the public sector (including universities) led by the SG.

Discussion of cross sector engagement spanned national issues to local sites. For example one respondent observed the juncture where the next steps on the national co-ordination and strategic development of the critical network infrastructure... ought to be considered, planned and implemented quickly; another called for engagement with communities and supply chains in areas like the North Highlands which are likely to be closest to major offshore wind developments.

Fostering market conditions

Some respondents reflected on the role of government in establishing conditions for a strong market, echoing comments covered elsewhere in this report. This included calls for an efficient planning system, changes to transmission charging, annual CfD auctions, assuring a revenue stabilising mechanism and regulatory changes. One respondent suggested that UK companies should be involved in all aspects of the design and build of the offshore wind development projects.

The leasing process

A small number of respondents advocated for changes to the leasing process, for example, by concluding the Scotwind leasing process to open up new development opportunities. There was also a call for regular leasing rounds to be put in place.

Employment standards

Two respondents urged the SG to agree basic employment standards and trade union recognition that governs all work in the offshore supply chain.

4. Economic opportunities - supply chain

The current state of the Scottish supply chain

Q13: What areas of the Scottish supply chain do we excel at, and what could we do better?

Twenty-one respondents left comments at question 13.

Strengths in the Scottish supply chain

Engineering and project development expertise

Project development expertise in the Scottish supply chain was the strength most frequently mentioned by respondents. For example, competence and expertise in engineering, environmental and development services were praised. A few highlighted the well-established developers that exist in Scotland.

Some described Scotland's strength in engineering at length, specifically, in relation to design and fabrication. It was observed that Scotland has a wealth of experience in marine engineering, with examples of success in this area. Data, communications and mooring expertise were other areas of expertise highlighted by respondents.

Other strengths described in supply chain development stages were; small fabrication and components supply, modelling and commissioning, installation, opportunity identification, procurement and construction.

Professional services

Legal, environmental and financial consulting services were noted as assets to the Scottish supply chain by some respondents. These comments were mostly brief and highlighted that these can continue to play a key role in the development of the offshore wind sector. Other consulting services mentioned by a few respondents were; technical, commercial, intellectual, property, risk assessment and diligence.

Strengths in local supply

Workforce skills in remote areas and the benefits to local communities were highlighted by some respondents. A few described the jobs created to service existing facilities; one urged the SG to recognise the skills and facilities that already exist in remote communities and to encourage developers to exploit these when creating new projects. They offered suggestions about how this could work in practice. One organisation's detailed response outlined their contribution to energising local supply chains, signposted to the SG for review.

Operations, maintenance and port facilities

A small number of respondents highlighted expertise in operations and maintenance. These comments were typically brief. One respondent suggested Scotland has

outstanding quayside facilities and should build upon these to ensure that towers, full jacket foundations and component parts can be manufactured there.

Other comments from a small number of respondents were strengths within vessels and access to offshore services. Innovation in science and research and development was highlighted as a key asset by a few respondents.

Areas in which the Scottish supply chain could do better

A long term or holistic view

The prevalent theme in discussion of areas for improvement was in long term or holistic thinking in future developments. Some respondents requested long-term thinking in the investment into infrastructure development, particularly facilities and capabilities, as well as consideration of the full life cycle of projects instead of just the initial stages. A few highlighted the importance of investing in early action to identify local supply chain opportunities for floating projects and to ensure their commercial success. One respondent specified they would like to see a holistic approach to subsea infrastructure development.

Fabrication and installation

Issues with installation and fabrication were outlined by some respondents. This was particularly in relation to creating a standard of fabrication that could compete internationally and on a large scale. There were suggestions that this would require significant investment to enable Scottish suppliers to compete with more advanced manufacturers outside of the UK. Others commented that larger scale fabrications in relation to floating wind would need improved. One respondent gave a detailed comment outlining the ways in which the supply chain could improve its construction and installation capabilities, which has been shared with the SG for consideration.

Utilising existing skills, expertise and facilities

A few respondents urged the sector to recognise opportunities that already exist in Scotland in relation to facilities, for example, developers and supply chain manufacturers in Aberdeen. One respondent suggested the skills development landscape in Scotland is well placed to deliver the resource required for operations.

There was comment on maximising the opportunity to develop skilled, long-term employment and one outlined an opportunity for enterprise agencies to keep an updated register of the supply chain skills profile across Scotland, to allow developers to gain a scope of the skills they can access locally. Another urged the SG to grasp the opportunity to create employment by investing in local communities.

Other suggestions made by small numbers of respondents included improving the construction of Special Operations Vessels (SOVs) heavy lifting vessels, and transport or installation vessels. A few called for better price competitiveness on the fabrication of jackets, and locally manufacturing these as well as turbine foundations.

Developing a competitive advantage

Q14: Where are the new areas that Scotland can develop and exploit a competitive supply chain advantage?

There were 22 responses to question 14.

Developing floating wind

Offshore floating wind was the most frequently mentioned area of competitive advantage for development. In this discussion, the need for funding and further development of offshore floating wind was described. One respondent suggested a number of opportunities in floating wind for the Scottish supply chain which have been signposted to the SG for consideration.

Two respondents also commented on the role for the SG in fostering innovation in offshore wind, they suggested that this is required to determine which aspects of the supply chain can support floating offshore wind to maintain cost competitiveness. Another highlighted SG incentives like the Growth Partnership Fund, noting this could be well placed to focus efforts on areas where Scottish projects are leading, and where existing capacity lies.

Specific skills or areas of expertise that could be exploited

Some respondents outlined specific skills or expertise to maximise supply chain advantage, for example: bottom and middle Wind Tower Geometry (WtG) tower section production; battery fuel and cell storage; green hydrogen; secondary steel or transition piece manufacturing and mooring specialisms. A few respondents also highlighted the opportunities in operation and maintenance skills to service the offshore sector for the duration of projects as a benefit.

Active industrial policies from SG and UK Government

Industrial policies which enhance competitive advantage were called for by some respondents. In this discussion, collaboration between industry and government was highlighted as a way to optimise opportunities. One respondent offered examples from other countries; describing strong state support for manufacturers and developers, successful policy interventions to ensure demand for wind power in domestic markets. They argued this has led to success for local supply chains elsewhere. Another respondent advocated for public ownership and investment.

Assessment of gaps in the UK supply chain

There were several suggestions that identifying and capitalising on any gaps or bottlenecks present in the UK supply chain would boost competitive advantage. It was suggested that coordination with UK industry groups would be crucial in identifying these gaps. One respondent asked the SG to establish key ports for decommissioning and recycling components within the North Sea as these are likely to be in high demand.

Hydrogen industry

The development of the hydrogen industry was discussed as an opportunity for increasing competitive supply chain advantage by some respondents. They highlighted that hydrogen deployment opportunities could be maximised through further investment in infrastructure and storage as well as increasing demand for applications of hydrogen. A few gave examples of how a hydrogen economy could be developed in Scotland including supplying hydrogen from an offshore hydrogen super grid, and using offshore wind to generate zero carbon hydrogen from electrolysis for use in the gas distribution network.

Port infrastructure development

Upgrading port infrastructure was an area that was discussed by some respondents. The east and west coasts of Scotland, and deep-water facilities, were areas of focus suggested by a few. They outlined that revitalising port infrastructure in fishing towns could bring economic prosperity to these areas. Two respondents specifically mentioned the support received for Aberdeen Harbour South and suggested this kind of development could be replicated across Scotland. A few respondents outlined that ensuring developments are constructed in the right timescale is essential for cost-competitiveness.

General comments about overlap with Oil and Gas industry

General comments were shared by a few respondents about the potential to exploit existing opportunities present in the O&G industry. They outlined existing expertise, high end technical services, UAV, data collection and communications as areas that could be used to develop a competitive supply chain. The overlap between the two industries was discussed as beneficial to capitalising on these opportunities.

Data collection

A few respondents highlighted the value of data collected on turbine operations, for example, environmental conditions (and met-ocean sensing) and records of repairs and maintenance. They noted this data would be instrumental in the future development of offshore wind projects. Respondents suggested that this could offer Scotland a chance to commercialise this data and become a world leader in this field. Two others would like to see innovation in data processing and collection.

Tendering challenges

Q15: What are the main challenges a company faces when tendering for a contract?

There were 14 responses to question 15.

Existing synergies

Some respondents described difficulties in accessing existing synergies or relationships between manufacturers and suppliers. Others highlighted the complex contractual arrangements between suppliers and manufacturers and the inherent risk and financial liabilities that discourage partnership working. One of these went further to outline the

difficulty for a new entrant in gaining contracts as package managers often rely on trusted supply chain relationships.

Competing internationally

State aid for companies based abroad was mentioned by a few respondents. They suggested that this gave overseas companies a competitive advantage over those based in the UK. Respondents would like to see the SG and the UK Government continue to assess areas for investment to improve competitiveness in local supply chains.

Tendering processes

Accessing tender processes was described by a few respondents as a challenge. One highlighted that the supply chain needs insight into upcoming procurements, access, and knowledge of the process in a timely manner. Another addressed the capabilities of SME's in meeting the pre-qualification requirements for tenders, especially when considering smaller lots, they also outlined that SME's often miss out on large scale projects. One more respondent, an energy supplier, outlined challenging pre-tendering issues like; having sufficient finances to cover contract securities, being able to compete due to reliance on labour and the availability of that labour and the capability to deliver contracts.

Assisting the supply chain to secure contracts

Q16: Subject to procurement law, what more should government and its agencies do to assist the supply chain secure contracts?

There were 22 responses to question 16.

Developing a policy and regulatory framework

Many respondents urged for the development of a clear policy and regulatory framework to provide certainty for the supply chain. One respondent suggested that this would enable planning to reach targets and enable coordination the location of cable infrastructure. It was also suggested that incentives could facilitate the supply chain to participate in reviews of their capabilities to identify strengths and weaknesses resulting in a better understanding of the market. A few respondents argued that any reviews could be supported by the UK's Department for International Trade.

Encouraging partnership

A prevalent action outlined by respondents was for the SG to better promote the local supply chain's networks and capabilities by initiating partnerships. Some of respondents left general comments asking the SG to foster supply partnerships from early stages. Another respondent referred to a response given at question 15 about their own approach to partnership, the 'supply chain alignment model', which they suggested should be adopted by all developers entering ScotWind, and could be coordinated by the Clusters to ensure a structured programme of engagement between projects and local suppliers. One respondent went further to request the development of a skills profile for the local supply chain to help both developers and Tier 1 contractors gain an immediate understanding of what skills they can access from local supply chains.

Providing incentives or investment

Government investment was outlined by some respondents as an action that could assist the supply chain to secure contracts. Some suggested support could be offered in areas like port and manufacturing facilities, as this could also attract companies to establish operations in Scotland. A few respondents observed that supporting hybrid (fixed and floating) projects could facilitate deployment and best fabrication processes before the wider rollout of commercial floating wind. Others made general calls for the SG collaborate with the industry to deliver joint investments in infrastructure development.

Support the activity of the Offshore Wind Growth Partnership

The Growth Partnership was established as part of the Offshore Wind Sector Deal. Some respondents made brief comments urging the SG to continue to engage with and support this partnership.

Government interventions to facilitate international competition

A few respondents would like to see a more interventionist approach from the SG to support the Scottish supply chain in international markets. One respondent suggested this could be achieved by ensuring that suppliers can win projects in procurement processes, rather than imposing local content requirements.

Highlighting opportunities

Timely knowledge of upcoming procurements was described as an important contributory factor in contract success by a few respondents. They suggested government agencies should support the local supply chain to highlight opportunities, offer advice and enable partnerships. Two of these respondents furthered the suggestion that partnering, joint venturing and risk sharing in financing arrangements would be useful when considering procurement opportunities.

5. Economic opportunities - skills

This chapter presents an analysis of responses to consultation questions 17 to 19. These cover skills gaps, how these could be addressed, and learning from best practice.

Skills issues and gaps

Q17: What are the key skills issues and gaps facing the sector over the coming years, in the short and medium term?

There were 20 explanatory comments in response to this question.

Specific skills gaps

Many responses to question 17 gave specific examples of roles or skills where gaps exist. Gaps in Operations and Maintenance were commonly cited; most simply noted skills gaps in this area without elaborating.

Beyond this, a small number mentioned skills associated with deep-water capability, ports, and harbour logistics. Other singular skills or supply chain gaps mentioned were:

- A lack of tradesmen to support the manufacturing and assembly of components.
- Shortages in seafarer, diver, and technical roles.
- Training in marine planning knowledge and skills beyond the sector.
- Engineering and ship handling.
- Capacity for tasks required in decommissioning projects.
- Blade recycling.
- Concrete manufacture.
- Steel work, specifically structural steelworkers, fabricators, and welders.

One detailed response highlighted challenges arising from using leasing rounds. They said it stretches the capacity of specialist advisors such as ornithologists, ecologists, landscape advisors and aerial surveyors who must consider multiple projects simultaneously. The respondent argued for a strategic approach to site survey to alleviate this problem.

Transition from oil and gas

Also prevalent were comments encouraging the transition of workers from existing industries - in particular, the oil and gas sector. Some specifically highlighted a need for the SG to continue to engage with OWIC's Investment in Talent and SOWEC's Skills Group, with one noting their work in examining the role of apprenticeships and training schemes. Other suggestions to support the transition included: collating skills information to identify gaps; support for passporting programmes; greater coordination between

agencies such as Skills Development Scotland and training providers; and, the development of 'Shared Prosperity Funding' for investment in energy hubs and productivity.

One respondent provided a detailed response outlining challenges when transferring from other sectors, such as additional training costs and some offshore wind operators being reluctant to recognise existing qualifications. They argued against a bespoke offshore wind model which does not recognise skills from other energy sectors.

Attracting and retaining younger workers

Another theme was the need to attract and retain younger workers, in the context of an ageing existing workforce. Suggestions included the need to ensure a flow of technical expertise from further and higher education and working with education to maximise the attractiveness of the sector. These were seen to help ensure a pipeline of new, skilled workers who can learn from the existing workforce before they retire. One called for a comprehensive apprenticeship scheme, in cooperation with Skills Development Scotland, employers and trade unions.

Uncertainty

Some highlighted the challenge of filling skills gaps when there is uncertainty around what skills will be required in the future. Some skills will be new, are not yet developed or will require greater understanding of future technology – for example, in foundation design. Respondents highlighted increasing automation, stressing the importance of embedding development, management, and maintenance skills in the workforce to ensure the UK sector remains internationally competitive.

Increased diversity

Another theme was increased diversity in the sector. There were calls for greater inclusion of women and workers with Black and Minority Ethnic (BAME) backgrounds. Two urged for additional work by Government to 'debias' education and argued the sector must ensure a diverse representation of role to attract diverse and representative staff.

Developing and funding local skills

There was also discussion around facilitating skills development in local communities. A few made the same request for greater flexibility in funding mechanisms; to enable long-term roles for local residents who could be employed in one location, trained, and gain experience elsewhere, and then re-deployed locally. Another called for the development of local talent, and another for projects to commit to investment in training programmes and facilities in the areas that will provide their workforce.

Q18: What more should government and the sector do to build on the progress made in recent years?

Twenty-one gave explanatory comments in response to this question.

Skills review

One of the three most common themes in response to question 18 were calls for stakeholders to review the skills needed now and in the future. It was suggested this would ensure the supply chain can meet the requirements, or be upskilled accordingly. These respondents also noted a need for training and educational initiatives to match skill gaps.

Synergies with oil and gas

Another theme was for the SG to support and encourage synergies with the oil and gas sector, especially in re-training individuals transferring to offshore wind. Specifically:

- Encouraging the adoption of a cross-sector competence framework to allow for the transfer of skills, with the respondent citing the Connected Competence framework.
- Suggesting the Offshore Petroleum Industry Training Organization (OPITO) could be broadened to include modules covering offshore wind.
- Establishing an industry owned training organisation aimed at offshore wind sector.
- Refocussing suppliers for the offshore wind sector.

Training those entering the sector

Support for those entering the offshore wind sector was the third common theme. Within this were: general comments around the level of training support currently available in Scotland; calls for funding for critical skills intervention; and, mention of a need to focus on mid-or late-career workers and to improve funding and provision for their re-training. Another suggested work experience placements and internships beyond school pupils and students would support those considering a job in the sector. One made a very specific point, suggesting that corporate social responsibilities should be distilled into cash which can be used to support people entering the sector.

Other comments

A small number commented on engagement with the education sector. They asked for the energy sector to work with education to develop a fit for purpose curriculum; to connect the consultation with the Cumberford-Little report on the vision for Scotland's colleges; and, directed the SG to the renewables 'academy' vocational approach which can be accessed in the Aberdeen region.

A few called for fair working principles to be applied in practice, with one highlighting exploitative practice experienced by overseas workers. Another made a related point calling for due diligence of companies investing in the industry to ensure they have no history of mismanagement or actions which could be detrimental to jobs or communities.

Learning from international approaches

Q19: What can Scotland learn from the approach taken in other countries around the world in this area? Are there examples of best practice you can share?

There were 16 responses to this question. Given the smaller number of responses and respondents giving specific examples, only a few themes emerged.

Production

Some described models used in other countries to develop offshore wind, including:

- France, Portugal, and Norway's experience of developing pre-commercial pilots.
- The value of taking a long-term view of contracts as is done in Norway.
- A suggestion that the German model should be considered.
- France's step-by-step approach from prototype to commercialisation.

In their response to another question, one suggested mirroring the South Korean approach where Government has driven industry to focus on floating wind and harness local expertise and supply chain.

Two highlighted the potential role of a Scottish National Investment Bank in financing production and one made a specific point that projects will need subsidy and capital expenditure support for pre-commercial deployment to overcome competitiveness issues.

Workforce

A small number called for mechanisms to ensure projects set a minimum threshold for using local supply chains, guaranteeing jobs and contracts for local populations. Beyond this, singular examples of approaches or best practice included:

- Siemens' development of its mechatronics qualification.
- Developing centres of excellence for training, like the CATCH model in Hull.
- The Energy Skills Priorities in the East of England, and the Offshore Wind Skills Centre based at East Coast College in East Anglia.
- Singapore's integrated adult education system called Workforce Skills Qualifications (WSQ) which offers existing, mid-career workers access to modular training that can be developed progressively into nationally recognised qualifications.

6. Innovation and cost reduction

This chapter presents an analysis of responses to consultation questions 20-24.

Building on innovation support

Q20: What can the Scottish Government most usefully and feasibly do to build on the innovation support previously and currently available?

There were 27 responses to question 20.

Funding and support

The most prevalent theme in the responses to question 20 were comments covering support, funding, or incentives.

There were a few general comments in which respondents urged the SG to consider specific innovation funding. One suggested the current commitment of £4 million is insufficient when considering the target of delivering 8GW by 2030. Another pointed out that other energy innovation programmes, like Wave Energy Scotland received £9 million in 2019, and that offshore wind should receive similar. A further response observed that by investing more in Oil and Gas than in offshore wind, the SG are allowing that sector to have innovation advantage over renewable sectors.

Flexibility when considering innovation support, to reflect the evolving nature of the offshore wind sector, was an important consideration for one respondent. Another echoed this point and suggested that flexibility would drive down the cost of offshore renewables for the public. One argued that although innovation funding is essential, it is imperative companies in receipt of funding are part of the Fair Work First agenda.

A concern about reliance on EU innovation support, which is now under threat due to EU exit, was raised by one respondent. They urged the UK Government to consider how public funds could cover the shortfall when EU support is withdrawn. This response was detailed an offered examples of potential support models for the UK Government to consider and has been signposted to the SG for review. Further to this, another respondent suggested closer partnerships with universities and research and development (R&D) centres.

Collaboration in research

The second most prevalent theme concerned the continued support of research programmes from the SG. This included discussion of appropriate models and oversight to encourage effective knowledge sharing and to avoid duplications. These respondents discussed opportunities to improve the coordination of research development and design support. A few respondents called for the public sharing of the operational structure of bodies like the UK's Energy Innovation board, and to follow this example to create a similar body for Scotland. Another requested clarity about the SG's priority areas for innovation, and would like to see these outlined in the final OWPS.

Two respondents described detailed models for the SG to consider when building their own R&D capabilities; one also suggested that CES should consider factoring contributions to R&D into their leasing conditions. These have been signposted to the SG.

Investment in manufacturing and supply chain activities

Another prevalent theme were calls for further support in the initial stages of development for offshore wind. Most of these comments suggested that investing in and building the supply chain was crucial to the success of offshore wind. Two highlighted the importance of collaboration between the SG and industry in the early stages of development, and suggested that delivery agencies could stimulate the level of inward investment activity required to maximise Scottish innovation in the supply chain. A few observed that by supporting the supply chain the SG would be encouraging competitiveness. One of these respondents suggested a shared supply chain development plan should be developed by SOWEC.

The Offshore Renewable Energy Catapult (OREC)

OREC was described as advantageous by a few respondents. They urged the SG to continue its support of the development of the programme and suggested it will be instrumental in the success of offshore wind.

A long-term focus on innovation

A focus on the long-term success of offshore wind was important for a few respondents. They suggested any innovation support should also consider floating wind technology and the integration of renewables, to ensure sustainable growth and competitive pricing.

A technology agnostic approach

A technology agnostic approach² to innovation was requested by a small number of respondents, to encourage the exploration of all potential opportunities. All these respondents left almost identical responses suggesting that future development should ensure integration with other energy value chains, such as those presented by a potential hydrogen economy. Two more respondents commented on the importance of creating a hydrogen economy and urged the SG to champion sustainable commercialisation.

Realising the potential of other energy supply chains

An alignment with other energy supply chains to bolster innovation was suggested by a few respondents. One of these left a detailed response outlining the opportunities for investment and development of green hydrogen and offered examples of how the deployment of this technology could work in practice. Another response outlined the potential for innovation in O&G for example, by offering renewable power to offshore facilities, colocation with floating wind sites, and technology sharing.

² Unbiased towards the use of any specific technologies.

Q21: How can we support technologies and developments which reach a viable stage between leasing rounds and CfD auctions?

Nineteen respondents left comments at question 21.

Frequency of leasing rounds and CfD auctions

The most prevalent theme was in relation to increasing the frequency of leasing rounds and CfD auctions, and how this could minimise any issues that may arise. Many of these comments were brief. Specific suggestions included minimising gaps between leasing rounds, and providing necessary planning application and licenses that aligned with CfD timescales, technology, and development.

In a detailed comment one respondent asked the SG to assure a revenue stabilisation mechanism. They suggested that a system which acknowledges technological developments, and a regular and predictable auction cycle, would provide market transparency. This respondent referenced issues with the Transmission Network Use of System (TNUoS) and suggested if the situation is not resolved projects would only be allocated on the basis of geography, which could undermine the aims of a CfD mechanism.

Other comments

Near identical comments on lease milestones were left by a few respondents. They called for flexibility and baseline validity in Environmental Impact Assessments for projects that are not successful in CfD auctions, to apply for leases between rounds and reduce the volume of stranded assets.

A small number of comments urging the SG to offer financial support to pre-commercial projects, including technologies that contribute to achieving climate change goals. One suggested this could be achieved by instruments like capital grants, performance guarantees and equity participation.

Prioritising innovation

Q22: Where respondents believe that scope remains for innovation in fixed offshore wind, what areas should be prioritised?

Eighteen respondents answered question 22.

Prioritising operations and maintenance

The most prevalent theme in responses to question 22 was a request for the SG to prioritise lower tier suppliers and operations and maintenance (O&M) activities. For example, one described opportunities in areas such as SMART technology, robotics, and sensors, and suggested that the Scottish supply chain has the opportunity to increase its share of O&M expenditure. Another highlighted that developing new products and services in O&M may also be suitable for export to global markets. Investment in innovation at O&M stages can reduce the cost of offshore wind was also raised by one respondent.

Asset management and life extension

A minor theme was requests for the SG to prioritise asset management and life extension for projects. One went further to request that the minimisation of materials is considered when developing fixed bottom structures.

Supporting larger turbines

The prioritisation of larger turbines (15MW+) was requested by a few respondents, who said they would welcome a policy and support mechanism. One went further to suggest two avenues for turbine design that could lower costs; this detailed response has been signposted to the SG for consideration.

Actions to address key challenges

Q23: What actions should be taken to address the key challenges facing the uptake of commercial scale floating in Scotland?

23 respondents left comments in response to question 23.

Developing a CfD framework that allows floating wind to compete

Collaborating with the UK Government and industry to develop a CfD framework to enable floating wind to compete for contracts was the most common action outlined in the responses. Many comments were brief and outlined this action alone. One requested further investment in the supply chain to increase competitiveness; another argued that floating wind should be cost-competitive with other technologies by 2030 and one observed that existing expertise from the O&G sector would enable this.

Developing pre-commercial projects

Funding support to develop pre-commercial floating wind projects was requested by some respondents. A few reiterated points left at previous questions, for example explaining the role of the CfD mechanism in development.

Collaborative working to reduce costs

Collaboration with designers and supply chain workers to identify innovative approaches to reducing cost on a mass production was raised by some respondents. They also pointed out the uptake of commercial scale floating wind would be encouraged by ensuring mass production remains in Scotland.

A few suggested that collaborating with O&G industry would also raise the profile of floating wind as well as outlining the positive economic benefits. Further to this, one academic/research organisation suggested that Scotland should harness niche markets where the unique advantages of floating wind means it makes commercial sense to deploy

as this could then put Scotland in a stronger position to be able to deploy utility-scale floating wind projects in deep water.

Reforms to transmission charging and access

Another common suggestion was reforming transmission charging and access. In these comments, respondents repeated points they had made at previous questions.

Clarity around grid connection access

There were a few calls for clarity around grid connection access at the appropriate point of project development.

Infrastructure development

The importance of the timely development of infrastructure to enable Scotland to compete in an international market was stressed by a few respondents. One respondent gave the example that onshore fabrication, quayside, and port facilities should be established soon. Another suggested that any facilities developed needed to be of a modern standard, as lower quality facilities could impinge on timescales and cost.

Strengthening synergies

Q24: What can be done, on the part of government and / or others, to strengthen and benefit from the synergies with a) hydrogen and b) the oil and gas sector?

There were 26 responses to the final consultation question. Analysis responses are organised by comments that responded to 'part a' of the question, followed by 'part b'.

Hydrogen

Investment in the development green or blue hydrogen production

The most common theme in response to question 24 was discussion of support to develop green or blue hydrogen. These comments often highlighted a need for subsidy support or SG oversight and regulation so that they can compete against higher carbon incumbent fuels. A few respondents outlined that demand would be required to enable production facilities to be deployed and tested. A few suggested that without subsidies for infrastructure costs, hydrogen storage sectors would not progress over the next five years.

Comments around the Hydrogen Action Plan/Policy Statement

Another prevalent theme was that the SG's Hydrogen Action Plan should be coordinated with its approach to offshore wind. One respondent urged the SG to publish a Scottish hydrogen strategy to promote synergies between sectors, including hydrogen from CCS and electrolysis, offshore wind and CCUS.

Another asked the SG to encourage the delivery of net zero hydrocarbons. Continued support for the use of hydrogen for heat, transport and power and initiatives that help to reduce the cost of offshore wind and electrolysis was an important point for another respondent.

Calls for a Carbon Capture and Storage (CCS) policy statement

The creation of an CCS policy statement or action plan was suggested by some respondents. These suggested that storage solutions would need specific attention to ensure large scale production of offshore wind can take place. Two of these respondents observed the OWPS should not inadvertently prevent or impede the deployment of CCS. Another respondent left a detailed comment outlining the possibilities for CCS in Scotland, which has been signposted to the SG for consideration. They suggested that CCUS will offer more synergy opportunities from 2030 to 2045 than the O&G industry.

Funding for research

A few respondents said the SG should fund research into synergies with hydrogen and other Power to X³ (PTX) opportunities. One outlined the need for further research into hydrogen embrittlement of welds and structures, hydrogen permeation, and hydrogen compression. They highlighted that this could create additional value for offshore wind by production of hydrogen offshore and pipelining to the UK grid.

Oil and Gas

Operations and maintenance

The most common theme in comments on synergies within oil and gas relate to the operation phase of projects. Respondents argued that synergies would arise from wider collaboration between sectors to share best practice. One noted that group-based funding models are important to tackle innovation challenges shared by the sector as a whole.

Support for O&G supply chains to diversify their workforce

Another common theme related to skills transfer; retraining individuals for the offshore wind sector, drawing on best practice standards for operations, inspection and health and safety. A few suggested that the industry should capitalise on the job opportunities offered by offshore wind. They suggest that the synergies lie within skills bases for operating in complex, deep-water environments. They requested that the SG provide support to the O&G supply chain.

³ Number of electricity conversion, energy storage, and reconversion pathways that use surplus electric power, typically during periods where fluctuating renewable energy generation exceeds load.

7. Conclusions

A range of informed stakeholders took part in the consultation. They appeared highly engaged and knowledgeable about relevant matters, including designing, building and delivering offshore wind, workforce development, or managing geographic areas that may be potential sites for expansion. Together, these responses provided a useful evidence base for the Scottish Government to draw upon when developing the final offshore wind policy statement.

Much of the draft offshore wind policy statement was endorsed in principle. Reflecting their expert knowledge and specific interests, respondents' perspectives and evidence spanned a range of complex issues which cannot be summarised succinctly. Readers are encouraged to look to specific chapters, appendices and individual responses, where permission was granted for publication for more detail.

Key themes in the discussion on building on the current position of offshore wind in Scotland include recognition of the importance of the OWPS in delivering climate change goals and many encouraged the Scottish Government to be ambitious when settling on a final target. They reflected on constraints such as infrastructure, planning and grid capacity and also asked for the policy statement to set out a clear roadmap to enable detailed planning. There was significant discussion of Contracts for Difference mechanism, with many calling for a move towards annual auctions.

On barriers to deployment, respondents reflected on Scotland's competitive disadvantage arising from Transmission Network Charges. They called for enhancements to supply chain statements, the development of a fit-for-purpose regulatory framework, an improved grid infrastructure and an overall strategy for air radar. Knowledge sharing, collaboration and co-ordination of advance planning between sectors and different marine users was strongly encouraged.

Significant local and national benefits to Scotland from a flourishing offshore wind sector were described, such as the achievement of net zero emissions targets and the potential for a growing export market. To achieve this, respondents urged the Scottish Government to show ambition, develop a clear vision and develop an effective policy framework.

The comments on strengths focused on Scotland's capacity in engineering, environmental and professional services. In reflecting on workforce expansion, the scope for skills transitions from the oil and gas sector were highlighted. There were also calls for a review of workforce gaps to support the long-term development.

Respondents urged the Scottish Government to provide support, including funding and incentives to drive innovation. This was called for at a general level and also specifically in relation to floating wind and the development of hydrogen production, recognised as important potential growth sectors for Scotland. Respondents also asked for support to overcome barriers to tender by raising awareness of opportunities, facilitating partnerships, and sharing knowledge.

Appendix 1: Quantitative summary

Table 2 provides a quantitative summary of how many respondents answered each question. This was defined as providing any substantive or explanatory comment. Those referring to an answer to another question are classed as answering. Those stating 'No answer' or 'No comment', for example, are classed as not answering.

The counts below include Alternative Format Responses where 1) respondents clearly indicated their comment was in response to a specific question, or 2) the research team felt elements of a response answered a specific question and analysed it as such.

Table 2: Quantitative summary of all questions

Question	Number answering (out of 48)	% of respondents answering
Q1: Does the current pipeline and level of activity in the offshore wind sector in Scotland provide a sufficient platform upon which to build the greater contribution required to achieve our climate change goals?	37	77%
Q2: Do you believe that the 2030 visions and aspirations described above are sufficiently ambitious?	38	79%
Q3: What actions do you believe should be taken by the Scottish Government, UK Government and agencies in order to realise the full potential of Scotland's offshore wind sector?	45	94%
Q4: What are the key regulatory and cost challenges facing the offshore wind sector?	35	73%
Q5: What more can the sector and other key stakeholders do to tackle these?	36	75%
Q6: What should the key Scottish priorities be in relation to Air Defence Radar, and towards radar mitigation more generally?	16	33%
Q7: What more can the Scottish Government do, working with industry and other stakeholders, to address 'knowledge gaps' in environmental assessments for potential offshore wind developments?	26	54%
Q8: What steps can be taken to improve interactions between offshore wind and other marine sectors?	31	65%
Q9: How could a competitive market framework that promotes the development of floating wind be developed whilst still retaining value for money for the consumer?	28	58%
Q10: Considering the currently available literature and analysis, what do you consider a successful offshore wind industry in Scotland in the future would look like?	27	56%
Q11: What scale of deployment would you estimate or believe to represent a successful outcome, and why?	29	60%

Question	Number answering (out of 48)	% of respondents answering
Q12: What actions should industry and government take to address the issues described in this section and ensure the most positive future position for offshore wind in Scotland?	32	67%
Q13: What areas of the Scottish supply chain do we excel at, and what could we do better?	21	44%
Q14: Where are the new areas that Scotland can develop and exploit a competitive supply chain advantage?	22	46%
Q15: What are the main challenges a company faces when tendering for a contract?	14	29%
Q16: Subject to procurement law, what more should government and its agencies do to assist the supply chain secure contracts?	22	46%
Q17: What are the key skills issues and gaps facing the sector over the coming years, in the short and medium term?	20	42%
Q18: What more should government and the sector do to build on the progress made in recent years?	21	44%
Q19: What can Scotland learn from the approach taken in other countries around the world in this area? Are there examples of best practice you can share?	16	33%
Q20: What can the Scottish Government most usefully and feasibly do to build on the innovation support previously and currently available?	27	56%
Q21: How can we support technologies and developments which reach a viable stage between leasing rounds and Contract for Difference (CfD) auctions?	19	40%
Q22: Where respondents believe that scope remains for innovation in fixed offshore wind, what areas should be prioritised?	22	46%
Q23: What actions should be taken to address the key challenges facing the uptake of commercial scale floating in Scotland?	23	48%
Q24: What can be done, on the part of government and / or others, to strengthen and benefit from the synergies with a) hydrogen and b) the oil and gas sector?	26	54%

Appendix 2: Other comments

Q1: Does the current pipeline and level of activity in the offshore wind sector in Scotland provide a sufficient platform upon which to build the greater contribution required to achieve our climate change goals?

Support for OWPS

- One acknowledged the importance of the Climate Change Act in signalling Scotland's ambitions for offshore wind to the international market.
- One respondent discussed the SG's regulation of conditions applicable to Tier 1-3 contractors and sub-contractors and called for greater employment opportunities for Scottish workers. They suggested that depending on imported workers would impinge the achievement of the minimum target of 8GW.

Ambition in targets

- A suggestion that Scotland should be aiming for a 40 to 45% share of the UK target which would require deployment of 30 – 35 GW by 2050, requiring an increase in deployment of projects.

Action to meet workforce and supply chain development goals

Singular comments on this theme included:

- The creation of a local content clause in planning applications to provide guarantees for employment opportunities in development, production, and manufacturing within local communities. The same respondent encourages the SG to consider planning applications including environmental and local content clauses on top of the existing Environmental Statement required and the application of significant weighting during the contract procurement process.
- Arguing that a mechanism in the CfD would reflect total value added to the Scottish supply chain and therefore promote local investment.
- Implored the SG to seek diversification of other, experienced companies and new technologies including commercial scale floating wind, to reduce costs and offer associated opportunities to develop the local supply chain.
- The NURTM provided a detailed response urging the SG to: define the offshore wind supply chain to include all vessels engaged from planning to decommissioning; extend collective bargaining and a supply chain wage floor of the real Living Wage of £9.30 per hour as part of the Supply Chain Development Statement required by Crown Estate Scotland's ScotWind Leasing process and as a condition of membership of offshore wind clusters such as DeepWind and Forth & Tay; and, to commit to build the offshore wind skills base by training and employing Scottish workers across the offshore wind supply chain, including shipping support services with an aim for 100% Scottish or UK 'content' in these contracts.

- A suggestion the SG should take a holistic view, especially considering the COVID-19 pandemic, to include fishing in renewables planning.
- One respondent urged the SG to assure a revenue stabilisation mechanism.

Actions to meet goals in relation to infrastructure and planning

- A need to develop and increase electricity storage for Scotland was discussed, while also considering exports to other UK jurisdictions and Europe.
- For wind farms built solely for producing green hydrogen via electrolysis.

General comments about Scotland's renewables sector

Singular comments included calls for: the clearance of projects within migratory lanes; that the SG should return investment on fossil fuels instead; that the current pipeline and level of activity are insufficient to meet climate change goals; and for further investment and effort in environmental monitoring and research to understand the risks to the expansion of offshore wind.

Other comments

Comments not related to the themes above included:

- Two calls for the SG to consider moving to a model of public ownership or control.
- Crown Estate Scotland welcomed the coordinated approach of consulting on the two plans simultaneously and called for further development of policy hierarchy within offshore wind. One respondent advocated coordination between Marine Scotland and CES on the location of existing cable infrastructure.
- One described a rolling site award process enabling 10GW of new development opportunities into the pipeline every two years from 2020 to 2030 with the opportunity to extend, alongside an adequately resourced consenting process.

Q2: Do you believe that the 2030 visions and aspirations described above are sufficiently ambitious?

Calls for more ambitious targets

- A suggested increase to 10-15GW, but acknowledging this would depend on the capacity of developers among other factors. They suggested that outlining this increased target in the vision would provide an appropriate basis to work from.
- One respondent suggested 20-30GW by 2045.
- One other respondent's view was that Scotland should aim for 40% to 45% of the proposed 75GW by 2050, which would be 30GW-35GW.

Calls for more ambitious visions and aspirations

- One outlined four goals⁴ they implored SOWEC to include in its 2030 aspirations and visions. They requested the consideration of UN Sustainable Development Goals and European Commission Precautionary Principles in the visions.
- Another welcomed the vision but noted the new 2045 emissions target would require a faster pace of emissions reduction by this date. They also felt a longer-term target with increased capacity would be necessary.
- One respondent argued more ambition this would accelerate Scotland's ability to meet targets while enabling competitiveness in international markets and promoting economies of scale. They suggested these targets should be regularly reviewed, and revised if necessary, to keep Scotland on track to decarbonise and to take account of changing market circumstances.

Expressions of support for the visions

- Singular comments included support for: the targets of 8GW by 2030 and the 10GW potential outlined in the Draft SMP; the seabed leasing selection criteria adapted by Crown Estate Scotland for ScotWind; and, the focus on sites with deeper water and the discussion around floating wind.
- One commented it would decarbonise Scotland's economy through offering affordable electricity and energy.

Expressions of support with calls to action

- One respondent commented that there would need to be support at a policy level for the visions to be viable. Another supported the visions but noted there the need to consider the consequences to the environment and fishing industry.

Calls for specific timelines in relation to planning

- Singular suggestions included: that the ScotWind leasing process would need to be delivered quickly and efficiently to meet targets; that new projects from leasing rounds beyond 2020 would be unlikely to contribute to achieving targets until the project timeline is significantly shortened; and, that ambitions and visions should be outlined up to 2045 as this would provide clarity about aligning with other policies.

Collaboration between industry and the Scottish Government

- A respondent described the importance of floating wind being cost-competitive with other technologies, including offshore wind, by 2030 and suggested this could be

⁴ 1. To protect valued seascapes and landscapes through ensuring windfarms and associated infrastructure (including onshore infrastructure to transport electricity) are sensitively designed and sited. 2. To protect cultural heritage sites. 3. To ensure that offshore wind activity is sustainably managed to protect wildlife, biodiversity and marine ecosystems. 4. Work to develop mechanisms for better protecting the marine environment, including developing a comprehensive and well-managed network of Marine Protected Areas (MPAs) and High MPAs covering at least 30% of Scottish seas by 2030. MPAs and high MPAs are an effective way to, where required, help marine life and seabeds recover and encourage biodiversity (Marine Conservation Society 2019).

achieved by utilising existing expertise in fixed offshore wind and the competence and experience from the oil and gas sector.

- Another gave a detailed response proposing the creation of a publicly owned energy company. This response is discussed in the analysis of question 3. They suggested the creation of this company will require collaboration with the Scottish National Investment Bank to deliver an industrial policy for the offshore wind sector.

Other comments

Other singular comments not in the above themes included:

- That the targets suggested in the vision were too ambitious to be met.
- A suggestion that the vision should consider offshore wind farms built solely to produce hydrogen.
- A recommendation that the OWPS is condensed into an outline vision for the future of offshore wind in Scotland and that issues requiring further consideration are set out in an accompanying “road map” outlining how the vision will be delivered.
- Dissatisfaction with SG’s consideration of the UK’s Carbon Capture, Storage and Leak (CCS-LEAK) plans.

Q3: What actions do you believe should be taken by the Scottish Government, UK Government and agencies in order to realise the full potential of Scotland’s offshore wind sector?

CfD

One highlighted opportunities for promoting the development of green hydrogen through the CfD regime, suggesting this would create further revenue. Another suggested fixed deep water (50+meter) sites should also be considered as eligible to support development in challenging locations that could be delivered by fixed, floating or hybrid solutions.

Supporting the Scottish supply chain

- One trade union urged the SG to use the ScotWind Leasing process to reinforce commitments by developers and supply chain companies to recognise domestic trade unions, including those organising seafarers. They would like to see the Real Living Wage as the legal baseline for pay in the supply chain for all fixed and floating offshore wind farms in Scottish waters. One energy company stated that they supported the Scottish supply chain already and would continue to do so.
- Another respondent highlighted benefits of focusing on the region around Aberdeen as having potential to contribute significantly to export ambitions.

Exploring and amending regulations

- One respondent highlighted the necessity of a consistent approach to environmental assessment across the UK, particularly in relation to ornithology, to ensure Scotland's ability to compete in the market.
- Scottish Renewables called for departments and delivery bodies in Scotland and across the UK to be appropriately resourced to support the Government's ambitions and to deliver within an appropriate timescale. They suggested engagement would be required from Scottish Natural Heritage (SNH), the Scottish Environmental Protection Agency (SEPA), Marine Scotland, Local Planning Authorities (LPAs) and Heads of Planning Scotland (HoPS).
- One highlighted the current barriers to investing in renewable electricity generation across the north of Scotland; Transmission Network Use of System (TNUoS) and called for this to be reviewed.
- Another stressed that the regulator should support the continuation of uncertainty mechanisms as these are important to protect consumers from unnecessary investment and to meet net zero targets.

Collaborative working with industry

Singular comments on this theme included:

- Suggestions for the development of an industrial plan for floating wind through collaborating with the industry sector and for the SG to lead collaboration which should include offshore wind developers, CCUS and Hydrogen developers, CES and regulators (OFGEM and the OGA). One went further to request joint studies from the OFGEM and OGA to investigate possible synergies and highlighted early barriers to co-location. They suggested a specific area which has been signposted to the SG for consideration.
- A call to work with Ofgem and BEIS create a new approach to the development of grid infrastructure to integrate offshore wind into the energy system.
- Crown Estate Scotland requested close working with the SG to oversee the Offshore Renewable Energy Catapult (OREC) to contribute to overcoming the challenges associated with offshore wind connection and system costs in Scotland. They called for practical action on this topic detailed in the final Policy Statement.
- An Energy Company requested collaboration with stakeholders to reduce barriers to project delivery. They highlighted this would include examining the location of existing and consented infrastructure to ensure this is considered and mitigated during survey and design work for future leasing sites.

Regular seabed leasing

- One called for the SG to realise the full potential of the sector by concluding the ScotWind leasing process to offer a fresh pipeline of development opportunities.

- Crown Estate Scotland outlined their plans for the leasing process. This has been signposted to the SG for consideration.

Collaborative working with environment and marine stakeholders

- One called for a fundamental review of the approach to developing and constructing offshore grids. Another suggested an impact assessment could be achieved by conducting studies with shared responsibilities from stakeholders, and by setting out a plan for a derogation process.

Decarbonisation

- One welcomed the Ofgem decarbonisation programme action plan. Another would like to see the SG develop a carbon calculator for offshore wind.

Specific UK government actions

- One asked for consideration of differentiating between fixed bed and floating wind in the CfD process with a separate strike price for floating.
- One outlined ways the SG can support the UK Government in achieving cost reduction and scale. These involved collaborating to develop a competitive market framework, planning and leasing processes around all UK jurisdictions should allow for commercial floating wind sites, looking to identify joint investments in infrastructure when developing floating wind.
- One energy supplier encouraged the UK Government to undertake assess whether policy and market design is fit for purpose via the Energy White Paper due in 2020, and urged the SG to collaborate with the UK Government on this.

Wildlife concerns

- One call for ensuring constructions are 50km away from migratory bird lanes.
- Instead of the current presumption that all installations and structures are removed at the end of their operational life, one respondent would like the SG to assess on a case by case basis what decommissioning options would deliver the best outcomes for the marine environment and wildlife.
- One environmental charity/campaign group outlined ways in which the developmental process would continue to contribute negative environmental impacts. They suggested that more manufacturing work should take place in Scotland to minimise the impact and that integrating environmental costs at procurement stage could contribute to mitigating these.
- One call for the SG to develop clearer processes if derogations are required at the Plan and Project level, and how this will apply across all UK jurisdictions where the same species may be affected.

- One respondent left a detailed response outlining a series of actions for the SG to consider when expanding offshore wind capacity in Scottish waters to avoid important areas for wildlife.

Capitalising on existing expertise

- A few respondents suggested that the SG should further consider capitalising on existing expertise. In most cases this was in relation to floating wind.
- One respondent suggested that cost reductions for floating wind can be achieved by tapping into skills already present. Another suggested there would need to be sufficient knowledge and expertise present within key stakeholders like; SNH, SEPA, LPA's and HoPS. Another wished for the SG to recognise Aberdeen as a key resource for Scotland when considering trade development and local investment.

Public ownership/control

- One suggested that central to this would be the role of a publicly owned energy company and the Scottish National Investment Bank, outlining these need to have a focus on climate change and a Just Transition. Another would also like to see more government intervention, suggesting financial support and an application of statutory powers to facilitate the growth of local supply chains, investment, and mandate research and development.

Other comments

- There were several other singular responses or calls to action that did not align with a common theme. The calls for action asked; that the SG needed to act urgently to ensure that the publicly owned energy company and the Scottish National Investment Bank are established to deliver an industrial policy. Another call to action was that the offshore wind sector and for the final OWPS considers ongoing policy development related to Scottish infrastructure development by the Infrastructure Commission for Scotland, the work associated with developing National Planning Framework 4 or Ofgem's Decarbonisation Action Plan.
- Two respondents called for clarity; one in relation to the SG's priority areas for innovation in the final Policy Statement to help ensure that activities can be targeted accordingly, in alignment with government priorities. The other would welcome clarity on the process for the HRA in respect of derogations, and the role of the Advisory Group. Another respondent called for evidence-based assessments to allow robust conclusions under HRA's to be made.
- One suggested wind power, both onshore and offshore, is given consideration in the final OWPS particularly regarding its relationship to infrastructure plans for related sectors such as heat and transport.
- A final comment was calling the SG to reject Carbon Capture Storage and Leak (CCS-LEAK) projects such as Acorn at St Fergus.

Q4: What are the key regulatory and cost challenges facing the offshore wind sector?

Comments made by two respondents included:

- Calls for workforce protection: one noting construction should take place in Scotland for the benefit of Scottish workers, and a detailed response for review by the SG discussing employment conditions and immigration
- Requests for appropriate, effective, and creative use of the existing regulatory regime for development and protection of the marine environment i.e. the marine planning regime through the Marine (Scotland) Act 2010.
- Demand for shallower water sites.

Three responses included detailed discussions around specific points which have been signposted to the SG for review. These covered consenting and leasing, Anticipatory Network Investment and a reference to the RenewableUK OCLG Barriers to Growth working group.

Singular comments around challenges included: the need to develop a pipeline of projects to encourage investment in technology; uncertainty on timelines for the consenting process; the need to ensure sufficient ports and harbours are available to support the development of the supply chain; a comment around the industry citing cost challenges as a reason why they should use international rather than domestic supply chains; the need to ensure any drive to cut costs does not lead to a deterioration of health and safety standards; the cost to the UK in terms of expertise and economic benefit when projects are completed overseas; and, the need for storage solutions.

Other individual comments suggesting actions included: a call for the SG to support the fisheries sub-group within SOWEC to complement the work of Marine Scotland; a call to eliminate subsidies for wind power; and, a detailed response related to decommissioning and recycling costs.

Q5: What more can the sector and other key stakeholders do to tackle these?

Points mentioned by two respondents included encouraging the co-ordination of UK wide or cross-sectoral initiatives to avoid any duplication of effort and support for Ofgem's Decarbonisation Action Plan.

Other singular comments included: a call to invest in Bifab; a suggested focus on integrated energy system models; support for SOWEC and the Offshore Wind Sector Deal; the challenge of developing a pipeline for floating offshore; a suggestion that mapping of existing and consented transmission infrastructure on constraint maps so this can be identified at the early stages of a development; and, a call for strategic cabling and grid connections. Referring to the consultation question, one stated that it was a matter for the Government, not the sector to tackle the issues facing the sector.

Q6: What should the key Scottish priorities be in relation to Air Defence Radar, and towards radar mitigation more generally?

Other comments included:

- Two requests that the SG complements regulatory evolution at Westminster through the Scottish planning system.
- Two related to cost: that the cost for a long-term solution are shared by developers and Government departments and that the solution needs to be low cost
- One noting the impact on birds needs to be considered in relation to radar.

Q7: What more can the Scottish Government do, working with industry and other stakeholders, to address 'knowledge gaps' in environmental assessments for potential offshore wind developments?

Comments provided by two respondents included:

- Steps which could be taken to identify, review and update knowledge gaps relating to the ecological impacts of offshore wind.
- Specific comments on funding; one that adequate funding should be available and another that developers should be obliged to carry out and fund work to fill knowledge gaps which are identified.

Other singular responses included:

- Calls for the SG to: urgently provide clarity on the potential for development on the DPOs currently under moratorium; "explore the potential for Scottish projects to follow the derogations route under the Habitats Regulations"; work with environmental charities; and work with trade unions to overcome issues relating to training for staff transferring from offshore oil and gas to offshore wind
- One called for the experience of those who already successfully conduct offshore environmental assessment to be harnessed.
- One highlighted that environmental protection may raise public trust in the industry.
- One suggested a committee with power to assess fines and/or criminal penalties.

Q8: What steps can be taken to improve interactions between offshore wind and other marine sectors?

Comments provided by two respondents included:

- The need for joint working on technical and operational solutions, including knowledge sharing. One provided a detailed response which has been signposted

to the SG for review, suggesting best practice guidelines for knowledge exchange and collaboration.

- Comments related to interactions with the fishing industry. One highlighted the need to resolve issues such as abandoned fishing gear and mitigation measures for disruption to fishing. The other called for greater transparency in, and regulatory oversight of, consultations with the sector.

Other singular responses included:

- Calls for: a Marine Nature Fund to strengthen relationships between users; community support funds linked to specific offshore wind projects; and greater clarity about the interrelationships with terrestrial planning.
- A detailed comment calling for a detailed industrial plan to facilitate staff transitioning from oil and gas to offshore wind.
- A concern regarding the exclusion zones around floating turbines.

Q9: How could a competitive market framework that promotes the development of floating wind be developed whilst still retaining value for money for the consumer?

Two called for future marine spatial planning and leasing processes around the UK to allow for commercial floating wind sites to be made available, and one for a commitment to regular seabed leasing rounds that make available commercial floating wind sites.

Many of the other responses to this question called for specific actions. These included two calls for a more co-ordinated a regulated workforce supply chain which supports UK industry, and two calls for a specific target for floating wind for 2030 (one suggested 2GW).

Other singular responses included calls for: projects in +50m water depths to have the opportunity to bring forward hybrid solutions under any future regime to help offset the financing risk of large-scale floating projects; that consideration should be given to how CfD could be adapted to incentivise green hydrogen production; to secure a floating pipeline to encourage investment; investment in infrastructure; and support for offshore wind innovation in Scotland.

Q10: Considering the currently available literature and analysis, what do you consider a successful offshore wind industry in Scotland in the future would look like?

Less frequently expressed views on a successful offshore wind industry included:

- General comments, such as for offshore wind to maximise its supply of all sustainable energy for Scotland or to help meet energy demands.
- One respondent called for the creation of a North Sea Grid

- A suggestion from one respondent that there should be no wind farms at all, advocating for a focus on oil and gas instead.

Q11: What scale of deployment would you estimate or believe to represent a successful outcome, and why?

Less frequent comments in the discussion on rates of deployment for the offshore wind industry included:

- A suggestion from one respondent that there should be no wind farms deployment at all, advocating for a focus on oil and gas instead.
- Aberdeen City Council noted their support for the inclusion of the Draft Plan Options in the East and North East Zones.

Q12: What actions should industry and government take to address the issues described in this section and ensure the most positive future position for offshore wind in Scotland?

There was one suggestion that a holistic approach to the Regional Locational Guidelines would achieve the best result.

Q13: What areas of the Scottish supply chain do we excel at, and what could we do better?

The singular comments about the areas in which the supply chain excels were as follows:

- Existing infrastructure like cable laying, trenching, mooring and electrical controls.
- Logistics, emergency response plans, standards, health and safety and training.
- The subsea supply chain in relation to existing expertise created as a result of offshore O&G.
- That Aberdeen is seen as a centre for excellence internationally and this should continue with the deployment of hydrogen energy and its transport applications.
- One respondent specifically mentioned strengths in geotechnical and geophysical activity as well as oceanography and meteorology. Another highlighted innovations in foundations, cabling, interconnectors, production optimisation, data and communications, surveying, asset development and environmental mitigation.

Singular comments about where the supply chain can improve included:

- Meeting the demand for better ports for construction marshalling bases. Ensuring they are large and deep enough, with good infrastructure connections and located near other services to support construction requirements.
- Developing a hydrogen economy to ensure Scotland remains a leader in the deployments of hydrogen and its transport applications. This could be facilitated through the investment in producing hydrogen at offshore wind facilities.
- Manufacturing technology for surveying and maintaining light detection and ranging (LiDAR) as this is currently imported.

Q14: Where are the new areas that Scotland can develop and exploit a competitive supply chain advantage?

The singular themes in response to question 14 were as follows:

- Increasing manufacturing to capitalise fully in the fixed bottom market.
- A call to demonstrate new technologies for the floating wind market.
- The consideration of employment rights within the OWPS was called for by one respondent. They would like to see all trade unions included in the next SG summit and argued for recognition rights for supply chain operators, including the shipping, offshore technician, and contractor workforce.
- A request for further innovation in data processing and artificial intelligence in SUV's and autonomous vehicles.

Q15: What are the main challenges a company faces when tendering for a contract?

Challenges outlined by one respondent were:

- The short turnaround time at the early stages of a project to understand requirements before submitting a potentially complex response to a tender exercise.
- An issue relating to underwriting liabilities. This respondent would like to see bodies like UK Export Finance or the Scottish Investment Bank offer a service to help suppliers get to UK purchasing bodies.
- One respondent outlined their approach to maximising opportunity for timely and cost-effective delivery of projects; a 'supply chain alignment model'. They suggested it could be rolled out by all developers entering ScotWind and coordinated to ensure a structured programme of engagement between projects and local suppliers.

Q16: Subject to procurement law, what more should government and its agencies do to assist the supply chain secure contracts?

Suggestions outlined by one or two respondents included:

- Two respondents requested that whole life carbon costs should be included in the assessment of project tenders to give local suppliers an advantage.
- Encouragement for the SG to consider the socio-economic impact of tenders run by developers, ensuring they are held to account if benefits in tenders not be delivered.
- A call for more focus on lower tier supply chain capabilities.
- Ensuring universities teach students the skills necessary for the supply chain.
- A request for government to provide guarantees to companies with a 'weak balance sheet'.
- Guaranteeing that 80% of content in project work is derived from the UK.
- Consideration of how procurement will change because of EU Exit and how this will impact subsequent relations with trade partners.
- Adaption of the Offshore Wind Supply Chain Development Statement to include a regulation for Scottish workers to covered by collective bargaining agreements with UK trade unions in the Tier 1-3 contractor supply chains during all project phases.
- Offering flexibility in existing procurement strategies run by developers and reducing previous experience proof requirements was suggested to assist the supply chain.
- Introducing an assessment in leasing rounds of the carbon impacts of the manufacture, transport, and construction of all bids.

Q17: What are the key skills issues and gaps facing the sector over the coming years, in the short and medium term?

Singular comments included:

- A comment that the issue is not a skills gap but the lack of small business being allowed to tender and be awarded work.
- The difficulties of sourcing the right skills mix, especially in STEM and given the competition with other large infrastructure projects such as High Speed 2.
- A request to properly resource public bodies such as Scottish Natural Heritage and Marine Scotland.
- A call to end waivers from immigration rules provided to the industry by the UK Government for non-EEA crew to work on construction.

- One highlighting the recommendations in a report by Energy & Utility skills.
- One who expressed their belief that if jobs are created then the required skills will follow, and that any existing gaps are not seen as constraining future growth.

Q18: What more should government and the sector do to build on the progress made in recent years?

Comments provided by two respondents included:

- Suggestions to attract more young people to the industry, such as high-profile campaigns highlighting the potential for a lifetime career, apprenticeships and sector representatives pairing with educational organisations.
- Calls to support the development of local supply chains.
- Ensuring Scottish / UK firms have proper share of the supply chain.
- The need to promote opportunities and vacancies in the energy sector.
- Factoring in competition for skills with other industries such as water production and food and drink. Similarly, another commented on the need for a holistic approach across the education sector considering all economic activity in Scotland.

Singular comments included:

- Individual calls for: more early stage engagement between SG and communities; a reduction in the timescales of major offshore developments; the establishment of an 'excellence programme' bringing together the best individuals from offshore wind and other industries; and, public ownership, direction and control of the industry to ensure Scotland benefits from the transition to green energy.
- Challenges to building progress, such as cuts to education, the lack of a coordinated lifelong learning programme in the UK.
- Support for increasing gender diversity and BAME representation and a request that campaigns to address these issues are monitored for effectiveness.
- Creating a transparency platform where useful non-confidential information about offshore wind is uploaded for research or analysis – to promote best practice and improve cost-effectiveness.
- Three respondents provided a very similar comment which went beyond the scope of question 18 by highlighting other actions for Scottish Government. One respondent gave the same response to questions 17 and 19. These highlighted priority areas for innovation and cost reduction: disseminating lessons learned to the industry, increasing use of automation for inspection and repairs e.g. use of drones, minimising the use of material (steel and grout) on fixed bottom structures,

and creating support structures and target groups for floating offshore wind to facilitate supply chain development.

Q19: What can Scotland learn from the approach taken in other countries around the world in this area? Are there examples of best practice you can share?

Two respondents commented on research: one asked the SG to take account of the findings of Vattenfall's European Offshore Wind Deployment Centre's (EOWDC) Research Programme, and from the St Abbs Research Station; the other argued for more research into this area so learnings could be promoted in the industry.

Singular comments included:

- Potential learnings from adult education provision in European countries.
- A call for the UK and Scottish Governments to urgently explore the potential to devolve CfD to Scotland.
- Highlighting other examples in UK industry where 'gold-plating' the workforce will add further cost and barriers to workforce mobility.
- A request to consider skills growth as a sector.

Q20: What can the Scottish Government most usefully and feasibly do to build on the innovation support previously and currently available?

Two respondents made specific comments in relation to collaboration in research. One suggested initiatives to de-risk their application and bridge the gap to commercial adoption. Another called for closer alignment between innovation activities in the oil and gas and offshore wind sector to ensure synergies can be realised to the benefit of both.

Two organisations based in Aberdeen asked the SG to recognise and support the OGTC as a 'technology bridge' between the O&G and offshore renewables sectors.

Singular responses to question 20 included:

- One respondent left the same detailed response to questions 20 and 21, where its two main points were highlighting a lack of long-term revenue payments for pre-commercial floating wind projects and an over-reliance on EU innovation support, access to which is under threat from EU Exit. This response has been signposted to the SG.
- One argued for the SG to enable SMEs to tender for projects. This respondent made the same call in questions 21 and 22.
- There was support for the SG's willingness to consider test and demonstration projects as providing a significant opportunity for Scotland's commercial position.

- One urged the SG to ensure appropriate recycling would take place after decommissioning, specifically to consider foundation types or designs that would facilitate removal or repowering.
- A suggestion for campaigns to raise awareness and understanding of the offshore wind industry with the public.
- One specifically called for investment in a building programme for foundations, jackets, turbines, and vessels.

Q21: How can we support technologies and developments which reach a viable stage between leasing rounds and Contract for Difference (CfD) auctions?

Two respondents recommended that the SG should consult with industry technology developers, including the OGTC, and suggested that a partnership approach could support development.

Singular comments were made in response to this question, including:

- A desire for the creation of a publicly backed developer, allowing innovation to flourish without the price guarantees and incentives needed for private sector firms.
- That the CfD framework is too rigid in its approach to development, urging the UK Government to recognise that a broader strategy emphasising innovation is necessary to achieve targets.
- Requests for oversight to ensure that key bodies do not monopolise investment, and to facilitate demonstration sites between leasing rounds.

Q22: Where respondents believe that scope remains for innovation in fixed offshore wind, what areas should be prioritised?

Two responses were received on each of the following development issues:

- Streamlining fabrication to be developed by automated welding.
- Corrosion protection.
- New technology that safely lifts technicians onto wind turbine platforms.
- Requests for the SG to prioritise the automation of inspections and repairs. One suggested that this could link to the introduction of artificial intelligence and unmanned autonomous vehicles.
- Suggestions that deep-water technology should be supported as shallower and closer sites reduce. One also requested this innovation should follow the expertise of North Sea installation in the offshore O&G industry.

- That fixed projects are still in the early stages of development due to changing deployment conditions and market demands. Respondents requested continued innovation in this area and point out that innovation can mean improvement to current technology as well as new creation.
- For the SG to collaborate with the developers when considering innovation.

The other singular comments in relation to this question included requests for:

- CCTV monitoring to prevent harm to wildlife, specifically bat and bird populations.
- Innovation in digitization, robotics, and subsea engineering.
- The development and deployment of new technologies which enable large scale storage and integration of electricity.
- Synergies with the O&G sector supported by offering the transfer of skills and training of the workforce.
- Construction and installation optimisation.

Q23: What actions should be taken to address the key challenges facing the uptake of commercial scale floating in Scotland?

The comments received from two respondents are as follows:

- Offers of support for the SG in their suggestion of creating a floating wind specific CfD mechanism.
- Requests for the SG to create an environment around floating wind that reduces risk and creates more certainty, highlighting that clarity and communication about SG ambitions and targets including consenting and lease procedures and timescales.
- Specific requests for support for deep water hybrid projects. One suggested that this could enable more timely floating deployment by being built on the back of commercial financing products for fixed assets.
- Calls for future marine spatial planning and leasing processes to extend around the whole of the UK to allow for more commercial floating wind sites.

Comments in relation to Hydrogen received from two respondents were:

- The opportunity to store hydrogen offshore and onshore in depleted fields, to balance inter-seasonal demand variations.
- More research into the potential for Hydrogen's role in the transport sector. One called for the creation of demand for renewable hydrogen by encouraging new and existing users of hydrogen to switch to renewable hydrogen.

The other singular comments in relation to this question are as follows:

- A request that the SG facilitates large scale green hydrogen production. The respondent outlined this would ensure power can be exported from projects located from areas of best resources, not just those close to existing grid infrastructure.
- One trade union expressed that employment and training opportunities for Scottish workers on floating offshore wind projects should have recognition agreements with the relevant trade unions, including in the shipping supply chain.
- There was an observation that successful field demonstration would be vital in determining whether or not industry will be able to adopt particular technologies, both floating and fixed-bottom.
- An environmental/campaign group called for an ecological survey of deeper water sites to validate the final OWPS and offer clarity environmental impacts. They would also like the SG to lead in a monitoring and research programme to achieve the scale of deployment required and reduce costs for individual developers.
- A call for the SG to support SMEs in tendering for projects, especially those who specialise in offshore floating wind.
- One requested that commercial scale areas with the potential for future phases are made available for development.

Q24: What can be done, on the part of government and / or others, to strengthen and benefit from the synergies with a) hydrogen and b) the oil and gas sector?

Two respondents urged the SG to recognise and utilise the already established synergies present in Aberdeen. They offered examples of the synergies within both hydrogen and O&G in the local authority area which have been signposted to the SG for consideration.

Singular comments in relation to strengthening and benefitting from synergies in hydrogen:

- A request that sites should be assessed based on their suitability to support both wind and hydrogen operations.
- One highlighted an opportunity for diversifying Scotland's hydrogen output, suggesting the production through water electrolysis which is integrated into an offshore wind turbine installation and transported ashore via pipelines or ships.
- A suggestion that excess hydrogen could be sent abroad to help establish Scotland as an international supplier of hydrogen.
- The potential for harnessing hydrogen energy to heat Scottish homes, which could reduce the carbon footprint of the energy sector.

Singular comments in relation to strengthening and benefitting from synergies in O&G:

- One trade union urged the SG to consider the carbon imprint of hydrogen production. They gave examples of where this had not been done successfully.
- Requests for: the SG to make relevant areas of seabed available; links between offshore wind and O&G sectors are maintained through Offshore Renewable Energy Catapult and Oil and Gas Technology Centre; and, that publicly funded projects make their results openly available to facilitate knowledge exchange.



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