

Roadmap to net zero: a manifesto for a fully decarbonised power system by 2035

June 2022





RenewableUK members are building our future energy system, powered by clean electricity.

We bring them together to deliver that future faster; a future which is better for industry, billpayers, and the environment. We support over 400 member companies to ensure increasing amounts of renewable electricity are deployed across the UK and access markets to export all over the world. Our members are business leaders, technology innovators, and expert thinkers from right across industry.

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Foreword

Renewables are playing a more important role in our energy system than ever before, as the gas crisis and invasion of Ukraine push the cost of fossil fuels – and consumer bills – to record highs. Last year in the UK renewables produced 122TWh, 39% of total electricity generation. Replacing that with gas, at current prices, would cost at least £18bn – equivalent to £220 per household. In contrast, wind farms operating under Contracts for Difference are set to pay back over £550m in the year to September. The only way to sustainably guard against wild price swings is by rapidly switching to low-cost, home-grown renewable energy.

Government has underlined its commitment to this approach in the British Energy Security Strategy, setting a goal of 95% low carbon power by 2030. To meet the 6th Carbon Budget, we will need a fully decarbonised power system by 2035. Turning these goals into reality will mean that in the next 8 years we need to vastly increase our renewable sources of power and invest in new technologies like green hydrogen. It will require vast amounts of capital, £175bn in wind energy alone, as well as innovation and sustainable markets that support growing supply chains.

The Energy Strategy set sector-specific targets and it is clear that offshore wind will do the heavy-lifting in decarbonising our power system. We have a world-class wind resource and a mature industry that has innovated to make offshore wind one of the cheapest options for new power. We've achieved all this in a little over a decade, so it's fair to say our industry thrives on challenges – we've met and exceeded each one set for us to date. Meeting the UK's new 50GW ambition is our biggest challenge yet.

In a few weeks, the 4th CfD allocation round is expected to deliver record capacity across all renewable technologies and underlining the success industry has achieved in scaling up. Successful offshore projects in AR4 will begin generating in 2025 but some were leased in 2010. Meeting our target means unlocking speed. Industry is working

with Ministers to accelerate the development and consenting process to meet 50GW, and vital planning reforms are in train. I believe we can go further. We should consider a more strategic regulatory approach that brings together the skills, capacity and functions of disparate bodies in offshore development and consenting into a more centralised process or body.

Energy security is at the top of the political agenda as countries recognise the urgent need to end reliance on imported fossil fuels. The energy trilemma of sustainability, cost and security is back. As a result, many countries are ramping up renewable capacity more swiftly. I was recently in the USA and saw first hand the ambition and pace at which that market is moving. It is a truly global trend, and this new competition is stretching global supply chains at a time of rising costs and logistics crunches and dislocation.

The ever-downward trajectory of prices can no longer be taken for granted and there is increasing concern about sustainability in the market. The upcoming market reform process provides a crucial opportunity to evolve our market framework and build more resilience into the system. The CfD has been an incredible tool to attract investment and provide low and stable prices for consumers. Alongside that, reforms must ensure that it supports investment and sustainability in the supply chains needed to deliver new energy sources.

This report sets out our priorities and policy proposals to Government on how the UK can best meet our decarbonisation targets by harnessing the unparalleled opportunity renewables present to provide affordable, clean, secure energy to consumers.



Dan McGrail
Chief Executive, RenewableUK



Executive Summary

On the pathway to net zero, speed is key. We need to deliver more than half of the of the total emissions reduction required by 2050 within the next 13 years. A fully decarbonised power system by 2035, with renewables at its heart, will make this possible.

The renewable industry has a vision for how this can be delivered, but clearly some things will need to change for the ambition to translate into reality. The current market framework has successfully driven down costs and mobilised investment. But the framework needs to evolve to deliver the pace of deployment required and supports investment and sustainability in the supply chain. Alongside these changes, we will also need to transform the way we plan and regulate our energy system, as well as deal with barriers to development of strategic infrastructure. In addition, we need to harness the power of new technologies to create new markets for clean electricity, such as green hydrogen.

If we get this right, the economic and social benefit will be significant. Up to £175bn stands to be invested in onshore and offshore wind to 2030, cutting consumer bills and reducing our reliance on gas and global energy markets. This investment will create jobs across the country, as well as support growth and competitiveness in the economy.

To guide the transformation needed to fully decarbonise the power sector by 2035, this report sets out a framework for market, regulatory and policy reform. It provides a set of priority actions for the coming months that will enable bills and emissions to be reduced as fast as possible over the next decade, while also addressing the range of strategic barriers to delivering the necessary infrastructure required.

The document is structured as follows:

- 1. Critical pathway to a zero-emission power system:** highlights the levels of new power generation capacity we need to achieve the UK's climate goals
- 2. Reforming markets to drive low-carbon investment:** addresses the need to evolve current market frameworks to secure the additional investment needed and build greater resilience into the market
- 3. Creating a Net Zero network:** considers how regulatory reform can remove barriers to new renewable energy projects and enable further investment
- 4. Accelerating renewable deployment:** highlights additional issues that Government can address to help maximise renewable energy deployment
- 5. A green hydrogen revolution:** reviews the opportunities and priorities for cutting costs of hydrogen produced from renewable power, and accelerating the development a green hydrogen economy
- 6. Maximising the economic opportunity:** notes the economic benefits of delivering new renewable energy projects and recommendations on how to achieve this sustainably

Key short-term recommendations for Government

- Develop proposals for CfD allocation reforms which **enhance investment in resilience and sustainability**, particularly in supply chains
 - Government should scope **development of a centralised regulatory authority** to streamline offshore wind development
 - Government and The Crown Estate should work together to **outline a forward plan for the 2020s that sets out how the programme of CfD auctions and leasing rounds will be aligned** to maximise certainty for the sector
 - Formally update **Ofgem's remit via the Strategy and Policy Statement** this year with a legal duty to deliver the 2050 net zero emissions target
1. Through detailed engagement, Government should **design the new onshore communities scheme in a way that enables maximum deployment** in parts of England where there is local support
 - Define a **zero carbon hydrogen standard** and tailor the Hydrogen Business Model to **support green hydrogen production at different scales** including exemption from levies
 - Conduct a **formal review of how the education and skills framework can support the net zero transition**, including the development of highly-skilled green jobs

Key long-term recommendations for Government

- Building on the detail in the Net Zero Strategy, develop an **overarching '2035 plan'** for addressing the strategic barriers to deploying the necessary low-carbon capacity, such as cross-cutting planning issues and network delivery challenges
- Use the existing Offshore Transmission Network Review to **establish a long-term solution for planning integrated offshore grid infrastructure post-2030**, identifying a framework that will minimise development risk and increase the rate of deployment
- To **maximise the potential for a wider range of flexible energy sources**, provide innovation funding for new long duration storage technologies and create a clear route to market for long duration storage, including pumped storage hydropower
- Government should lead the **development of a comprehensive strategic plan for the marine environment** that outlines how trade-offs will be made across different seabed users
- Develop a **'Just Transition Strategy'** to set out how the UK is utilising energy decarbonisation to 'level-up' and ensure no one and nowhere is left behind



Section 1

Critical pathway to a zero-emission power system

CONTEXT

The Government's targets for 95% low carbon electricity by 2030 and to fully decarbonised power system by 2035 is a vital step towards achieving net zero. The commitment will do more than just help the country move away from a reliance on fossil fuels in the power sector, it will also pave the way for widespread electrification across the economy.

Significant progress in decarbonising the power sector has already been made. Emissions from the power sector have fallen by 68 per cent since 1990, driven by the phase out of coal-fired generation, and rapid growth in renewable power. This has been made possible thanks to significant falls in the cost of renewable energy generation, with offshore wind costs falling from £150/MWh to £40/MWh over the last decade.

However, the pace of change over the next decade will have to accelerate dramatically. The Government has set a target of quadrupling offshore wind capacity to 50GW and industry believes we need to double onshore wind to 30GW by 2030. Alongside decarbonising our current power supply, the Government's Net Zero Strategy set out that electricity demand will increase by 40-60% by 2035¹, as other sectors require more low-carbon electricity.

With the ambition from government and industry clear, now is the time to put in place a detailed plan to enable the transition. This will need to focus on the rapid deployment of renewable electricity generation over the next decade to form the backbone of a zero-emission economy, alongside securing firm low-carbon power to keep costs down and the system secure. The focus will need to be on near-term actions that will unlock investment, as well as longer-term strategic reforms that will maximise economic opportunity.

PRIORITIES

The importance of renewable power in 2035

Fully decarbonising the power sector by 2035 aligns with the emissions reduction pathways presented by the CCC in its advice on setting the 6th Carbon Budget. Their analysis presents various scenarios for cutting economy-wide emissions by 78% compared to 1990 levels by 2035. Under all these pathways, a fully decarbonised power system by 2035 dominated by renewable energy is an essential ingredient, allowing us to frontload the UK's decarbonisation efforts and deliver the target of achieving a 78% fall in total UK emissions in just 13 years' time.

Delivering the target will require a significant increase in renewable power generation over the next decade. The CCC's analysis forecasts an increase in demand for electricity, rising to 460 TWh in 2035. More than 70 per cent of this demand, 335 TWh, will be met by renewables providing affordable power to millions of homes across the country².

The Government's 50GW target is a challenging but necessary milestone if the country is to maintain the trajectory required to deploy 95-125GW of offshore wind capacity by 2050.

Other renewable technologies will also be required. While the CCC forecasts that onshore wind capacity will need to double by 2050, the industry is ambitious and believes that target can be met early, delivering 30GW of capacity by 2030. Alongside onshore wind, an annual build rate of around 3GW will also be required for solar, increasing the level of output from 10TWh in 2019 to 60TWh in 2035. Floating wind and marine energy will also play a critical role in expanding the renewables sector into new geographic areas.

Alongside rapid increases in renewable power supplies, it will be vital to develop a range of flexible energy sources to deal with periods where renewable generation falls. Embedding flexibility across the energy system, not just in power generation, will bring additional benefits, such as smart-charging of electric vehicles and flexible low-carbon heating systems in people's homes. A smart system will minimise challenges, while maximising benefits.

Achieving this step change in the deployment of renewable power and flexible technologies will require addressing a series of strategic barriers to deployment – ranging from reform of the current planning process, to changes to the way we regulate energy networks. Some of these actions are underway, including accelerated consenting for offshore wind and the Offshore Transmission Network Review, but we need to go further.

ACTIONS

The success we have had to date in decarbonising the power sector shows what is possible, but the demands of meeting the target to reach a net zero power system by 2035 will be more significant. Coordinated action to increase deployment of all forms of low-carbon power while phasing out fossil fuels from the system must be prioritised.

Short-term actions for Government

- » Examine how to streamline the process for developing new offshore wind sites, bringing together the skills, experience and capacity currently spread across disparate regulatory bodies
- » Set a commitment to phase out unabated gas generation in the power sector by 2035, subject to security of supply considerations
- » Outline a policy and regulatory framework for supporting the repowering of existing renewable sites to maximise the amount of existing capacity that can be kept on the system out to 2035

Long-term actions for Government

- » Building on the detail in the Net Zero Strategy, develop an overarching '2035 plan' for addressing the strategic barriers to deploying the necessary low-carbon capacity, such as cross-cutting planning issues and network delivery challenges
- » Commit to publishing an update to the Smart Systems & Flexibility plan every two years over the 2020s to reflect the pace of development of system flexibility and the wider reforms required
- » Within the annual Government performance update to the Net Zero Strategy, set out clearly the predicted ranges of renewable capacity that will be delivered by 2035, and where technology specific targets already exist, update them to reflect the 2035 target



Photo: Vattenfall

¹ HM Government, Net Zero Strategy, October 2021,

² Ibid

Section 2

Reforming markets to drive low-carbon investment

CONTEXT

The UK's energy market framework has been very successful in securing new generation capacity and significant private investment at a low-cost. The CfD has been a crucial part of this success and while the current auction round will deliver a record amount of new capacity, it may not be enough to put us on track towards the 50GW target.

Looking ahead, if we are to deliver the pipeline of new projects required to fully decarbonise the power sector by 2035, a evolution of the current market needs to take place. Market reform can ensure that the pace of deployment can accelerate sustainably, develop our industrial capacity and provide consumers with energy at a low and stable price.

The new challenges posed by the current gas crisis and impact on consumers, as well as maturing technology and an increasingly challenging international environment. Not only have global commodity prices soared since the lifting of Covid restrictions and the invasion of Ukraine, but the international investment environment is also shifting rapidly, particularly as interest rates rise.

Against these global headwinds and cost pressures, we must also consider the maturity of offshore wind. A decade of technology innovation has slashed offshore wind costs by over two-thirds. Having made those unprecedented gains and making wind energy the cheapest option for the UK, the trajectory of ever cheaper prices cannot be assumed. International demand for offshore wind – both in terms of technology and capital – are surging. While the industry in the UK continues to innovate across the value chain, prices are likely to stabilise and even rise in response to global challenges.

Nonetheless, offshore wind and low-cost renewables remain the cheapest and most effective option to meet the trilemma of affordable, clean and secure energy for consumers.

PRIORITIES

Evolution of the current market framework

The CfD framework remains the best route to deliver the generation volumes required out to 2035, however, reform is clearly needed to accelerate deployment and build greater resilience into the system. An evolution of the current market framework must be proportionate and underpinned by a clear set of objectives. The market framework should incentivise long-term capital investment in major projects, provide consumers with clean energy at low and stable prices, and ensure sustainability of supply chains.

The Review of Energy Market Arrangements (REMA) will examine the current EMR set-up and wider reforms. Careful consideration will need to be given to CfD reform, perhaps entailing a shift to a greater focus on payment based on availability to link the mechanism more directly with the Capacity Market and sharpen incentives for generators to respond to short-term market signals.

Competition must remain a central pillar of any CfD reform to ensure that consumers are benefitting from lowest cost energy. Alongside this, we must consider how the market can better encourage investment in resilience and sustainability. This is true not only of generation sources but also our supply chains. As prices have converged at very low levels across much of Europe, a number of markets are considering an additional role for 'non-price criteria' for determining allocation of CfDs. Such an approach is a novel option to ensure energy policy supports wider economic and social objectives and should be explored in the market reform process.

Industry has welcomed the inclusion of minima for floating wind and tidal stream in CfD allocation round 4. However, while the allocation for less established technologies (Pot 2) has created the world leading offshore wind market we have today, it is not functioning for other technologies. Of the 14 non-wind projects competitively awarded a CfD in Pot 2, only two have been delivered. To maximise innovation and development of these technologies, it is time to consider whether a different model of allocation is required for innovation.

More widely, REMA is expected to consider wholesale market changes. Under current arrangements, wholesale prices will become increasingly volatile as more variable generation comes online. The model will have to evolve to ensure that there is true value within the market framework for low-carbon generation, opposed to simply the marginal plant, usually gas, on the system.

Ahead of REMA, academics, think-tanks and market analysts have proposed various market reforms to accelerate the shift to an affordable, secure, net zero power system. Locational Marginal Pricing, for example, has been put forward as a fundamental reform of the wholesale market. Proponents of LMP suggest it could reduce costs of managing the system, while many in industry are concerned that increased price risk for projects would push up finance and consumer costs, while also slowing investment. The trade-offs involved in all reform proposals underline the need for clear objectives in this process – investment, cost and sustainability.

Development of flexibility markets

Alongside wider market reform, changes to promote the role of flexibility at all levels in the system will be key. The CCC identifies hydrogen as the primary source of energy storage, supported by pumped hydro and inter-day storage from batteries. Greater levels of flexibility in the system will allow the UK to integrate renewables with significant savings of up to £16.7bn a year in 2050.¹

The role of carbon pricing will be critical in ensuring that there are carbon signals at play in flexibility markets, while longer-term changes to pricing structures could present opportunities in future to ensure the right market signals are being sent. System services such as frequency response and inertia will actively support the growth of non-synchronous generation such as wind and solar as they develop. Careful policy design will be required to bring this flexibility into the system in a way that does not undermine the investment case for the broader electricity market.

ACTIONS

Following the success of EMR in the last decade, market reform is coming. Evolving the CfD and wider market arrangements are needed to respond to new global challenges, rapidly reduce consumer costs and maximise industrial benefits of the UK's energy transition.

Short-term actions for Government

- » In the short term, ensure CfD allocation round parameters enable maximum deployment of low cost technologies – particularly offshore wind to meet our 50GW target
- » Review the functioning of Pot 2 of the CfD to ensure that we maximise the benefit of developing less established technologies, particularly floating wind and marine power
- » Consider what short-term changes could be introduced to ensure all generators are more responsive to short-term price signals, including low-carbon generators

- » Develop more comprehensive future flexibility markets and services through Government working closely with NG ESO and Ofgem to deliver the actions set out in the Smart System's and Flexibility plan

Long-term actions for Government

- » Develop CfD and wholesale market reforms which incentivise long-term capital investment, provide consumers with clean energy at low and stable prices, and enhance the sustainability of supply chains.
- » Use the Government's developing plans for cross-economy carbon pricing to send market signals that support investment in low-carbon flexibility and balancing services
- » To maximise the potential for a wider range of flexible energy sources, provide innovation funding for new long duration storage technologies and create a clear route to market for long duration storage, including pumped storage hydropower

¹ The Carbon Trust, Flexibility in Great Britain, May 2021

Section 3

Creating a Net Zero network

CONTEXT

The current system of network design and management is based on incremental change to a fossil fuel led system. While new investments were required over time, the main focus of network development has historically been on the maintenance of existing assets and dealing with localised constraints.

Given the scale of new investment that will be required right across the energy system out to 2050, fundamental reform of the way we design, plan and deliver network infrastructure will be required. This will include coordinating onshore and offshore transmission in order to minimise the localised impacts of new infrastructure of developing major pieces of network infrastructure in already constrained areas, as we have seen on the East Coast of England.

Despite the UK's increasingly ambitious decarbonisation ambitions, there has been no formal change to the regulatory underpinning of decision making that is needed to facilitate this transition across the energy networks. This means that the incremental regulatory approach to network development needs to be addressed, shown through some of the recent challenges on the latest set of network price controls.

A range of challenges currently faced by renewable energy developers could be addressed through a process of regulatory reform that supports anticipatory investment, ensures the network is paid for fairly, and long-term planning is encouraged.

PRIORITIES

Role of the regulator

As Government sets out a clear framework for action on the net zero agenda, it is right that the broader policy and regulatory framework adapts to reflect that new ambition. Government needs to ensure that markets and systems are underpinned by a clear decarbonisation remit, so that the carbon intensity of system services is valued and measured transparently.

Ofgem's current mandate does not fully reflect the need to support the transition to net zero. This impacts its ability to prioritise decarbonisation against its other responsibilities. Given the vital role that Ofgem plays in shaping investment across the net zero transition, ensuring that its remit fully reflects the long-term goal will be critical, therefore giving Ofgem a legal duty to deliver the net zero target is an essential action for Government.

The recent Government commitment in the Net Zero Strategy to publish and consult on an energy sector strategy and policy statement (SPS) for Ofgem is vitally important. Publishing a SPS this year that gives Ofgem a legal obligation to have regard for strategic priorities like decarbonisation will provide the basis for sending the right market signals to mobilise new investment.

Even within its current remit and responsibilities, Ofgem has a vital role to play in mobilising investment across its core set of price controls. Investing in a net zero network should be at the forefront of the next price control settlements for energy network and transmissions companies, enabled through forthcoming determinations on investment RIIO-ED2. This will need to include anticipatory investment which offers the opportunity to get ahead of public demand and avoid any sense that the right infrastructure is missing as uptake accelerates.

Network design and delivery

The current approach to prioritise point to point network connections for major new low-carbon infrastructure projects has run its course. The current approach risks creating local opposition, as well as driving up the cost of the net zero transition through less efficient investment. The Government has acknowledged this and launched the Offshore Transmission Network Review (OTNR), a process strongly supported by the sector. 2022 is a crucial year for progressing the OTNR in order to help accelerate new infrastructure deployment and secure a pipeline of international investment.

The Net Zero Strategy commits the Government to adopting a new approach to offshore electricity networks. As Government consults on a new long-

term policy regime for offshore networks in the OTNR, it is vital that the new enduring regime being created allows for strategic planning to reduce barriers to the development process down the line. This will help deliver the grid connections needed for the UK's offshore wind expansion in the most efficient way, benefitting local communities as well as energy consumers.

Alongside more fundamental reform, it will also be important to ensure that the current crop of projects in the pipeline are able to move forward at pace. This could be done through maximising the range of projects that can have early access to coordinated connections so they can still support the delivery of the Government's 2030 40GW target.

Also critical to the development of the network will be wider reforms to the framework for energy system governance, including the separation of the ESO from National Grid. These reforms must consider how to deliver a more coordinated and long-term approach to network planning to support the delivery of low-carbon infrastructure, de-risking the development process down the line. There is also a need for greater co-ordination between DNOs and NGENSO for the provision of low-carbon flexibility services across the whole energy system.

ACTIONS

Developing a net zero network to support the development of low-carbon power projects will be critical to delivering the net zero target. A range of actions will be required to ensure the regulatory and policy framework that currently dictates the development of the network effectively mobilises the investment needed.

Short-term actions for Government

- » Formally update Ofgem's remit via the Strategy and Policy Statement this year with a legal duty to support delivery of the 2050 net zero emissions target, reflecting the need to support the net zero transition and enable anticipatory investment across the networks

- » Ensure that any reforms to the role of the Electricity System Operator consider the need for strategic network design, with a clear set of roles and responsibilities agreed to drive investment
- » Through the Offshore Transmission Network Review, prioritise early opportunities to coordinate investment in network assets for projects that can deliver ahead of the 40GW by 2030 target

Long-term actions for Government

- » Use the existing Offshore Transmission Network Review to establish a long-term solution for planning integrated offshore grid infrastructure post-2030, identifying a framework that will minimise development risk and increase the rate of deployment
- » As part of wider reforms to energy system governance, consider what roles and responsibilities and legal obligations across the system will best deliver a net zero network, including the respective role for the system operator to guide strategic investments



Photo: Ørsted

Section 4

Accelerating renewable deployment

CONTEXT

Even with clear investment mechanisms and functioning markets, there are a range of other barriers to the deployment of renewable energy projects that need to be addressed to reach a fully decarbonised power system by 2035. The system itself should be designed around the need to give a reasonable level of priority to the development of low-carbon infrastructure that has significant societal value. The current cost pressures that many households are facing highlight the wide benefits that the country can reap from accelerating renewable projects and should add urgency to our collective actions.

There are often non-market barriers encountered by renewable projects, which are not linked specifically to the energy system. A number of these barriers, such as parts of the planning regime, directly impact wider infrastructure delivery and there are therefore wider advantages in seeking to address them. This will require coordination across Government, as well as a range of regulatory bodies and wider stakeholders.

The overall focus of infrastructure delivery to support net zero should be to streamlined wherever possible. International companies and investors need to know that there is a clear pathway to developing their projects and securing access to the consents as soon as is possible.

PRIORITIES

Planning regime

The planning process for major low-carbon infrastructure projects, such as offshore wind, creates significant barriers to deployment. These lead to both substantive delays, as well as drive up the cost of development. Given the scale of the current planning challenges facing companies, there is a real risk that this undermines the UK's reputation as the pre-eminent location for international investment.

In the case of development offshore, the measures announced in the British Energy Security Strategy to accelerate the current consenting process are a

welcome step forward and industry is working with Government through the OWAT to progress these changes. But we should be more ambitious and imaginative. Government should consider how we can better bring together the disparate bodies with different roles and responsibilities in the leasing, development and consenting process into a more streamlined approach. Combining regulatory skills and capacity into a centralised regulator or one-stop-shop could significantly accelerate the process and allow us to strategically develop habitat solutions and environmental protections.

Non-market barriers

There are a range of other barriers that feed into the development timetable for new projects that will be critical to the delivery of the 2035 target. These include the seabed leasing process where the trade-off is most acute between the development of new infrastructure and the need of other seabed users, including fisheries and marine protected areas.

Building on recent leasing rounds, it will be important for The Crown Estate and Crown Estate Scotland to work with the System Operator and give the market maximum possible foresight on the future availability of seabed for future leasing opportunities. There is also an important role for Government in guiding the political tradeoffs that will have to be made over the use of seabed in the context of the net zero target, while also thinking about how the overall delivery model for offshore wind can be designed as efficiently as possible to drive deployment while respecting other demands on the seabed.

In addition to the availability of seabed, developers of low-carbon infrastructure projects must also contend with indirect conflicts with other strategic Government priorities. One example is the potential impact of offshore wind projects on radar installations that are vital for national security purposes. Significant work has been done to develop frameworks for addressing these issues.

Other barriers include the capabilities of bodies that support the industry, including the Marine Management Organisation (MMO) and the Joint Nature

Conservation Committee (JNCC). Ensuring that these organisations have sufficient capacity that is aligned around coordinated industry and project timelines will help tackle pinch points that can slow developments.

ACTIONS

To accelerate the deployment of low-carbon infrastructure projects, a range of non-market barriers will need to be addressed. There is a critical role for Government in making this possible by addressing shared challenges that impact wider infrastructure delivery across the UK.

Short-term actions for Government

- » OWAT must deliver rapid progress on regulatory measures and enabling legislation to implement acceleration set out in the Energy Strategy
- » Government, leasing bodies and the System Operator should work together to outline a forward plan for the 2020s that sets out how the programme of CfD auctions and leasing rounds will be aligned to maximise certainty for the sector

Long-term actions for Government

- » Government should scope development of a centralised regulatory authority to streamline offshore wind development.
- » Government should lead the development of a comprehensive strategic plan for the marine environment that outlines how trade-offs will be made across different seabed users
- » Through detailed engagement with local communities, Government should design the new onshore communities scheme in a way that enables maximum deployment in parts of England where there is local support



Photo: EDF Renewables



Photo: Red Rock Power Ltd

Section 5

A green hydrogen revolution

CONTEXT

Electrification alone is not enough to unlock a net zero energy system; there is also a need for renewable energy in a form that can be stored and used across wider applications. The dramatically declining costs of renewable power offer the chance to drive innovation in the green hydrogen sector to cut costs and reduce emissions. Action over the next decade will be critical given the Government's forecast in the target of at least 5GW of green hydrogen by 2030.

The diversity of applications and scales, such as in transport and industry means that creating secure, low-cost supplies of green hydrogen is a no-regrets option for Government as it looks to develop a UK hydrogen economy. The development of a hydrogen economy creates potential benefits for a decarbonised power system by providing opportunities for offtake from renewable power production, creating both energy system flexibility and inter-seasonal storage. Hydrogen production can add to multi-technology sites, which can help create new routes to market.

With wind and solar now the cheapest forms of new build electricity generation available in the UK, renewable electricity is becoming one of the best options for the country's long-term hydrogen production needs. Research by the Offshore Renewable Energy Catapult shows that significant cost reduction can take place by 2030¹, with renewable hydrogen competitive, or even costing less to produce than blue hydrogen, a trend accelerated by current gas price spike.

The cost reduction in renewable hydrogen will be achieved through accelerated deployment of electrolysis, coupled with targeted research and development (R&D), and demonstration projects and technology validation at large-scale. This will require the UK to develop the right framework to drive down costs and upscale production rapidly over the 2020s.

PRIORITIES

Development of a UK production market

Green hydrogen can enable deep decarbonisation in sectors ranging from heavy duty road transport to maritime shipping, and as a feedstock for producing essential chemicals, such as fertilisers. Green hydrogen is unique among other types of hydrogen because it also helps solve the challenge of integrating renewables into our energy system through providing balancing services, seasonal storage, avoiding curtailment and creating a fuel that can be used in peaking plant to fully end our use of gas for power.

The British Energy Security Strategy confirmed the Government's ambition to building a world-leading green hydrogen industry in the UK.

Rapid progress on projects to meet our target of at least 5GW green hydrogen by 2030 will support UK firms and technology to be compete in the global race for green hydrogen.

To mobilise the rate of deployment needed, Government will need to tailor the Hydrogen Business Model to support green hydrogen production at different scales to come forward. Equally, there are important regulatory challenges that need to be addressed such as simplifying and clarifying the consenting process for green hydrogen production, defining a zero carbon hydrogen standard and encourage co-location and retrofit.

Creating markets for green hydrogen

While industry waits for further detail on the proposed hydrogen business model, there are other market-building blocks for green hydrogen that can be put in place. We know that this low carbon fuel will play a critical role in decarbonising industry and heavy transport, as well as a limited role in heating.

To avoid a 'chicken and egg' situation slowing investment, Government should bring forward a suite of measures to stimulate demand. These should include phasing out grey hydrogen production, implementing hydrogen obligations for industrial users and measures to create a level playing field in fuel for heavy transport. Additionally, electrolyzers should be exempted from levies to reduce distortions and provide clarity to the market.

ACTIONS

Building on the Government's ambitious Hydrogen and Energy Security Strategies, a set of targeted policy and regulatory actions can be taken to position the UK at the forefront of capturing the global opportunities from green hydrogen.

Short-term actions for Government

- » Ensure funding is provided to support innovation in design and manufacturing of electrolyser systems, such as through the Net Zero Hydrogen Fund
- » Define a zero carbon hydrogen standard and tailor the Hydrogen Business Model to support green hydrogen production at different scales including exemption from levies

Long-term actions for Government

- » Create a level playing field for hydrogen in transport, including through changes to VAT, identify strategic locations for hydrogen refuelling infrastructure and explore phase-out targets for maritime fossil fuels
- » Address planning and regulatory barriers to green hydrogen, encouraging retrofit and co-location
- » Stimulate demand for hydrogen through clarity on hydrogen production and use, supporting uptake across a variety of sectors



Photo: OIC



Photo: Bibby Marine

¹ Offshore Renewable Energy Catapult/OWIC, 2020, Solving the Integration Challenge Workstream B – Final Report, <https://www.owic.org.uk/documents>

Section 6

Maximising the economic opportunity

CONTEXT

Our net zero target represents an unprecedented economic opportunity for the UK, with green industries boosting investment, jobs and competitiveness across the economy. The renewable energy sector will be the major contributor to this opportunity. The Offshore Wind Industry Council highlights that by 2030 the sector can support nearly 100,000 jobs and unlock over £150bn pounds of private investment. In onshore wind, meeting our ambition of 30GW by 2030 will create 27,000 high quality jobs and add £45 billion to the UK economy.

PRIORITIES

Unlocking investment

Developing our industrial capacity will enhance our ability to meet our domestic goals and export ambitions. As set out earlier, the current context of maturing technology and rising input costs means the CfD allocation dynamic is straining the supply chain. It is, therefore, vital that Government and industry work together on reforms to CfD allocation to enhance financial sustainability in the market and encourage investment in the supply chain.

Already, Government and industry have worked together to unlock barriers to investment, particularly the need upgrade our port facilities, and funding is in place to support investment. We welcome the Government extending this approach to floating offshore wind, as this is another area where the UK has a clear opportunity for global leadership and export.

It's time to challenge ourselves, however, to imagine an evolution of our approach to date. We can take the positive fundamentals of our current approach - market certainty, ambition, active government policy, collaboration- and transform it to make the UK the most attractive destination for offshore supply chain investment in Europe.

Creating new industry and facilities will always mean there is an 'investment premium' to cover the risk firms take on. Our task is to help companies manage that risk. We can build on the regulatory and market reforms

set out earlier, and add to those a comprehensive package of tax, development, R&D and skills incentives that provide the wrap-around support for investment that can deliver the step-change that government and industry want to see in this space.

The fierce competition for Freeport and Green Port status shows how powerful these kinds of incentives can be in driving investment. Government should consider whether, alongside this, we can create enterprise zones that are applied to parts of, or businesses located in, UK ports to incentivise investment beyond Free and Green Ports. These enterprise zones could avail of tax reliefs or credits, as happens in the US, to further bolster our attractiveness for investment. This is a low-risk approach that could turbocharge our current approach with minimal public funding attached.

To make our investment offer even more attractive, we should aim to be a powerhouse of innovation. We can build on our specialisations in blade technology, floating wind, digital and O&M to propel the UK to the forefront of global innovation. The UK has long-term R&D funding in place sized to the opportunity in sectors like oil & gas, nuclear, automotive and aerospace. We can replicate this for offshore wind and support an environment for investment in the UK as a global centre for offshore excellence.

Developing green skills

The UK stands to benefit immensely from the green skills revolution, with people across the country entering into jobs that were only made possible through the net zero transition. Building on the recent recommendations of the Green Jobs Taskforce, it will be vital to develop a coherent framework that ensures the opportunities around the net zero transition are captured.

Developers invest in recruitment, apprenticeships, and upskilling to meet the needs of individual projects or a series of projects. But a project by project can't deliver the rapid rise in workforce needed. This needs to start at all educational levels, with a particular focus on Secondary and Further Education sectors, while also building into the existing workforce as fossil fuel sectors face a decline in activity. The clarity provided by the 2035 decarbonisation target will accelerate the need to make progress across the skills framework in the years ahead.

ACTIONS

The development of a credible skills framework to support the development of a rapidly growing economic sector will be far from straightforward. It will require concerted action across Government and the various agencies involved to ensure the right training is getting to the right people, ahead of need.

Short-term actions for Government

- » Work with industry on a suite of policies, building on the Freeports approach, to provide wrap-around support to make the UK the most attractive place in Europe for supply chain investment
- » Review the R&D funding levels for offshore wind so that support is similar to that available in other key strategic sectors for the economy such as oil & gas, automotive and aerospace
- » Review the funding available to support supply chain development to reflect our increased and accelerated ambitions, particularly in floating wind

- » Respond to the recommendations set out by the Green Jobs Taskforce to show swift action on working with the private sector to develop the right skills across the supply chain

Long-term actions for Government

- » Conduct a formal review of how the education and skills framework from Secondary and Further Education onwards can support the net zero transition, including the development of highly-skilled green jobs
- » Develop a 'Just Transition Strategy' to set out how the UK is utilising energy decarbonisation to 'level-up' and ensure no one and nowhere is left behind, including a Just Transition Fund to support reskilling of workers and retooling of plant



Photo: Ørsted

Section 7

Conclusion

Despite the challenges we all face with rising energy prices and a more acute focus on affordability, 2022 must still be another defining year in the net zero journey. Building on the commitments made at COP26, and the UK's international leadership on climate change, we must now shift towards delivery and accelerating tangible progress.

Reaching the 2035 target will be far from easy. It will require a set of short-term actions to drive deployment, combined with a set of long-term changes that can help build the market framework that will maximise the economic and social benefits from the transition. But as we have shown through

the transformation of the power sector over the last decade, rapid change is possible.

The impact of surging international gas prices makes progress even more urgent, as the rapid transition towards renewables will help protect the UK from future fossil fuel price shocks, while at the same time delivering on our vital climate targets.

Industry stands ready to deliver. We look forward to working alongside government and regulators to deliver progress that will not only cut emissions, but deliver the economic and regional renewal that the country will unlock through the net zero transition.





RenewableUK members are building our future energy system, powered by clean electricity.

We bring them together to deliver that future faster; a future which is better for industry, billpayers, and the environment. We support over 400 member companies to ensure increasing amounts of renewable electricity are deployed across the UK and access markets to export all over the world. Our members are business leaders, technology innovators, and expert thinkers from right across industry.

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