Technological Innovation and Climate Change: Role of Offshore Wind
Response from Shell UK
15 May

Shell UK Ltd[1] welcomes the opportunity to respond to the Environmental Audit Committee's inquiry into "Technological Innovation and Climate Change", with the first part of this inquiry focusing on the role of Offshore Wind.

Shell UK's Interests

Shell has had a home in the UK since 1897, currently employing around 6,000 skilled staff in this country. Globally, Shell is organised into four separate businesses: Upstream, Downstream, Projects & Technology, and Integrated Gas & New Energies. All four businesses operate in the UK, making a vital contribution to its energy security and economy. In addition, Shell Energy Europe Ltd, based in London, is a leading trader of energy commodities, including gas, power and environmental products.

Shell fully supports the goal of the Paris Climate Agreement and the UK's 2050 net zero target, and, in April 2020, Shell announced that it aims to be a net-zero emissions energy business by 2050, or sooner if possible, in step with society.

Firstly, by seeking to be net zero on all the emissions from the manufacture of all our products by 2050 at the latest. This ambition includes the emissions created by our operations and also those associated with the energy we consume. But the bulk of the emissions are our customers' emissions when they use our products, known as scope three emissions.

That is why Shell's second step towards being a net-zero emissions energy business is to reduce the Net Carbon Footprint of our energy products, in step with society's progress. To achieve this Shell will need to sell more products with a lower carbon intensity, such as renewable power, biofuels and hydrogen. Our long-term ambition is to reduce the Net Carbon Footprint of the energy products we sell globally by 65% by 2050%.

Finally, as a business that supplies energy, we will work with sectors which use energy to help identify and enable decarbonisation pathways for them to follow towards a net zero emissions future. And for those customers who still have emissions as they near 2050, we will work ever more intensely with them to find a way to mitigate those emissions.[2]

Shell considers the UK a globally important market as we build the low carbon businesses of tomorrow.

Through Shell Energy Retail Ltd, we provide GB home energy customers with 100% certified renewable electricity, and future access to a wealth of smart services including sonnen home batteries and B-Snug hybrid heat pumps.

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[1] The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate legal entities. In this submission "Shell" and "Shell Group" are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general.

[2] it is important to note that as of 15 May, Shell's operating plans and budgets do not reflect Shell's Net-Zero Emissions ambition. Shell's aim is that, in the future, its operating plans and budgets will change to reflect this movement towards its new Net-Zero Emissions ambition. However, these plans and budgets need to be in step with the movement towards a Net-Zero Emissions economy within society and among Shell's customers. Also, in this submission we may refer to Shell's "Net Carbon Footprint", which includes Shell's carbon emissions from the production of our energy products, our suppliers' carbon emissions in supplying energy for that production and our customers' carbon emissions associated with their use of the energy products we sell. Shell only controls its own emissions. The use of the term Shell's "Net Carbon Footprint" is for convenience only and not intended to suggest these emissions are those of Shell or its subsidiaries.

Shell UK is delivering electric vehicle charging at home (through New Motion) and on the move (through the network of ReCharge posts at Shell service stations, with 200 by 2021 and more to follow); and offering customers who fill up at UK service stations the opportunity to drive carbon neutral using nature-based carbon credits. In 2019, Shell started working with the Forestry and Land Scotland team to establish around a million trees across the forest estate over the course of five years. This activity will ultimately generate carbon credits for Shell and will form part of our global trading portfolio.

Shell UK is also investing in the early stages of two UK Carbon Capture, Usage and Storage ("CCUS") clusters, including the "Acorn" project at St Fergus in Scotland and Net Zero Teesside.

Shell does not yet have a position in UK offshore wind, but is actively seeking to grow our footprint here, leveraging our global experience. This ranges from operational and construction projects in the Netherlands; to large scale leases in the USA and floating projects in South Korea. We see many opportunities where offshore oil and gas capabilities can be transferred to offshore wind, both commercially and technically and are keen to grow our offshore wind footprint in the UK.

In late 2019, Shell, through one of its subsidiaries, acquired Eolfi, a French renewable energies developer specialised in floating wind projects. In addition, Shell is a 66% shareholder in a new floating foundation, Tetraspar, which will be tested off the coast of Norway in the coming year.

Technological Innovation and Climate Change: the Role of Offshore Wind

Shell globally believes offshore wind will play an increasing role in the decarbonisation of the global power system

The IEA predicts global offshore wind capacity could increase fifteen-fold to 2040, becoming a $1 trillion industry over the next two decades. Through leveraging the expertise and innovation of today's UK offshore wind market – the largest in the world – we believe UK industry could be well-positioned to lead globally this emerging trillion-dollar industry.[3]

Technological innovation – such as larger turbine sizes – has been critical for the success of offshore wind in the UK, and the resulting ever-declining costs. This is expected to continue, particularly in the context of floating wind turbine technologies.

In Shell UK's view, such innovation has been unlocked through:

1. A robust, predictable carbon price, delivered via the EU Emissions Trading Scheme coupled with the Carbon Price Support. We urge the government to safeguard appropriate carbon trading and Carbon Price Support arrangements as the UK leaves the EU

2. Time-limited early innovation and deployment funding, such as using the Contract for Difference regime to support pre-commercial technologies (whether through competition or bespoke arrangements).

3. Sectoral deals: in order to maximise collaboration across supply chains, working with governments to increase efficiencies, maximise the UK opportunity, and bring benefits to local communities.

4. The long-term, competitive Contract for Difference framework: in Shell's view, the stable market framework through the regular CfD auction process creates competition between developers, which incentivises each of them to control costs. And the pipeline of future auctions has given manufacturers the confidence they need to invest in innovation, scaling up and improving turbine technology: turbine sizes have increased by over 50% since 2010, with costs falling in parallel.

The opportunity

[3] IEA Offshore Wind Report, 2019, Link

Shell UK expects offshore wind technology costs will continue to decline, provided (i) CfD auctions scale to deliver the 40GW of offshore wind required by 2030 (ii) larger developments are unlocked through the appropriate leasing of larger areas of acreage and combined with streamlined and correctly resourced permitting and consenting; and (iii) the next generation of turbine technology is brought forward through initial innovation and deployment funding.

Shell UK supports the view of BEIS 2019 Energy Innovation Needs Assessment[4] that "*The value of innovation in floating offshore wind is significant and will support the commercialisation and future deployment to enable the UK to tap into new high wind speed resources",* and therefore that developing floating offshore wind should be a priority for the future. In the context of the need for a green recovery from COVID-19 , we note the Assessment's conclusion that "*significant innovation opportunities exist in this space ranging from foundations, installation, logistics as well as offshore operations. Developers suggested that there is a significant opportunity to reduce cost by utilising the UK's supply cha n expertise in ship building and the maritime sector. The UK has a strong history of innovation in sectors such as shipbuilding and Oil & Gas that can be mobilised for floating wind".*

Floating offshore wind is where, instead of fixing turbines to the seabed, floating turbines are anchored in deeper waters than possible for fixed turbines, thereby opening-up deeper-water areas where wind speeds are typically higher, giving access to the best wind resources. By some estimates, 80% of the potential offshore wind resource in Europe (4,000GW) and Japan (500GW) and 60% of potential offshore wind resource in the USA (2,450GW) is in waters of 60 metres or deeper.[5] Additionally, floating technologies can open-up areas of seabed with different ground conditions, and can also overcome potential environmental concerns around underwater construction noise from piling.

In Shell UK's view, investment and policy support in the 2020s could enable floating offshore wind to be cost-competitive by 2030, and thereby giving the option to deploy at scale in the 2030s. Such a pathway will be critical to delivering 75GW of offshore wind by 2050, as implied by Net Zero.[6].

Today, the floating wind market consists almost solely of Hywind Scotland's 30 MW park, the world's first grid-connected floating windfarm. However, several demonstrator projects are in development, such as the TetraSpar project being progressed by Shell with partners Stiesdal Offshore Technologies and Innogy.

The potential for exporting innovative technology is significant, with other European markets, South Korea, Japan, the West Coast of the US and China potential markets. Without government investment and support, it is likely that these markets could develop floating technologies and benefit from early-mover advantage in the long term versus the UK.

There are also likely to be significant supply chain benefits as discussed by the BEIS Assessment referenced; we therefore consider that developing floating wind technologies in the 2020s with the aim of deploying at scale in the 2030s could bring economic benefits to a range of coastal communities around the UK, in line with the government's Industrial Strategy. Floating wind deployment could also provide benefits to all of the UK as it will open up the opportunity to consider access to waters that are otherwise unsuitable for fixed turbines.

Shell UK is also of the view that floating wind presents an opportunity to make use of the UK's world-leading skills and capabilities from the offshore oil and gas sectors, and may play a role in supporting the transition to net zero for this sector. Looking across energy systems, the government

[4] 2019 Energy Innovation Needs Assessment: Offshore Wind, BEIS, 2019, Link

[5] Macroeconomic benefits of floating offsfhore wind to the UK, Crown Estate Scotland and Energy Catapult, 2018, Link

[6] *Net Zero*, May 2019, Committee on Climate Change, Link

should also consider the potential opportunities to link offshore wind projects to oil and gas assets to support decarbonisation of indigenous hydrocarbon production.

Policy interventions required

To unlock the potential benefits of floating offshore wind, initial specific government support will likely be required, ideally starting from the next CfD auction ('allocation round 4').

Shell UK fully supports the proposal set out in the government's recent consultation to include floating wind in 'Pot 2' which covers less-established technologies such as tidal generation and remote island wind, potentially with minima to ensure diversity of competition between these technologies. We also support the proposal to separate (fixed) offshore wind into a new 'Pot 3' to enable the rapid deployment of that technology to proceed in the 2020s. Over time we expect CfD "pots" to converge to allow mature technologies to compete on an equal basis, driving down costs for consumers.

To support an acceleration of the rate of deployment of offshore wind, we are of the view that government should hold more frequent auctions. This should have the benefit of 'flattening out' the deployment of projects for consenting bodies/ regulators, the supply chain and developers alike, reducing the critical path for project development.

The government should also work with devolved governments, regulatory bodies and the Crown Estate/Crown Estate Scotland to ensure that future marine spatial planning and leasing processes allow for commercial floating wind sites to be made available.

Greening the recovery

In the context of the unprecedented economic hibernation resulting from Coronavirus, we recognise that government will have significantly less fiscal headroom than at any other time in recent history.

COVID19 has plunged the world into an unprecedented crisis, and economic responses from governments will rightly seek to address both emergency support to cashflow-constrained consumers and businesses, and to minomise permanent structural damage to the economy.

In Shell's view, appropriately targeted investment in power infrastructure should be considered as an option to both stimulate economic activity in the near-term and enhance the capacity of the economy to grow – and decarbonise - in the longer-term.

For example, increased CfD support for renewables and Carbon Capture and Storage – another technology where the UK has both world-leading resources and strong academic and industry expertise - could unlock significant jobs across the supply chain today, but at low cost to today's Treasury or consumer.

Other "green recovery" investments could include expanding transmission and distribution infrastructure to accommodate more and decarbonised electricity, or upgrading ageing grid infrastructures to make them smarter (e.g., to improve operation and efficiency, to effectively integrate different power and flexibility sources, and to be responsive to end consumers)

Finally, time-limited support to commercialise close-to-market green technologies such as offshore wind could deliver breakthroughs over relatively short timeframes, subsequently crowding in private investment and leading to their earlier and at-scale deployment, with the UK then taking a global leadership role in the development and delivery of those technologies in the future.

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