
Offshore Wind Policy Statement



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Ministerial Foreword



When we published our draft Offshore Wind Policy Statement in late 2019¹, I highlighted Scotland's global leadership in the face of a climate emergency. I also talked about our commitment to achieve the most ambitious, statutory climate targets anywhere in the World – which we set out in our landmark Climate Change (Emissions Reduction Targets) (Scotland) Act², passed in September 2019.

That Act commits us to reach net zero emissions of all greenhouse gases by 2045, ahead of the UK target of 2050. It includes bold interim targets to reduce emissions by 75% by 2030, against a 1990 baseline, and to reduce emissions by 90% by 2040. These targets are in line with what is required to meet Scotland's commitments under the 2015 Paris Agreement, to limit global average temperature increases to 1.5 degrees Celsius or less.

The targets represent a huge shift away from established norms, and the way in which we live and work. The Scottish Government's focus on ensuring a Just Transition³ – considering and involving the people of Scotland in discussions and decisions about these changes to our homes, communities and lives – is a major component of our net zero efforts.

Meeting our hugely challenging climate change targets will require developing as much of Scotland's renewable energy potential as possible, so that we can meet the anticipated growth in demand for low carbon electricity necessary to decarbonise Scotland's wider energy system. This will require progress in areas such as the energy needed for domestic and industrial heat supplies and our transport systems, as discussed in Scotland's Energy Strategy in 2017⁴. Early next year we will publish a refresh of Scotland's Energy Strategy – informed by our engagement with key stakeholders and recent work in areas such as hydrogen we will set out our short-term priorities along with a roadmap towards our target of a 75% reduction in emissions by 2030.

¹ <https://www.gov.scot/publications/draft-offshore-wind-policy-statement/>

² <https://www.legislation.gov.uk/asp/2019/15/enacted>

³ <https://www.gov.scot/publications/transition-commission-advice-green-recovery/>

⁴ <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/>

I have said many times that Scottish offshore wind generation will play a vital part in helping us meet this challenge, effectively and affordably, while taking into account wider environmental factors and the interests of other users of the sea. Offshore wind is one of the lowest cost forms of electricity generation at scale, offering cheap, green electricity for consumers, with latest projects capable of generating power at below wholesale electricity prices.

Our consultation⁵ underlined Scotland's huge potential resource, the work that we have been doing to develop a robust Plan, and our collaboration with the sector and stakeholders to tackle barriers, support innovation and maximise economic benefits for Scotland. The consultation also brought into sharp focus the potential for offshore wind to connect with green hydrogen production at scale adding another potential layer to Scotland's rich energy portfolio.

All of this remains true. However, as we all know, since I wrote those words last year, the World has changed in ways we couldn't have begun to imagine. We are in the midst of a global pandemic, which continues to threaten lives, and which has also caused significant damage to our economy and those of our trading partners.

While the Scottish Government works tirelessly to protect lives and livelihoods amid the global health and economic crisis, the threat posed by climate change has not gone away, and we remain committed to tackling it and decarbonising our energy system and demand. Our starting point may have been affected by Coronavirus but our ambitions have not and we are determined to drive a green economic recovery in which the potential of offshore wind is crystal clear.

Our latest Programme for Government⁶ recognises and responds to the huge economic challenges that the pandemic has created, and sets out in detail how Scottish Government's unwavering commitment and focus on green jobs. I believe firmly that our offshore wind sector will play a crucial part in this process.

That is why I want to be even more ambitious than before. The magnitude of change required to meet our targets is unlike anything we have seen before. We must aim high, while ensuring a just transition and being sensitive to the impacts on people and businesses that these changes may bring.

That is why we're moving ahead with a new leasing round, through our agency Crown Estate Scotland, and through Marine Scotland finalising a Sectoral Marine Plan (SMP) for offshore wind, which ensures that we are managing the delicate balance between delivering our net zero commitment and protecting Scotland's diverse marine environment and other marine users.

That is why we're calling for UK Government to get it's Contracts for Difference (CfD) auction and other interventions right and ensure that allocations of contracts are not done purely on price. UK Government must also consider value added to the economy and the need to respond to the climate emergency. Although our offshore wind sector has benefited hugely from the CfD mechanism in terms of cost

⁵ <https://www.gov.scot/ISBN/978-1-80004-238-4>

⁶ <https://www.gov.scot/publications/protecting-scotland-renewing-scotland-governments-programme-scotland-2020-2021/>

reduction; significant investment in infrastructure will be necessary to deliver the technology at scale and boost the domestic supply chain. There must be an avoidance of any arbitrary capacity caps that do not take heed of the urgency of the climate emergency.

That is why the required electricity connections and networks must be structured and regulated in a way that will enable, rather than hinder, these developments. We will continue to make the case to the UK Government and the regulator for necessary changes to be made. We will work constructively with all parties to make sure that future changes can be delivered in a considered and effective manner.

That is why we will continue to prioritise and maximise benefits for Scotland's supply chain and economy from offshore wind – we'll be demanding this of developers in Scottish waters. The need to maximise Scotland's economic gain from the transition to net zero has become increasingly vital in the context of a green recovery where quality, green jobs are central. I am determined to ensure that the sector plays a key role in driving this recovery, such is the scale of our offshore wind opportunity.

I am grateful to all who have taken part in the process which has led to this Policy Statement's publication. This is only the beginning of Scotland's offshore wind journey. In front of us stands the opportunity of a lifetime to create a prosperous green future for generations to come.

I hope we can continue working collaboratively to turn this aspiration into a reality in the years ahead.

Paul Wheelhouse MSP
Minister for Energy, Connectivity and the Islands.

Executive Summary

- **We believe that as much as 11 GW of offshore wind capacity is possible in Scottish waters by 2030.** Our Sectoral Marine Plan (SMP)⁷, now, and through its future updates, will set the course for this delivery, maximising deployment in Scottish waters whilst protecting marine users and our environment.
- **We will build on the launch of our ScotWind leasing round in June this year** – this offers the first round of seabed leasing for offshore windfarms in Scottish waters for a decade, with Crown Estate Scotland managing the seabed assets of Scotland to deliver on our net zero ambitions. We intend our second round to follow in 2022/23]
- **We will continue to constantly review and improve our processes.** Our response to the *Advisory Group on Economic Recovery* report⁸ confirmed that work is underway to undertake a review of the key issues facing our planning and consenting frameworks. This will aim to strengthen our natural capital and streamline our approach, while maintaining the rigour of the assessment system and the protections it offers Scotland's rich natural environment.
- **We will continue to fight for Scotland's interests across the range of reserved policy and regulatory areas that directly affect the offshore wind sector.** These include the design of the CfD regime, the approach to network design and provision, and transmission charging.
- **We will conduct a review and relaunch of our support for renewable energy innovation.** This will enable us to build effectively on the support we've delivered for innovation, research and skills development in the offshore wind sector over the past few years – with almost £10 million directed into projects since 2014.
- **We will continue to work through the Scottish Offshore Wind Energy Council (SOWEC), and through the Offshore Wind Industry Council (OWIC) to fully understand and tackle the range of significant barriers facing the deployment of offshore wind** – building the collaborations and supporting the innovation necessary to achieve this.
- **We will continue to make every effort to maximise the economic benefit from developments in Scottish waters** – protecting our indigenous supply chain and ensuring that the Scottish economy sees the full benefit of these massive infrastructure projects.
- **We will work to develop our skills landscape and supply chain** to allow Scotland to truly deliver on these projects.

⁷ <https://www.gov.scot/isbn/9781800042421>

⁸ <https://www.gov.scot/publications/towards-robust-resilient-wellbeing-economy-scotland-report-advisory-group-economic-recovery/>

- **We will continue to ensure that communities who host development, and those most affected by development, will also share in the benefits.** We are committed to a net zero economy that is fair for all, and the creation of a more cohesive and resilient economy that improves the opportunities, life chances, and wellbeing of every citizen.
- **We will continue to develop and strengthen our international relationships.** Scotland is renowned as a renewables pioneer, and also leads the world in our decarbonisation and Just Transition agendas. We will prioritise offshore activity and collaborations that promote learning and policy exchange, build upon Scotland's reputation and increase our attractiveness to international partners and ensure a flow of new investment.

Chapter 1: Overview

1. Scotland has always punched above its weight in the development and deployment of renewable energy, and, as the figures above demonstrate, remains one of the World's renewable powerhouses. This reputation was established through the construction of our hydro power generating stations during, predominantly, the second half of the 20th Century, and this continues with our current focus on both wind energy and marine renewables. Our 12,000 miles of coastline, 462,000km² of Scotland's Exclusive Economic Zone, attractive wind regime and extensive potential resources, allied to world class research and innovation, all combine to mean that few can rival Scotland in terms of what it is possible to achieve.

2. Our draft Offshore Wind Policy Statement (OWPS), published in December 2019, demonstrated that the Scottish Government has supported and promoted a positive policy landscape for renewables, balanced by a rigorous environmental impact assessment regime. These supportive policies, coupled with the efforts of investors, innovators and communities across Scotland, have seen our renewable capacity grow to 11.9 GW, according to the most recent statistics – with the equivalent of 90.1% of gross Scottish electricity consumption in 2019 met by renewable sources.⁹

3. This is why the Scottish Government plans to ensure that Scotland's long and positive association with renewables continues to go from strength to strength and is central to our green recovery. Scotland's people will be key to this, which will mean ensuring local communities can participate in, and benefit from Scotland's transition to net zero emissions. This is consistent with our response to the report in summer 2020 by the Advisory Group on Economic Recovery, which underlined the Scottish Government's commitment to invest in local and regional economies, and to support into work young people and those facing unemployment or redundancy.

4. This commitment was at the heart of our 2020/21 Programme for Government, and its promise of "a new national mission to create new jobs, good jobs and green jobs." This will be delivered through a number of initiatives, backed by significant new programmes – including £100 million over the next five years to deliver a Green Jobs Fund. This will support new and increased opportunities for green job creation across Scotland. Our £25 million National Transition Training Fund¹⁰ supports those oil and gas workers needing to retrain as they transition from high carbon occupations to roles consistent with the energy transition. The £62 million pound Energy Transition Fund¹¹ announced by the Scottish Government in June 2020 will further support our energy sector and help us make significant progress on energy transition.

⁹ <https://www.gov.scot/publications/scottish-energy-statistics-hub-index/>

¹⁰ <https://www.skillsdevelopmentscotland.co.uk/news-events/2020/october/new-national-transition-training-fund-offers-fresh-support-for-people-facing-redundancy/>

¹¹ <https://www.gov.scot/news/gbp-62-million-fund-for-energy-sector/>

2030 Ambition

5. Current statistics, as of September 2020, demonstrate the current and expected offshore wind deployment picture within Scotland ahead of the Draft Sectoral Marine Plan and ScotWind leasing round.

Current Development Pipeline

Table 1: Consented and Operational Offshore Wind Capacity

	Total Consented (MW)	Total of Installed Operational Capacity (MW)
Offshore Wind (fixed)	5532.9	862.2
Offshore Wind (floating)	92	32
Total	5624.9	894.2

6. Scotland's expertise in wind energy planning and environmental impact assessment, supplemented by the transferable skills and experience gained across our highly efficient oil and gas sector, has resulted to date in the deployment of over 150 offshore turbines. These range from innovative test and demonstration sites, such as the 30 MW Hywind Scotland, to commercial scale, including the recently commissioned, ground-breaking 588 MW Beatrice offshore wind farm. However, there is a strong development pipeline to come.

7. Our consultation asked if Scotland's current pipeline and level of offshore wind activity (see annex A) provides a sufficient platform upon which to build the greater contribution required to achieve our climate change goals. Many of the responses we received highlighted the importance of the offshore wind sector in delivering climate change targets, however, the consultation also prompted several calls for the Scottish Government to consider a higher level of ambition for 2030 than the 8 GW which that document had proposed.

8. Our consultation had suggested adopting SOWEC's vision of 8 GW by 2030 as a reasonable starting point. Now, having listened carefully to our stakeholders, we have revisited what might be possible within the coming decade. The Scottish Government continues to believe that any ambition for offshore wind deployment in Scotland – rather than a target – should be realistic and based as far as possible on expectations driven by evidence.

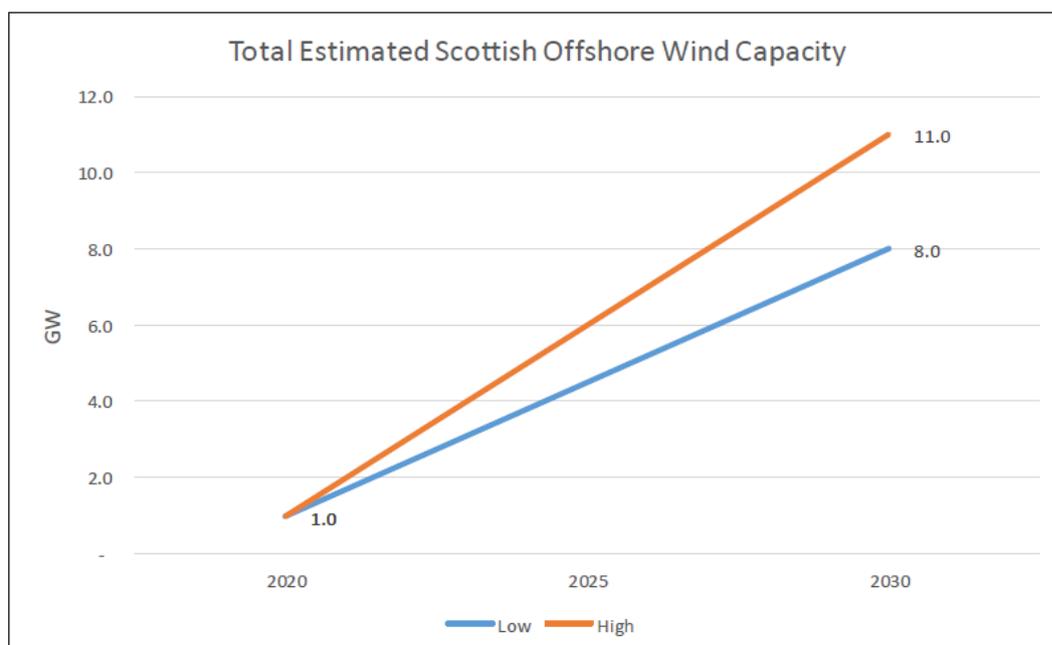
9. On that basis, we have reviewed the latest evidence, and worked with a combination of the scenarios developed and included within Scottish transmission network companies' business plans, information available through the TEC register, and the platform provided by our Sectoral Marine Plan. Taking these together, we now believe that 8 GW represents the lower end of a range that might be achieved by 2030, and that **as much as 11 GW of installed offshore capacity is possible**. Our Sectoral Marine Plan (SMP), now, and through its future updates, will set the

course for this delivery, maximising deployment in Scottish waters whilst protecting marine users and our environment.

10. Looking beyond 2030, we know that huge increases in renewable capacity and generation are likely to be needed in order to decarbonise our energy use, and to meet the potential for much greater demand for clean electricity – as well as for green hydrogen¹² – to reduce emissions associated with heat, transport and industrial energy demand as we move towards 2045 and net zero. The 2020 Future Energy Scenarios, published by National Grid ESO, includes the potential requirement for 24 GW of offshore wind capacity dedicated solely to hydrogen production.

11. We believe that this expected surge in demand will require and create a major demand for new offshore wind capacity and deployment in the years following 2030, with an associated pipeline of development and supply chain opportunities. We will be exploring these issues and potential requirements in more detail as part of imminent work to update Scotland’s Energy Strategy, following the update to the Scottish Government’s Climate Change Plan. We will also ensure that this process involves and informs clear links to future iterations of strategic planning and leasing being led by Marine Scotland and Crown Estate Scotland.

12. For now, we know that hitting the upper level of our range for 2030 would represent a remarkable achievement, and one which we know will require a huge amount of effort and investment. It will also require the right levels of support, from the right design of market mechanisms and innovation support, skills and knowledge building, and the successful removal of barriers to development. The rest of this document looks at these areas and discusses potential ways forward.



¹² <https://www.nationalgrideso.com/future-energy/future-energy-scenarios>

Contracts for Difference (CfD) / Routes to Market

13. Many of our OWPS consultation responses highlighted planned amendments to the UK CfD mechanism, especially in the context of floating wind. There is no question that, as a less-established technology, floating offshore wind will require further demonstration projects to drive down costs.

14. The Scottish Government does not have powers to provide revenue support for the commercialisation of less established technologies. Scottish Ministers have consistently, over many years, pressed the UK Government to ensure that the CfD mechanism and auction process is used as effectively as possible in pursuit of the new capacity. This capacity will be essential for our net zero and decarbonisation ambitions and presents significant supply chain development opportunities. While offshore wind costs have been dramatically reduced through successive auctions, this has happened in the shadow of other technologies' exclusion or marginalisation. It has been clear for some time that further change was essential.

15. The UK Government's recent CfD consultation¹³ proposed a reversal of some of the previous changes which had stifled renewables development and investment. While welcoming those proposals, in our own response, we also confirmed the Scottish Government's belief that the proposed introduction of a separate technology pot for floating offshore wind was an overdue change. This could help ensure that a high capacity of offshore wind can continue to secure a CfD at an affordable cost, while providing a potential route to market for higher cost floating technologies. These technologies offer a very significant route to decarbonisation while also constituting a particular supply chain opportunity for Scotland.

16. However, we also believe that the effectiveness of the CfD mechanism risks being blunted in the event that its design for forthcoming auctions includes unnecessary financial or capacity "caps". The National Infrastructure Commission (NIC) has recently increased its recommended UK renewables deployment target from 50% to **65%** by 2030¹⁴. The Scottish Government not only welcomes this increase in ambition, but also agrees strongly with the NIC's view on the importance of a refreshed and effective CfD auction plan and pipeline to delivering the capacity and investment necessary.

Community Benefits / Engagement

17. Our response to the CfD consultation also highlighted the importance of more and meaningful engagement with communities about the effects and benefits of increased renewables development. The proposal to share best practice is one that we welcome, and is – as we pointed out, and the UK Government has acknowledged – an area where the Scottish Government has been working in effective collaboration with communities and the energy sector for many years.

¹³ <https://www.gov.uk/government/consultations/contracts-for-difference-cfd-proposed-amendments-to-the-scheme-2020>

¹⁴ <https://nic.org.uk/app/uploads/Final-Renewables-Recovery-Reaching-Net-Zero.pdf>

18. We published our Good Practice Principles for Community Benefits from Offshore Renewable Energy developments¹⁵, in 2018, in collaboration with the renewables sector. This was done following consultation, and set out national standards on community benefits, which we encourage renewable energy businesses and communities to use.

19. This document acknowledges the success of community benefits to date, recognises the value of a more flexible and holistic approach to community benefits discussions in the future, and places a greater focus on achieving a lasting legacy for local communities, underpinned by a well-developed community action plan.

20. Some examples of these community benefits include:

- **The Robin Rigg Community Fund (RWE)**¹⁶, extended from its initial 10 year period for a further two years from 2020 to 2022, benefitting local communities along the Solway coast. In 2020, over £120,000 was awarded to 19 organisations in Dumfries and Galloway and Cumbria. Several of these were green infrastructure and community hall projects.
- **The Beatrice Fund (SSE Renewables)**¹⁷, which has included a £40,000 grant towards an educational heritage centre.
- **The Unlock our Future Fund (Vattenfall)**¹⁸, supporting charitable activity that focuses on environmental sustainability and encourages innovative projects which ensure a lasting legacy and impact. Over £124,000 of funding has been announced in 2020. An example of this funding in Central Aberdeenshire, is the Alford District Men's Shed¹⁹ which was awarded £15,000 to further develop their existing renewable energy system, including solar and thermal battery storage, increasing capacity and optimising the use of renewable energy they already use on site.

21. The Scottish Government clearly seeks to encourage the establishment of community benefit funds, but also encourages renewable energy developers to offer local communities the opportunity to take a stake in schemes. Shared ownership can help promote stronger relationships between local communities and the renewable sector, and deliver lasting economic and social benefits to communities. We believe that successful renewable energy projects are those which treat communities as active and positive partners, and are encouraged that most developers are offering shared ownership as standard.

Sectoral Marine Plan for Offshore Wind Energy (SMP)

22. The Sectoral Marine Plan sets out a strategic spatial vision for future commercial-scale offshore wind energy development up to 2030 and beyond. It provides a spatial strategy through the identification and assessment of 15 Plan

¹⁵ <https://www.gov.scot/publications/consultation-scottish-government-good-practice-principles-community-benefits-offshore-renewable-energy-developments/>

¹⁶ <http://thirdsectordumgal.org.uk/funding-robin-rigg-community-fund/>

¹⁷ <https://www.sserenewables.com/communities/community-fund-locations/great-britain/beatrice-partnership/>

¹⁸ <https://www.foundationscotland.org.uk/programmes/unlock-our-future-fund/>

¹⁹ <https://www.foundationscotland.org.uk/news/vattenfall-unlock-our-future-fun-awards-2020/>

Options (PO) capable of accommodating up to 10 GW of generating capacity. The SMP informs the spatial component of the first cycle of ScotWind seabed leasing in Scottish waters. It:

- Minimises the potential adverse effects on other marine users, economic sectors and the environment resulting from further commercial-scale offshore wind development, and;
- Maximises opportunities for economic development, investment and employment in Scotland, by identifying new opportunities for commercial-scale offshore wind development, including deeper water wind technologies.

23. Significant stakeholder engagement and technical planning work has gone into developing the Plan, as we look to identify the most sustainable options for further offshore wind development. We undertook full Sustainability Appraisal (SA) (including Strategic Environmental Assessment (SEA), Habitats Regulations Appraisal (HRA) and Socio Economic Impact Assessment (SEIA)) for the 17 Draft Plan Options, with a statutory consultation taking place on the draft Plan and SA between 18 December 2019 and 25 March 2020. The responses to the consultation informed the selection of the final PO by Scottish Ministers.

24. The SMP and SA identified some key recommendations and plan-level mitigation measures to reduce, avoid or offset potential negative impacts arising from development. Because some of these potential impacts identified in the Plan and SA, discussed elsewhere in this paper, may have implications for the timing, scale and progression of future development(s), and to ensure that it remains up-to-date with the most recent scientific advice and the political climate, the SMP will be subject to iterative review. .

25. The deployment of existing planned and consented offshore wind farms will also present an opportunity to gather further data and grow our understanding of offshore wind development in Scottish waters.

ScotWind

26. While the Sectoral Marine Plan identifies areas of seabed considered suitable for future development, Crown Estate Scotland (CES), in its role as manager of Scotland's seabed, is responsible for administering the leasing system. CES will be able to lease areas of seabed located within the identified Plan Options (and any subsequent revised or amended SMPs).

27. A big step was taken in June 2020 when CES launched its first cycle of **ScotWind leasing**. ScotWind will grant property rights for seabed in Scottish waters for new commercial scale offshore wind energy projects, in a way that is fair and transparent, with future rounds and options to be guided by the SMP.

28. The leasing process will provide a pipeline of new projects from the late 2020s onwards, and provide an opportunity to introduce new companies to the UK market – boosting competition, driving innovation and unlocking new sources of investment. Since launching on 10 June 2020, the Crown Estate Scotland “ScotWind” portal has

received over 800 requests for clarifications on the leasing documents and a healthy level of interest overall, confirming significant interest in offshore wind leasing in Scottish waters.

Offshore Wind Sector Deal

29. The UK Government published its **Offshore Wind Sector Deal**²⁰ in March 2019. This document celebrated the success of offshore wind in the UK, and detailed specific actions to be undertaken by governments and industry, designed to promote and grow the sector. The Sector Deal included targets set by the industry, such as improving representation of women and BAME in the sector, building early-stage skills and knowledge accessibility, and an aim to generate 30 GW of offshore wind by 2030. Since the Offshore Wind Sector Deal was published, the UK deployment target has been increased to 40 GW of offshore wind by 2030.

30. Since launching the Sector Deal, the Scottish and UK governments have worked together with the offshore wind sector to make progress on delivering the commitments that it contains. Developments so far include the establishment of the Offshore Wind Growth Partnership, the development of regional clusters – collaboration between developers, regional supply chain, public sector and education bodies – and appointment of a Diversity Champion. (Offshore wind Sector Deal – one year on)

31. The Sector Deal also contained a commitment to collaborate with industry and other Government departments on **strategic barriers to deployment** such as radar, environmental issues, and transmission. The Scottish Government is represented across all main work streams, and remains determined to ensure that Scotland's interests are taken fully into account as the Sector Deal continues to progress. We are working closely with the UK Government to deliver a number of key outputs from the Sector Deal, because we know that resolving these issues will be vital to unlocking Scotland's potential. These work streams include:

- Offshore Wind Transmission Network Review
- Radar Project
- Offshore Wind Future Deployment Scenarios.
- The Offshore Wind Evidence and Change Programme (OWEC - formerly known as SEAMAP)

32. Further information on each of these work streams can be found in the Barriers to Deployment chapter which follows.

The Scottish Offshore Wind Energy Council

33. The Scottish Government believes that a flourishing offshore wind sector in the UK both implies and requires a strong and well-developed sector in Scotland. To that end, the Scottish Offshore Wind Energy Council (SOWEC) was formed in 2019,

²⁰ <https://www.gov.uk/government/publications/offshore-wind-sector-deal>

co-chaired by Paul Wheelhouse MSP, Minister for Energy, Connectivity and the Islands, and SSE's Head of Offshore Project Development, Brian McFarlane.

34. The work of SOWEC aligns to the SOWEC Vision²¹, designed to maximise the economic benefits to Scotland of offshore wind deployment in Scottish waters. This is achieved through subject-specific groups covering, the following work streams:

- Developers
- Skills
- Supply Chain and Clusters
- Innovation
- Barriers to the Deployment of Projects and Route to Market

²¹ <https://www.offshorewindscotland.org.uk/sowec/>

Chapter 2: Barriers to Deployment

35. There are a number of barriers to the deployment of offshore wind in Scotland, ranging from technological and administrative to market and regulatory. Our consultation looked for views on how to tackle these, in order to maximise deployment in Scottish waters.

36. Delivering a green recovery and achieving our net zero emission goals will mean that we **must** find – and implement at reasonable cost – practical solutions to these issues. This needs to happen within timeframes that keep us on course for Scotland’s 2045 and interim emissions reduction targets, and securing our 2030 target of meeting at least 50% of Scotland’s total energy needs from renewable sources.

37. The Scottish Government continues to believe that a more universal and collaborative approach, capable of looking beyond individual sites and issues wherever possible, can help fully realise the potential of sustainable energy production within the 462,000km² of waters in Scotland’s Exclusive Economic Zone. However, we must seek approaches and solutions which can be delivered at an affordable cost, while protecting our natural environment and maximising low carbon generation.

38. As we face a global recession resulting from the unprecedented experience of COVID-19, and we focus on a green economic recovery, it becomes more crucial than ever that projects which contribute to the Scottish economy, that take us closer to our net zero ambitions and that give consumers access to one of the cheapest form of electricity generation at scale, must not be unnecessarily hindered.

Transmission Charging

39. We know that comparatively higher levels of transmission charging can have a profound effect on the financial viability of offshore wind projects in Scotland. Some studies have suggested that transmission tariffs have remained relatively steady, due to increases in turbine efficiency and capacity factors, as well as upgrades in cable capacity. However, the dramatic reduction in overall project costs achieved by offshore wind at the last two CfD allocation rounds places more pressure than ever on the costs attributable to the transmission assets and charges.

40. The pressure to achieve greater cost reductions is more acute in Scotland due to the higher transmission use of system (TnUOS) costs faced by generators here, as a result of their greater distance from GB’s main centres of demand in the south and south east of England. Developers working or interested in Scottish waters have made clear to us their view, with evidence to support it, that TnUOS charges represent a large and increasing proportion of project revenues, and are essentially a locational signal and disincentive to which they are unable to respond. We have long regarded the system of TnUOS as unfairly hampering the competitiveness of Scottish projects and have repeatedly flagged this disparity to the UK Government as part of our discussions on the subject of the CfD review. Given that Scotland needs to achieve net zero by 2045, and the contribution this will make

to the UK 2050 net zero target, it would be in the wider interest of the UK, and in the interest of consumers, for this issue to be addressed by regulators and the UK Government.

41. We have long argued that the transmission charging model was developed to deal with a different generation landscape; and that our increasingly decentralised electricity generation system, the abundance of renewable resource in Scotland, as well as the context of a climate emergency and the anticipated growth of electricity demand arising from decarbonisation, strengthen the case for urgent reform of transmission charges. The Scottish Government believes that processes such as Ofgem's **Targeted Charging Review**²² must take fully into account these kinds of effects on renewables project costs, ensuring that they do not present barriers to investment and progress in Scotland – key to us addressing the climate emergency and achieving net zero.

42. Ministers have raised these questions directly with Ofgem on a number of occasions, and will continue to do so – believing that progress in these areas is crucial to the delivery of net zero for both Scotland and the UK. In order to maintain the pressure for action in this area, we will continue to work with developers on compiling and understanding the evidence around the potential impacts of the current approach, as well as the regulatory or technical changes and solutions which can improve matters.

43. The 2020 Committee on Climate Change (CCC) report to Parliament also called for the government to develop a strategy “to coordinate interconnectors and offshore networks for wind farms and their connections to the onshore network, and bring forward any legislation necessary to enable coordination”.

44. Some movement is starting to develop on the need for a transmission infrastructure and approach which is commensurate with Scotland's, and GB's offshore wind ambitions. Ofgem's Decarbonisation Action Plan²³, published earlier in 2020, acknowledged the need for a co-ordinated and improved approach if we're to develop the capacity in the quantity and at the speed which will be essential to achieve net zero and decarbonise our electricity demand.

45. More recently, in June 2020, the Offshore Wind Transmission Network Review²⁴ was launched. This initiative is designed to ensure that the transmission connections for offshore wind generation are delivered in the most appropriate way, considering the increased ambition for offshore wind necessary to help achieve net zero. The Scottish Government will be taking a place on the project board for this work, as it identifies and works to implement actions which will help deliver our offshore wind objectives.

46. Technological innovation will also be necessary to develop a system which reflects this decentralised and intermittent generation, and the increase in electricity demand that net zero will necessitate. This also presents opportunities for

²² <https://www.ofgem.gov.uk/electricity/transmission-networks/charging/targeted-charging-review-significant-code-review>

²³ <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-decarbonisation-action-plan>

²⁴ <https://www.gov.uk/government/publications/offshore-transmission-network-review>

generators to contribute to the supply of ancillary and other system operability and balancing services. That's why Scottish Government has been taking steps in recent years to support these efforts. Last year, we commissioned ORE Catapult to undertake a project focused on grid and network barriers in Scotland. This project identified the constraints imposed on Scottish offshore wind deployment by existing grid infrastructure, and quantified the cost and benefits of grid upgrades – highlighting the potential for off-grid applications for Scottish offshore wind in general, and for floating wind in particular. It also mapped future leasing areas to suitable grid connections and quantified grid constraints in terms of connection and transmission capacity, taking into account planned upgrades

Radar

47. The Scottish Government is aware that potential impact on radar is a significant constraint to offshore developments, and may, if unresolved, place some limits on the sector's ability to contribute to ending Scotland's contribution to global climate change. We asked for comments on this issue through our draft Offshore Wind Policy Statement, and the contributions received were strongly aligned with our established views. The Scottish Government remains focussed on the necessity of a holistic and long-term solution to this issue which reflects our current and anticipated development pipeline as well the future scale of development which net zero ambitions will necessitate.

48. The Offshore Wind Sector Deal, which was published in March 2019, builds on the UK's global leadership in offshore wind and aims to maximise the advantages for industry from the global shift to clean growth. The Scottish Government was supportive of the inclusion of the following wording and commitment in this document

*“..the UK is able to meet its national security obligations, and that its radars can operate effectively as the offshore wind sector expands in the coming years. **This will include working in partnership with the sector on innovation activity and development of a technical solution**”.*

49. This is a positive move towards collaborative working, intended to deliver effective and enduring solutions. The Scottish Government remains committed to this collaboration, and to working with others to resolve these issues – for example, as part of the continuing focus this issue is given by the Aviation Management Board (AMB). As an AMB member, we will continue to ensure that Scottish interests, including radar issues which affect developments both offshore and onshore, are considered fully and in a way which fits with Scotland's timescales and ambitions.

50. The Offshore Wind Industry Council (OWIC) oversees and drives the implementation of the Sector Deal from an industry perspective, and we look forward to continuing to work with industry on this issue, including through the Joint Windfarm Mitigation Task Force, and the programmes and studies planned as part of this work.

Environmental and Planning Barriers

51. Marine Scotland's License and Operations Team (MS-LOT) is responsible for processing the necessary applications and licences for offshore wind developments in Scottish waters. MS-LOT endeavour to process these applications and licences as openly, thoroughly and efficiently as possible.

52. The Scottish Government is aware that there are several environmental and planning factors that must be considered when considering future deployment of offshore wind projects. These requirements must be addressed through a combination of strategic and project level solutions. The development of the SMP involved a detailed plan-level SEA, HRA and SEIA.

53. The SMP was informed by these assessments and accordingly, has introduced plan-level mitigation measures to alleviate the potential negative impacts of future offshore wind development. The SMP also points to project-level measures that must be employed and/or further assessments that must be completed, to better understand the possibility of negative impact(s).

54. The SEIA identified potential negative impacts on the commercial fisheries, commercial shipping, tourism and recreation sectors, and these impacts were highlighted in the consultation responses, received for draft SMP. Stakeholder feedback has led to revisions to the final SMP and POs to reduce potential impacts on these sectors. The SMP sets out the range of issues which must be considered at a project-level and further spatial-planning within each PO will be required to mitigate potential impacts and the detailed Regional Locational Guidance highlights potential interactions with other sectors.

55. The potential negative impact of offshore wind projects on key seabird species, particularly in the east and north east regions of Scotland, has been clearly highlighted as an environmental concern via the SMP, SA and recent consent decisions, as a possible barrier to future deployment of offshore wind technology. Planning and consenting decisions must be based on the best available information and Marine Scotland and its advisors recognise that the scientific uncertainties in the potential biodiversity impacts should be addressed strategically, through a combination of plan and project-level work. Plan-level mitigation measures fulfil our commitment to sustainable development and the protection of our natural heritage, limiting development in certain areas until these uncertainties, namely bird interactions with turbines or presence of key species, can be better understood.

56. The SMP sets out how these uncertainties may be addressed and removed, presenting a realistic picture for the offshore wind industry, thus creating more certainty around future consenting requirements. The formation of an Advisory Group and Ornithology Working Group to lead the process to address potential 'knowledge gaps', and the commitment to keep the SMP under iterative review, will ensure that the SMP is up-to-date and relevant. The SMP also sets out a clear understating and appreciation of the relevant regulations, and acknowledges that other routes to project consent may be available.

57. Our draft Offshore Wind Policy Statement recognised these ‘knowledge gaps’ in environmental assessments, and asked for specific comment on this issue. We also know that investment in research is required to address a number of consenting questions, particularly in relation to potential impacts on marine mammals, commercial fisheries and ornithological interests, which need to be examined and addressed over the coming years.

58. The importance of this to ongoing development was a clear theme in responses received, and the Advisory Group will form a key role in the Scottish Government effort to understand and tackle this issue. Paul Wheelhouse, Minister for Energy, Connectivity and the Islands, acts as co-Chair of the Scottish Offshore Wind Energy Council (SOWEC), whose “Barriers to the Deployment of Projects and Route to Market Group” is conscious that deployment is critical to delivering a net zero economy. This is why mitigating the impacts that environmental constraints have on deployment remains a key priority for SOWEC.

59. We are also closely engaged with UK Government’s Offshore Wind Future Deployment Scenarios project, which will seek to define a range of plausible scenarios for offshore wind development to 2050 and will assess the extent to which deployment levels are constrained by technical, economic, environmental and system factors. The research, part funded by Crown Estate Scotland, will examine the key drivers of costs and how these relate to increased offshore wind deployment, as well as the role of floating offshore wind in overcoming spatial limitations and at what cost.

60. The Scottish Government, including Marine Scotland, is taking part in the Offshore Wind Evidence and Change Programme (OWEC – formerly known as SEAMAP), led by The Crown Estate. OWEC aims to “facilitate the sustainable and coordinated expansion of offshore wind, helping the sector to meet the UK’s commitments to the low carbon energy transition whilst supporting action to secure clean, healthy, productive and biologically diverse seas”.

61. The OWEC Programme held a workshop in December 2019 with stakeholders, showing a strategic, level, coordinated programme, which would deliver faster progress to net zero without compromising the marine environment. This includes a number of projects, including a UK-wide spatial study to develop theoretical scenarios for future offshore wind deployment. This will add to the evidence base which can inform policy decisions on the use of sea space to deliver on net zero commitments.

Contract for Difference (CfD) Framework and Innovation

62. Our consultation asked a specific question around market stabilisation mechanisms, and how these could promote the development of floating technology whilst still retaining value for money for the consumer. Following the consultation’s publication in 2020, the UK Government published its consultation on proposed

amendments to the Contracts for Difference (CfD) for Low Carbon Electricity Generation scheme.²⁵

63. Our views on the proposals as a whole are set out at paragraphs 14-16 of this document. However, our response to the consultation also included specific comments on the vital need to support innovative technologies, such as wave and tidal generation as well as floating offshore wind. The powerful arguments for using the CfD mechanism to pull these technologies closer to market, and the CfD's potential to support innovation and cost reduction in these areas, are stronger than ever in light of the pandemic and the imperative to deliver a green recovery in the context of a declared climate emergency. The Scottish Government had used its previous powers to do exactly this, through Scottish ROCs, prior to those powers being removed by UK Ministers and replaced by the UK-wide CfD. We believe that the UK Government must be willing to show greater ambition in these areas.

²⁵

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/885248/cfd-ar4-proposed-amendments-consultation.pdf

Chapter 3: Future Position

64. Scotland's natural resources, which include a strong and consistent wind resource along with our established expertise in offshore oil and gas, skilled offshore workforce, excellent port structure and strong innovation hub, make Scotland one of the best places in the world to develop offshore wind and its supply chain. Offshore wind offers large-scale, low carbon electricity at a low cost to consumers, and, although environmental considerations need to be given due regard, it is not restricted by factors such as land availability that affect other low cost renewable sources.

65. The Sectoral Marine Plan makes clear the near-term, practical ambitions of the Scottish Government and our agencies to grow this sector, with due respect and regard for and awareness of other marine users and environmental implications.

66. In our draft Offshore Wind Policy Statement, published in December 2019, we referenced the potential of this sector and noted our considerations around quantifying a level of ambition. We also posed a series of specific questions on the future of this sector in Scotland and how success or achievement could be measured.

67. Consultation responses focussed around specific areas of policy and development, which are each considered in greater detail in further chapters. These remain a focus of attention for policy makers, regulators and industry and it is clear that their resolution will continue to have profound effect on future build and capacity scenarios.

Grid

68. In order to meet our net zero ambitions we expect a significant increase in demand over the coming years, including the electrification of heat and transportation, which between them account for more than three quarters of Scotland's energy consumption. This will require a significant increase in the deployment of renewable electricity to facilitate electrification of both sectors or, indirectly, for production of hydrogen via electrolysis. The intermittency of sources such as offshore wind will create a need for greater flexibility in our energy system, the need to consider black start capabilities and a greater requirement balancing and ancillary services, which renewables can provide.

69. There are also considerations around transmission charging and how net zero is influencing future charging regimes. One of the key regulatory issues which our consultation drew out was the impact of transmission charging on the financial viability of offshore wind projects in Scotland. These issues are considered in more detail in the 'Barriers to Deployment' chapter of this Statement.

70. The Scottish Government recognises the need for a modern energy system which protects the interests of consumers and reflects the urgency of the climate emergency. We work closely with industry and academia on these issues, through our Scottish Energy Advisory Board and its leadership groups – aiming to consider, protect and promote Scotland’s interests. This work also informs ministers’ frequent engagement with Ofgem, and the Scottish Government’s continuing efforts to ensure that the regulator takes Scotland’s energy ambitions and policies fully into account in its decision making.

Hydrogen and Storage

71. Another strong theme that came through our consultation was the future role of hydrogen, and the technological and economic opportunities that this, and energy storage, offers. ‘Offshore Wind and Hydrogen’ – commissioned by the Offshore Wind Industry Council (OWIC) as part of the Offshore Wind Sector Deal, concludes that offshore wind with green hydrogen is a major opportunity for the offshore wind industry. If offshore wind costs continue to fall, this opens up the potential for the offshore wind industry to move beyond electricity requirements and produce green hydrogen for export, which could generate significant economic impact.

72. The use of surplus renewable electricity for the production of green hydrogen via electrolysis offers potential solutions to grid constraint and we also expect future demand for off-grid electricity solely for dedicated hydrogen production. The Scottish Government has an established, supportive policy position for hydrogen, and considers hydrogen to be a key part of our future energy system. Our position on hydrogen and its future deployment in Scotland will be set out in our Hydrogen Policy Statement and Action Plan, which will be completed before the end of 2020.

Supply Chain

73. Another dominant theme through the consultation responses around what a “successful offshore wind industry in Scotland in the future” looks like, was the delivery of national and local benefits, through the development of indigenous supply chain.

74. The Scottish Government is committed to maximising the economic benefit to Scotland of development on Scotland’s land and seas, and this is considered in more detail in the “Supply Chain” chapter.

75. In terms of future supply chain and economic opportunities, the re-use and re-cycling of offshore wind farm components, as decommissioning begins to come into play, will offer further opportunities. The Scottish Government has strong commitments to the circular and zero-waste economy and decommissioning must be taken forward in alignment with those commitments and whilst protecting our natural environment.

Skills and Training

76. Scottish Government recognises that in order to ensure we maximise the economic benefit to Scotland from offshore wind, we must ensure that our skills landscape continues to develop and reflect the needs of industry. Covid-19 has had a massive impact on the Scottish economy, in line with impacts in the UK and other advanced economies. Given the parallel need to address the climate emergency through delivery of a just transition, it is imperative that our economic recovery is a green recovery. That is why, as part of our Programme for Government 2020, we have committed to creating a £100 million Green Jobs Fund over the next five years, investing alongside businesses and organisations to support new and increased opportunities for green job creation across Scotland. In addition, we have announced a £25 million National Transition Training Fund to provide targeted support to those individuals being made redundant or facing the threat of redundancy, to help them transition into new opportunities arising from the green recovery.

77. As robotics and autonomous systems become increasingly prevalent within the operation and maintenance of offshore wind projects, we are likely to experience a shift from traditional offshore technician jobs towards roles that are more focused on data and information management. Scotland should continue to build on expertise in these sectors to ensure that we remain able to react to the rapidly evolving technologies that will affect skills requirement in the future. We must ensure that any loss of economic impact in coastal communities from changes in operations and maintenance models is offset by high value employment opportunities in these emerging skill areas. This should continue alongside efforts to attract work arising from the construction process.

78. The Scottish Government will continue to work alongside, and have a strong interest in the work of bodies such as Energy Skills Partnership, the Investment in Talent Group, the Energy Skills Alliance and through our role in SOWEC. We will use these partnerships, to look at future skills demand across the energy sector and increase the employment impact and, thereby, the number of skilled people working in Scotland's offshore wind industry.

Policy Interventions

79. The Scottish Government has created a long-term and stable supportive policy environment for renewable energy which has contributed to the successful driving down of costs and tackled deployment issues. Consultation responses acknowledged this, and called for this policy support to be maintained and strengthened.

80. The Scottish Government has continued to demonstrate ambition and vision for the offshore wind sector with the Offshore Wind Policy Statement and the Sectoral Marine Plan, as well as our commitment to tackling the global climate emergency.

81. The refresh of Scotland's Energy Strategy, published in 2017, is due to get underway before the end of 2020 and will conclude in 2021. This refresh will

demonstrate clear links between our renewable generation requirements and the broader context of our Energy Strategy and wider energy systems thinking. It will also emphasise the future role we expect renewable electricity generation to play in our overall strategic ambitions, with further analysis to consider the potential scale of offshore wind deployment, and that of other technologies, which may be necessary to deliver our net zero and decarbonisation goals.

82. In relation to investment, the proposed “Mission 1” for the Scottish National Investment Bank is:

***Achieving a Just Transition to net zero carbon emissions by
2045***

*Invest in rebalancing our economy towards leadership in sustainable
technology, services and industries.*

83. All three proposed missions, and their corresponding grand challenges, were laid before Parliament for consultation at the end of August. The consultation period has now closed and the missions will be amended as necessary, based on the feedback received. It is expected that these missions can officially be set for the Bank in the final quarter of 2020.

Future Deployment

84. A dominant theme in the responses to the consultation was the setting of appropriate ambition for the offshore wind sector in Scotland.

85. The Scottish Government is confident that Scotland’s 2 GW of operational and under construction offshore wind capacity could grow to between 8GW to 11GW by 2030, based on current literature and estimated forecasts of growth trends. However, the most significant economic and supply chain benefits are likely to require substantially increased deployment in the future. Recognising this, and the challenge that net zero by 2045 represents, we believe that we are going to need significantly more offshore wind deployment, particularly beyond 2030. As we have stated in our Overview, we will continue to explore issues and potential requirements as we move towards 2045 and net zero as part of our work to update Scotland’s Energy Strategy.

86. As referenced in the “Barriers to Deployment” chapter, there is an understanding that in order to meet these ambition the pace of deployment, the timescales from inception to deployment, will need to speed up.

87. The report “Towards a Robust, Resilient Wellbeing Economy for Scotland: Report of the Advisory Group on Economic Recovery”²⁶ made specific reference, at recommendation 5.8 around Planning and Regulation. This stated that:

The Scottish Government, regulatory bodies and local authorities should review their key policy, planning and consenting frameworks, especially for key infrastructure investments such as marine renewables, to accelerate projects.

88. The report further states “One of the most critical areas for strategic focus in the context of a green recovery and climate change, however, is the marine renewables sector. Scotland has some of the most ambitious climate change targets in the world. Central to the Scottish Government’s response, and a key component in the transition to a low-carbon economy in Scotland, is the development of offshore wind energy. With huge wind resources and a marine area six times the size of Scotland’s land mass, offshore wind offers considerable potential for sustainable economic growth. Scotland can and should be a leader in marine renewables.”

89. Our response to the report committed to “continuously review [our] consenting frameworks for marine renewables, [and] to look for opportunities for further simplification and improvements while ensuring protection for our marine environment and the ecosystem services from which current and future generations can benefit”.

²⁶ <https://www.gov.scot/publications/towards-robust-resilient-wellbeing-economy-scotland-report-advisory-group-economic-recovery/>

Chapter 4: Economic Opportunities – Supply Chain

90. The Offshore Wind Sector Deal set a target of 60% lifetime UK content in domestic projects (up from the current 50%), and a commitment to increase UK content in the capital expenditure (CapEx) phase.

91. Scottish Ministers are fully committed to ensuring that Scotland's supply chain benefits from this commitment by the sector and have been left frustrated by the procurement outcomes arising from recent projects. We have seen vital fabrication contracts go to overseas yards, as a result of price pressures arising from the CfD process pushing risk and cost reductions down the supply chain.

92. While key electricity market policy levers are reserved to UK Government, Scottish Ministers are determined to use all our devolved policy powers, under the provisions of the 1998 Scotland Act, to support the supply chain. In practice, this means working with the sector, and particularly developers, original equipment manufacturers, tier 1 contractors and industry representatives. We must ensure not only that the Offshore Wind Sector Deal target is delivered, but that the benefits and effects of doing so are demonstrated and felt in areas across Scotland. This must maintain the strong social licence which the sector has enjoyed with the people of Scotland, but which has not been reflected in sufficient economic opportunities, to date.

93. As part of this process, we held an Offshore Wind Supply Chain Summit in 2019 with a follow-up in early 2020 to consider options designed to increase the relatively low levels of Scottish content in projects to date, particularly during the Capital Expenditure phase.

94. During the Summit, Crown Estate Scotland set out its intention to utilise the ScotWind Leasing Round to support the local supply chain and introduce a Supply Chain Development Statement into the Scotwind Leasing process. Prior to lease, a Contracted Position Statement will be required to lay out in more detail how the Supply Chain Development Statement will be fulfilled. If all parties fully engage, this will enable our Enterprise Agencies and economic development partners to work with potential supply chain partners to ensure their competitiveness. This will also provide visibility of the pipeline for supply chain companies and their financial backers. The process will also help ensure earlier visibility of any likely economic impacts throughout the consenting process than is currently the case.

95. If the Contracted Position Statement does not fulfil the Supply Chain Development Statement, then we have been clear there will be contractual consequences. We believe this is a constructive step forward, providing an opportunity for the sector to demonstrate its commitment to ensuring they deliver for

the Scottish supply chain, particularly at a time of volatility in markets. Further details of the scheme are available from Crown Estate Scotland.²⁷

96. Following the Summit, it was also agreed that SOWEC would undertake a short, focussed independent review, which is now underway, and will cover the following:

- Summarise the current status of the offshore wind supply chain in Scotland (including the recent studies, assessments and industry developments)
- Map future deployment and consider the current status of the OSW supply chain in Scotland, determine the supply chain and technology barriers and opportunities, both domestically and globally, which provide longevity to the industry in Scotland
- Provide scenarios of potential economic impact associated with varying levels of investment (infrastructure, supply chain, innovation, skills and cross sector transition)
- Recommend immediate action, through investment, including detailing means to support investor confidence and the industry in Scotland and to maximise economic value.

97. The outputs of this assessment will identify areas of the supply chain where the sector should look to direct its attention to over the coming years. We expect areas such as port infrastructure to be a key feature of the Assessment's findings, but remain open to all avenues of possibility to build a Scottish supply chain that is attractive to inward investment.

98. We ask and expect that Scottish supply chain companies must continually reflect on their performance to ensure that they remain competitive both on price and deliverability in a challenging offshore wind sector. We also encourage them to actively engage with our Enterprise Agencies who can provide advice and support to assist in this process.

99. Those competing in this market must ensure that they are able to present innovative and compelling tenders to the Engineering, Procurement, Construction and Installation (EPCI) contractors and look to explore collaborative opportunities to present the strongest bids possible within their respective specialisms. The Scottish Government is keen to welcome new entrants into the market, as well as supporting established players.

100. We share the concerns of supply chain companies, and indeed citizens, across Scotland that revenue support for offshore wind is not contingent on local supply chain use. As stated earlier, this is a matter reserved in its entirety to the UK Government and we will continue to press UK Ministers to restructure the CfD mechanism so that it places a greater emphasis on the quality of bids, rather than exclusively on cost, as it is at present.

²⁷ <https://www.crownestatescotland.com/what-we-do/marine/asset/offshore-wind/section/scotwind-leasing>

101. Collectively we are keen to explore how best to increase Scotland's success in winning orders for projects outside Scotland's waters, to leverage the wider pipeline of projects to deliver economies of scale in the Scottish supply chain.

102. While we accept that there are challenges facing the local supply chain with price competitive yards in Asia and the realities of the UK exit from the EU continuing to unfold we must once again remind the sector of their previous voluntary commitment to achieve 60% UK content in offshore wind projects by 2030. We expect the sector to take ownership of this issue, and collectively agree a way to deliver on their commitments to strengthen and expand the local supply chain. The Scottish Government will continue to actively engage in this area with the sector and will seek out opportunities to drive and change the sectors behaviours on this issue. We will ensure that fair work principles are understood where manufacturing work is carried out in jurisdictions with weaker employee rights, or where ethical issues or issues of high carbon intensity may arise.

103. The uncertainty of the UK exit from the EU, alongside the problems presented to business throughout the Covid-19 pandemic, continue to bring significant challenges to businesses and communities across Scotland. We are considering every possible measure to ensure Scotland is as prepared as it can be for any difficulties ahead and to ensure we increase our resilience and strengthen the foundations of our economy – something, it should not be forgotten, that ultimately benefits the generators of electricity in boosting demand for clean energy.

Floating Wind Opportunity

104. There is huge economic opportunity attached to floating offshore wind – Crown Estate Scotland's *Macroeconomic Benefits of Floating Offshore Wind* report²⁸ suggests that the UK floating offshore wind market has potential to support 17,000 jobs and £33.6 billion of Gross Value Added (GVA), with particular potential for deployment in Scotland's 462,000 km² of waters, much of which are more than 60m in depth. Globally, the market is set to grow to at least 4 GW of capacity by 2030 and 55 GW by 2050, offering an export opportunity to Scotland's supply chain which is estimated at around £550 million per annum by 2050.

105. The expertise gained through over 40 years of experience gained from oil and gas sector operations in Scottish waters, means Scotland is well placed to capitalise on this opportunity, and this is expanded upon further in the innovation chapter of this document. We have an abundance of offshore skills and the capabilities necessary to manufacture specialised components such as moorings, chains and anchors.

106. As we transition to a net zero economy, it will be increasingly important that these skills can be seamlessly transferred to our growing renewables sector – retaining, and growing, the economic value of our energy industry. However, taking full advantage of the floating wind opportunity will – as well as a more targeted and

²⁸ <https://ore.catapult.org.uk/?industryreports=macroeconomic-benefits-of-floating-offshore-wind-in-the-uk>

effective approach through the CfD – require significant investment in critical infrastructure such as fabrication yards, ports and harbours.

107. The economic benefit of this technology will arise from achieving early mover advantage. This means that the Scottish supply chain must be fully prepared, with the capability and capacity required to deliver floating offshore wind at commercial scale and this also requires action on the part of UK Ministers to provide a commercially attractive environment for the sector to flourish here and to capture the market lead. The delivery of Oil and Gas UK's Roadmap 2035,²⁹ which seeks to effectively decarbonise offshore production of oil and gas in the UKCS, presents an exciting opportunity for Scotland to grow floating wind capacity and develop a successful supply chain to build and service it. This is an issue that is being actively examined by Marine Scotland in parallel with the process leading to publication of the Sectoral Marine Plan for offshore wind.

108. We are pleased that the DeepWind Cluster, which specialises in floating offshore wind in deeper waters, is now the largest offshore wind representative body in Scotland, demonstrating the sector's commitment to the expansion of this key technology in Scotland, with potential for global opportunities to be capitalised on.

International Opportunity

109. Scotland's Energy Strategy identifies internationalisation as a key area, recognising the importance of working with international partners and the contribution this can make to sustainable economic growth as we transition to a net zero economy. We will continue to develop and strengthen our international relationships, prioritising activity and collaborations that promote learning and policy exchange, build upon Scotland's reputation and increase our attractiveness to international partners and ensure a flow of new investment.

110. Offshore wind has rapidly become one of the UK's lowest cost renewable sources at scale, and the resulting international market for this technology is growing at an unparalleled pace. Over 6.1 GW of offshore wind capacity was installed globally in 2019, making it a record year for deployment. The Global Wind Energy Council's Market Intelligence forecasts indicate that, through to 2030, more than 205 GW of new offshore wind capacity will be added globally, including at least 6.2 GW of floating offshore wind.

111. This huge increase in offshore wind has the potential to create around 900,000 jobs worldwide in the next decade. It is expected that the technology will be a key driver in a global green recovery, providing an excellent opportunity for Scotland to showcase the skills we have already developed in offshore wind construction and maintenance. This represents one of our strongest opportunities, alongside development of hydrogen, for achieving a just transition for Scotland's oil and gas sector and its supply chain.

112. We are world leaders in offshore wind innovation, and our oil and gas expertise means that we are as well placed as any country to address the

²⁹ <https://oilandgasuk.co.uk/roadmap-2035/>

engineering and manufacturing challenges presented by offshore wind and to remain at the forefront of floating wind technology

113. Scotland has already established strong collaborative relationships with California and New Jersey in the USA. Both of these states, are seeking to rapidly build out large scale offshore wind projects. However, current gaps in the USA supply chain present a huge opportunity for established Scottish companies to assist with the deployment of offshore wind overseas. We are also engaging with Ireland on research and further development of floating wind technology. Generating export earnings from our expertise in areas such as subsea engineering, environmental planning, consenting and project management can help achieve the ambitions of other countries, while significantly boosting the economy of Scotland.

114. The Scottish Government, along with our Enterprise Agencies, will continue to engage with international partners – strengthening existing relationships and seeking out opportunities for our offshore wind industry to flourish in the global market. This will include maximising opportunities in new innovations and emerging technologies, like the development of a hydrogen economy, and the potential for Scotland to harness its offshore wind capabilities to position itself as a key player in the production and export of green hydrogen.

Chapter 5: Economic Opportunities – Skills

115. We are committed to an economic recovery from Covid-19 that is both green and fair – where we capture the opportunities of our transition to net-zero including in green jobs, innovation and competitiveness. The need for a skilled workforce is more important than ever to enable us to meet these unprecedented challenges. As highlighted in the previous chapter, with a history of oil and gas expertise in Scotland, and building on our existing onshore and offshore wind supply chains, Scotland is comparatively very well placed to build on these existing skills, and provide skilled professionals to meet the increasing demands of the growing offshore wind industry, from planning through to development and, ultimately, operations and maintenance (O&M).

116. Our Programme for Government was published in September 2020 and sets out the key elements of a green recovery, the next step in delivering Scotland's Green New Deal. This included commitments on the part of the Scottish Government to:

- work with employers and individuals to build the necessary skills and infrastructure to support the industries of the future.
- ensure every young person has access to a job, education, training or development programme, through our Youth Guarantee.
- support older workers at risk of redundancy through our new £25 million National Transition Training Programme.

117. Through our existing STEM Strategy³⁰ and our STEM Hub Partnerships, we are working with industry specialists to continue to inspire talented individuals from all backgrounds, including school leavers and career changers, and to promote the Scottish Offshore wind sector as an attractive industry for a future career.

118. Our current and future skills landscape must be able to incorporate the varying job requirements of the sector, across the supply chain, from leadership and management, project management and technical roles, project development and planning through to manufacture, construction and O&M. We must also continue to consider the export value that can be derived for the Scottish supply chain arising from exploiting our uniquely placed skills and established business networks in other countries.

119. The Scottish Government is fully committed to ensuring that our workforce is ready to meet the skills demands of industry in spite of the challenges as we emerge from the Covid-19 pandemic. The Scottish Government has a long relationship with the Energy Skills Partnership (ESP) through grant-funding where they provide technology and their valuable expertise to college courses across the country. This has been used to establish courses which are under high demand, and which result in a high level of graduate employment.

³⁰ <https://www.gov.scot/publications/science-technology-engineering-mathematics-education-training-strategy-scotland/>

120. The Scottish supply chain must be able to provide companies with access to the skills required to develop projects now, and as we look towards the future. To fully understand this, the industry must be able to indicate estimated job requirements to allow our skills capacity and capability to be fully prepared and we anticipate they will be able to provide government and its agencies with this information via the ScotWind leasing round and their Supply Chain Development Statement.

121. The Scottish Government will work closely with key partners, such as the Energy Skills Alliance, which is working to produce a clear forecast of energy skills demand up to 2050, deliver an integrated energy apprenticeship scheme by 2022 and develop a roadmap for aligning training and standards by 2021. This alignment of training and standards across energy sectors is crucial to allowing offshore wind to benefit from and utilise the skills and expertise of the oil and gas industry. Removing the need for the workforce to obtain additional certification in order to transfer into other energy sectors, will be a key enabler for companies to diversify their business portfolios and to meet the required skills demand

122. Scotland's clusters, DeepWind and Forth & Tay, will remain crucial forums for industry to collaborate and communicate in locations where the current demand for skilled offshore wind jobs is at its highest. Further to this, SOWEC is working to understand the anticipated demand for skills in Scotland, which will allow us to ensure that the skills supply is in place in line with industry demand.

123. By improving our understanding of the demand for skills and the role profiles that will be required going forward, our colleges, universities and private training providers with the skills sector will be able to collaborate with our enterprise and skills agencies and react appropriately and comprehensively to industry requirements – ensuring maximum benefit to Scotland's economy, especially in coastal and rural areas, where viable employment is crucial to the local communities.

124. We know that we must continue to increase gender diversity and BAME representation throughout the sector, and recognise the challenges in recruitment, and we are ensuring, through SOWEC, that our ambitions are in line with UK Sector Deal Targets.

125. Schools must lead by example to educate children on the vast array of jobs included within the sector, ensuring that children from all backgrounds consider offshore wind as a viable career option. Industry must also recognise these targets and ensure they are considered within their recruitment processes.

126. The Scottish Government and SOWEC will continue to participate in the UK Investment in Talent Group to ensure that Scotland's unique skills system is recognised and reflected when developing skills interventions intended for use across the UK.

Chapter 6: Innovation and Cost Reduction

127. Scotland's Energy Strategy set out a commitment to continue our support for offshore wind innovation in Scotland. Since then, we have committed up to £4 million in this area, including £2 million in 2019/20 aimed specifically at reducing costs in the floating wind sector.

128. Over the last 6 years, the Scottish Government has committed over £9.5 million in grant funding to support innovation and skills in offshore wind. We have worked closely with the Carbon Trust, funding the hugely successful Offshore Wind Accelerator programme and the Floating Wind Joint Industry Partnership (JIP). Both of these programmes utilise a market led approach to address technical challenges in order to lower the levelised cost of energy. Scotland is helping industry to achieve cost reductions, but in doing so, we expect to see that investment in innovation not only benefit project cost-competitiveness, and accelerate deployment, but also to lead to employment opportunities in Scotland.

129. The Carbon Trust published the Floating JIP Phase II Summary Report³¹ in July, outlining findings across four main themes: turbine requirements and foundations scaling, heavy lift offshore operations, dynamic export cables and monitoring and inspection. The report also includes new market projections from the Carbon Trust, forecasting 70GW of floating wind capacity installed globally by 2040.

130. The Scottish Government also match funded a number of projects last year delivered by ORE Catapult in partnership with industry and the Welsh Government, through their Floating Offshore Wind Centre of Excellence. These projects explored barriers and opportunities for floating wind in Scotland across innovative areas such as: oil platform electrification using floating wind; fixed/floating hybrid offshore wind sites; floating substructure fabrication in Scotland; and, mapping the Scottish supply chain

131. We are currently fully funding a £1 million Floating Wind Technology Acceleration Competition in partnership with Carbon Trust, with the aim of solving key technical challenges in the industry. Eight competition winners, including Scottish engineering specialists AS Mosley, were announced in January, and are currently developing a host of innovative technologies including a 3D concrete anchor, a passive load reduction device, and an adjustable seabed lock. The competition projects are due for completion in Q1 2021, and a case study showing progress to date will be published in before the end of 2020.

132. We have taken on board feedback from industry outlining the importance future funding for research and innovation will remain vital to the success of offshore wind in Scotland. That is we are currently undertaking a review of innovation grant funding across the Scottish Government Energy and Climate Change Directorate, to ensure a coordinated and focused approach to future grant funding. This review aims to develop a funding mechanism, for the financial year 2021/22, that will enable

³¹ <https://www.carbontrust.com/resources/floating-wind-joint-industry-project-phase-2-summary-report>

us to prioritise key areas for innovation across and apply a more holistic approach across energy when procuring future innovation work.

133. During the consultation of this document, many respondents also highlighted the potential effect of the UK's departure from the European Union on innovation funding for Scottish energy projects. We are acutely aware that EU funding has played a crucial role in progressing offshore wind research and demonstration across the UK. For the avoidance of doubt, we strongly object to Scotland being removed from the EU against the wishes of 62% of Scotland's voters and we will continue to argue for the closest possible links with our EU partners. We will also continue to challenge the UK Government to take responsibility for its course of action and ensure that, at the very least, our thriving innovation landscape in Scotland is protected in the face of EU exit and the potential harms this may cause to the research community here.

Cost Reduction

134. Innovation is a key driver in achieving sustainable growth. Scotland is already a world renowned hub for innovation in offshore wind. We are home to the world's first floating offshore wind farm, Equinor's 30 MW Hywind Scotland, with a second, the 50 MW Kincardine project, currently under construction. In addition, some of the most powerful turbines in commercial operation in the world are located in waters off Aberdeen, at Vattenfall's 93 MW European Offshore Wind Deployment Centre. The site demonstrates innovative suction bucket foundations – one of which was installed in a record breaking two hours and forty minutes.

135. The developments referred to above were made possible by unique legislation and support introduced by the Scottish Government in 2013. These changes supported offshore wind test and demonstration sites deploying innovative, new to market turbines, and pilot projects consisting of non-fixed turbines. Regrettably, these financial instruments have been removed by UK Ministers and therefore are not available to Scottish Ministers to stimulate new projects.

136. However, the Scottish Government's leadership together with investment made in these projects has resulted in a huge step forward for the technology, and represent the foundations upon which Scotland future floating wind sector will be built. Although the offshore wind industry has already achieved incredible cost reduction in fixed technologies, floating wind still requires further research and innovation, along with the necessary scale, to bring costs down to a similar level.

Floating Offshore Wind

137. Floating wind pilot projects and test and demonstration sites are beginning to grow across the world. Indeed, Scotland has already become a global leader in the deployment of floating wind. However we recognise that floating wind's ability to become cost competitive with fixed bottom structures will require continued effort and innovation.

138. Scotland's unique deep water profile and high, consistent wind resource means that our waters are ideally suited to floating wind. The Committee on Climate

Change (CCC) report in May 2019³², which includes a scenario requiring 75 GW of offshore wind in UK waters by 2050 to achieve net zero, suggests that we are likely to need floating wind in our energy system earlier than previously anticipated.

139. However, the higher costs of floating wind mean that without similar intervention or additional support (e.g. through changes to the successor CfD mechanism), this technology is unlikely to develop at the rate or scale required to retain early mover advantages and to exploit supply chain growth opportunities. We made this clear in our response to the BEIS CfD consultation by outlining the critical importance of floating technologies being able to bid in separately to fixed offshore wind. The UK Government must take urgent action in this regard if we are to see the floating offshore wind opportunity in Scotland fully realised.

140. In line with the feedback we received through the consultation for this document, cost reduction in floating offshore wind will remain a key innovation priority for the Scottish Government as we move towards commercial scale development. We will continue to explore both technical challenges and those specific to Scottish waters, whilst ensuring that we take full advantage of Scotland's transferable strengths in other sectors.

Fixed Offshore Wind

141. Fixed-bottom offshore wind has seen incredible cost reduction in recent years, and increase in turbine sizes – helped in part by Scottish Government support for the Carbon Trust Offshore Wind Accelerator programme³³. This underlines the effectiveness of strategic government intervention at a time when the sector was less mature.

142. Scope for industry led innovation in fixed offshore wind remains, particularly in key areas such as turbines, operations and maintenance – balancing the development potential alongside the needs of the marine environment and other users of the sea.

143. However, as discussed in our 'Barriers to deployment chapter', there are legal and regulatory barriers that would need to be addressed prior to deployment. We would encourage developers to consider this approach early in their project planning stages, and discuss with Marine Scotland and other developers and operators as early as possible. In addition, the drop in levelised cost of fixed-bottom offshore wind has had negative consequences for Scottish and UK supply chain development, with cost reduction and risk being pushed down the supply chain.

³² <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>

³³ <https://www.carbontrust.com/our-projects/offshore-wind-accelerator-owa>

Synergies with other Sectors

Hydrogen

144. As mentioned in the Future Position section, we received a hugely positive response regarding the potential for hydrogen production from offshore wind. Developers are becoming increasingly interested in the concept of using electricity generated from offshore wind resources to produce **large scale green hydrogen** via electrolysis. This technology is also referred to as 'power-to-gas'.

145. There is huge export opportunity linked to the production of green hydrogen, however a suitable mechanism is required to facilitate production from renewable sources. This could take the form of dedicated offshore wind projects without a grid connection, or surplus turbines that are part of a wider project that holds a CfD. It is therefore imperative that existing energy innovation hubs and centres focus on exploring innovation in hydrogen production and the use of electrolysers connected to offshore wind developments

146. Hydrogen and offshore wind is a key area of focus for the Scottish Government in terms of innovation and R&D. We are developing our policy response to this opportunity through our Hydrogen Assessment Project, that will inform the publication of a Hydrogen Policy Statement and Action Plan for Scotland by the end of the calendar year.

Oil and Gas

147. Our oil and gas industry and heritage can provide much of the expertise and skills to support our transition to a different energy future. Scotland's oil and gas sector has 40 years' experience of operating in the North Sea, and possesses vital subsea skills which can help overcome the engineering and innovation challenges presented by the move to a low carbon future.

148. For example, Scotland's oil and gas industry has developed a cluster of companies with world class expertise in underwater engineering – approximately half of the subsea installations in the world today are in the North Sea, a strength that can be developed even further.

149. The sector also has extensive experience in heavy steel and concrete fabrication, operations and maintenance of offshore structures and complex large scale project management. It also has access to onshore infrastructure which could be shared – including general service vessels, jack-up rigs and accommodation vessels, as well as geophysical survey kit and sea trenching plant.

150. There is also scope to reduce the offshore wind sector's development and operational costs. The oil and gas sector has made great progress in managing costs and improving efficiencies, and its experience could benefit the offshore wind sector in terms of managing costs and delivery of considerable project benefits.

151. As the floating wind example demonstrates, the energy transition also creates opportunities to more closely connect all forms of offshore energy production. The Oil and Gas Authority (OGA) Energy Integration Project³⁴ has been hugely valuable in exploring the potential for a more integrated offshore energy sector, including innovative and closer links between oil and gas production and offshore renewables. UKCS Energy Integration: Final Report³⁵ was published in August, and indicates that the integration of offshore energy systems, including offshore electrification, CCS, and hydrogen, could deliver 30% of the UK's decarbonisation requirements, increasing to 60% with the inclusion of offshore renewables such as wind, wave and tidal. The report finds that the integration of energy technologies would not only support the delivery of net zero ambitions, but also make these technologies more economically attractive.

152. The reports sets out a clear set of recommendations to realise this potential including: Accelerating and enabling energy integration projects: Leveraging oil and gas assets and capabilities to support offshore renewables expansion; the coordination of regulatory processes and; utilising digital and data to enhance visibility of cross industry opportunities

153. Significant work in this area is also being driven by a new venture between the Oil and Gas Technology Centre (OGTC) and ORE Catapult, who recently joined forces to launch a 5 year Energy Transition Alliance with the aim of delivering advanced technologies to accelerate the transition to net zero across the UK.

154. The Scottish Government recognises that the public sector has a significant role to play in ensuring that the synergies between oil and gas and renewables are fully realised. The recently launched £62 million Energy Transition Fund will contribute to this by supporting businesses in the oil, gas and energy sectors from 2020-2025 as they undertake a just transitions into low carbon and renewable sectors.

155. The projects considered for support include the creation of an Energy Transition Zone (ETZ) in Aberdeen and a Global Underwater Hub (GUH), projects aimed at positioning the North East as a hydrogen model region, and a range of innovation projects led by the OGTC's Net Zero Solution Centre. These projects will, as part of their wider aims of leveraging the collective strengths of Scotland's underwater industries, look to accelerate innovation in offshore wind, and support growth in international markets.

156. It is intended that, subject to planning, the ETZ will result in the creation of a business park supporting the technology and innovation environment in Aberdeen by enabling large scale partnered projects focused on offshore wind; hydrogen; CCUS, alongside oil and gas.

157. The GUH will provide a cross-sectoral framework to ensure manufacturing and service companies and research institutions engaged in oil and gas, offshore

³⁴ <https://www.ogauthority.co.uk/the-move-to-net-zero/energy-integration/>

³⁵ <https://www.ogauthority.co.uk/news-publications/news/2020/offshore-energy-integration-can-deliver-30-of-uk-s-net-zero-target/>

renewables, CCUS, aquaculture and defence, work collectively and capitalise on the market opportunities, in the UK and internationally.

158. Although Sectoral Marine Plans will identify sites suitable for projects with a generating capacity greater than 100 MW, the Scottish Government remains committed to considering opportunities for innovative offshore wind development within Scottish waters. We recommend early and proactive engagement with Crown Estate Scotland, Marine Scotland and other stakeholders (as appropriate) to discuss any such development proposals.

159. Future rounds of offshore wind development also present the opportunity to explore options for 'hybrid projects' or projects that support the decarbonisation of the oil and gas sector – i.e. sharing transmission infrastructure and assets between projects. This approach may offer potential cost and space savings, as well as potential reductions in environmental impacts.

As of October 2020, the list of consented, operational and in-planning offshore wind projects in Scottish waters is as follows.

Consented, Operational and Planned Offshore Wind Projects

Site Name	Development Status	Capacity (MW)	Installed capacity (MW)
Forth of Firth (Methil)	Consented	29.9	
Dounreay Tri Floating Wind Demonstration	Consented	12	
Inch Cape	Consented	1000	
Moray Offshore Windfarm (West) Limited	Consented	850	
Neart na Gaoithe Offshore Wind Farm (Revised Design)	Consented	450	
Seagreen Alpha Offshore Wind Farm	Consented	525	
Seagreen Bravo Offshore Wind Farm	Consented	525	
Kincardine Offshore Windfarm	Construction	50	
Moray East (MacColl, Telford and Stevenson) Offshore Windfarms	Construction	1116	
European Offshore Wind Deployment Centre (EOWDC) (Aberdeen Bay - Demonstration site)	Operational	100	93.2

Beatrice Demonstrator	Operational (to be decommissioned)	10	10
Beatrice	Operational	750	588
Hywind Scotland Pilot Park	Operational	30	29
Levenmouth demonstration turbine (Fife Energy Park)	Operational	7	7
Robin Rigg	Operational	180	174



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