Net Zero, Energy and Transport Committee
Scottish Parliament
Edinburgh
EH991SP
By email only

Ref: Scotland's electricity infrastructure an inhibitor or an enabler?

18 April 2023

Dear Mr Mountain MSP,

The West of Orkney Windfarm welcomes the opportunity to respond to the Scottish Parliament Net Zero, Energy and Transport Committee's inquiry. The project is facing several key challenges linked to Scotland's electricity infrastructure which may delay the target first generation date of 2029.

Project overview

The West of Orkney Windfarm is being developed around 30km off the west coast of Orkney and around 25km from the north Sutherland coast. With an expected capacity of around 2GW, and first power scheduled for 2029, the project will be capable of powering the equivalent of more than two million homes.

The West of Orkney Windfarm lies wholly within the "N1" Plan Option, which is one of 15 areas around Scotland which the Scottish Government considered suitable for the development of commercial scale offshore windfarms. The project is being developed by a consortium of Corio Generation Ltd (part of Macquarie Group), TotalEnergies and RIDG, a Scottish developer.

In January 2022 the consortium was successful in securing an Option Agreement from Crown Estate Scotland for the project in the ScotWind leasing process.

The West of Orkney Windfarm has a grid connection agreement with National Grid for a connection in Caithness. Additionally, the project partners are exploring an option to power the Flotta Hydrogen Hub. There is the potential for both power export options to be utilised.

The project is currently considering fixed-bottom foundations for the wind turbines.

We have submitted an Environmental Impact Assessment (EIA) Scoping Report to Marine Scotland, Orkney Islands Council and The Highland Council detailing all of the studies and surveys we will undertake in the years ahead.

Key points

- Timely upgrades to the UK transmission network are essential to ensure first power from the West of Orkney Windfarm in 2029, helping to guarantee security of supply and to achieve the UK's 2030 net zero ambitions.
- The Scottish Government should review the planning regime for onshore transmission in Scotland. The delivery of the North-South electricity transmission network is a key enabler to ensure first power from the West of Orkney Windfarm in 2029.

Please find below the West of Orkney Windfarm responses to the inquiry questions.

Electricity network readiness

1. Do the current business plans from Scottish and Southern Energy Networks (SSEN) and ScottishPower Energy Networks (in relation both to transmission and distribution) allow for sufficient investment in networks to realise the Energy Strategy's ambitions?

The electricity network needs to be transformed at an unprecedented scale to facilitate decarbonisation and demand growth. The quick implementation of the Holistic Network Design (HND) – a key output from the Offshore Transmission Network Review[1] initiated by the UK Government in July 2021 - is key. Any delays, predominantly linked to planning and supply chain constraints, will jeopardise investor confidence, Scottish supply chain development and the scope for Scotland and the wider UK to meet their respective 2030 targets. The West of Orkney Windarm has initiated an industry-leading £140m supply chain investment plan to ensure the ramp-up of UK content in advance of procurement. Any slippage in our 2029 date will therefore not only damage the opportunity for a highly competitive fixed-bottom project to contribute to Scotland's drive for 11GW of offshore wind capacity by 2030 and the UK Government's ambition for 50GW by the same date, it will also significantly impact the investment confidence of our partners in the supply chain and the credibility of the HND process. There is currently no contingency for delay in the grid reinforcement works programme required for the West of Orkney wind farm, meaning that any delay will inevitably impact first power generation.

Meeting HND target milestones will require Scottish government reforms to speed up planning and regulatory approvals to enable quicker delivery of projects by the networks industry and its supply chain.

2. To what extent are SPEN and SSEN able to alter investment plans in response to a fast-moving policy environment?

The Accelerated Strategic Transmission Investment (ASTI) framework is a positive step to incentivise long-term onshore electricity transmission projects and promote their timely delivery. However, given the short history of ASTI, Transmissions Operator (TO) developments and their ability to overcome public planning concerns are yet to be tested under the framework. For example, it is unclear how much flexibility will be given to TOs to change investment plans in response to public requests to install transmission 400kV cables underground.

Grid reinforcement projects are currently catching up with offshore wind farm developments, leading to significant grid connection delays and curtailment. The Centralised Strategic Network Plan will be a positive step, enabling consistency in approach and providing the essential long-term vision to ensure transmission network investments are made. This should look to incentivise more anticipatory investment, including for future offshore wind farm extensions in high wind locations.

System resilience

3. What role will dispatchable* electricity sources - pumped hydro, battery technologies, thermal generation (hydrogen power, gas with CCS) - play in ensuring security of supply and system resilience? Should any other technology play a role in supporting Scotland's electricity system?

A full range of renewable and clean technologies is required to get to Net Zero. Dispatchable, zero carbon, electricity generation is essential to ensuring security of supply and system resilience. Hydrogen storage and turbines could be beneficial to support electricity system resilience during peak consumption and low wind days.

Hydrogen production would use excess wind generated power during windy days where UK electricity demand is exceeded. The hydrogen could then be blended into the gas network to decarbonise UK heat and industry. This would necessitate an system-wide approach to transmission infrastructure planning, integrating the production, storage and transmission of electricity, gas and hydrogen to secure Scottish and UK net zero targets.

[1] Offshore Transmission Network Review, Department for Business, Energy & Industrial Strategy, 15 July 2020

4. What are the key barriers to deploying these technologies and how should they be addressed?

No response

5. Do proposed UK Government reforms to the electricity capacity market align with the Draft Energy Strategy?

No response

Wind energy

6.What are the key barriers to achieving the Scottish Government's ambition for onshore and offshore wind contained in the Draft Strategy; could the readiness of the electricity network to accommodate new projects affect the business case for the proposals?

The timely development of new transmission infrastructure is the key barrier to achieving Scottish Government's ambitions for offshore wind deployment. Without the means to transport the electricity generated, the offshore wind industry cannot help to reduce Scotland's carbon footprint. The speed of planning approval for grid reinforcement in Scotland is a significant challenge. The Beauly-Denny and Kendoon-Tongland electricity transmission line upgrades are recent examples of long planning approval processes. Delivery and deployment of infrastructure must be achieved at a much greater pace than the present regulatory, planning and consenting regimes have achieved historically.

The West of Orkney Windfarm is the only fixed-bottom site awarded in the ScotWind leasing round that can realistically deliver large-scale low-carbon generation by 2030. Being located outside of the east coast region, much of which is under strict ornithological constraints, means the project has the lowest consenting risk in the round. With water depths suitable for jacket foundations and an HVAC radial connection to shore, the project also has a low technical delivery risk. Alongside RIDG, our experienced partnership of Corio Generation Ltd (part of Macquarie Group) and TotalEnergies ensures that all resources are available to realise our ambitious delivery programme. Since project inception, we have consistently demonstrated that we have the resources and ability to deliver our project by 2029. However, our 31 October 2029 contractual connection date will be at risk if the required transmission network reinforcement projects are not delivered on time. Maintaining the contracted schedule for our enabling works is fundamental to our project delivery, our investment programme and our industry-leading £140m UK supply chain development plans. Maintaining the 2029 date is also essential to the fundamental credibility of the HND process since it would clearly be counter to the stated purpose of the HND to delay the most advanced ScotWind project.

Wind farm project returns are already under pressure from higher capex costs on one hand, whilst high interest rates are leading investors to demand higher returns on capital. The additional cost and risk generated by grid reinforcement delays may impact the financial viability of offshore wind projects.

7.Given the generation potential, and market ambition, is there a risk of oversupply if options for use of surplus electricity (e.g. green hydrogen production) do not become reality?

The risk of surplus electricity generation in the short term should not be overstated as in the longer term the consumption of electricity is forecast to significantly increase. In the short term any physical oversupply should more correctly be characterised as a fundamental lack of the necessary network capacity to bring energy to market, the result of which sees windfarms being constrained-off the grid. Instead of focusing on the short-term oversupply, there should therefore be greater emphasis on the smooth and timely implementation of grid reinforcements to supply electricity to areas of consumption, along with incentives to decarbonise heat and transport that will increase electricity demand over the medium term.

One area that would boost medium-term electricity demand is the development of green hydrogen. Green hydrogen has a vital role to play in the UK's transition to net zero. The UK has targeted a four-fold increase in offshore

renewable energy by 2030 to decarbonise the UK power sector. Electricity generated by wind farms in Scotland is forecast to greatly exceed local demand. This excess will be able to be supplied to the rest of the UK via the transmission network once significant upgrades are made. However, in the interim, there is a significant risk that wind farm electricity generation will be curtailed at significant cost to UK electricity consumers. Hydrogen can balance the intermittency of renewables and create value from power that would otherwise have been curtailed. Hydrogen can be stored during periods of high renewable electricity generation and used during periods of low generation, helping to smooth variability from renewables.

There is an important role for Government in setting strategic direction for power and non-power uses of hydrogen. In addition, the government should communicate to the public the benefits and address public concerns over the health & safety risks of hydrogen.

Hydrogen and the electricity system

8.How much of the Scottish Government ambitions for 5 GW of hydrogen production capacity by 2030, and 25 GW by 2045 should come from green hydrogen?

The Scottish Government 2030 targets are ambitious given hydrogen production is in its infancy and limited hydrogen industrial, heat or transport infrastructure exists. Therefore, governmental efforts may be best invested in providing targeted incentives to drive hydrogen production growth from the most viable projects, rather than trying to split targets based on hydrogen production technologies.

9. What are the key infrastructure barriers to building a hydrogen economy in Scotland and how should they be addressed?

Given the fledgling nature of the green hydrogen economy, significant support will be required to increase production, encourage demand and invest in infrastructure. Current Scottish hydrogen infrastructure is very limited and so substantial investment is needed. One approach could be to select a small number of large pilot projects e.g. the Flotta Hydrogen Hub. Early hydrogen pilot projects will need bespoke arrangements and targeted support to demonstrate hydrogen application feasibility to build confidence in the market and with investors.

An example of targeted support could be to utilise Scotland's extensive pipeline infrastructure to export green hydrogen to the rest of the UK. Repurposed pipelines offer cost effective transport and quicker build times. Thus, modifying the gas grid to enable hydrogen transmission to England should be explored (e.g. Project Union). Accelerating the UK government's position on hydrogen's role in blending and heating would help to significantly stimulate hydrogen demand for piped hydrogen.

Ofgem

10. Ofgem are "working with government, industry and consumer groups to deliver a net-zero economy". What changes have recently been made to support the delivery of net-zero? What more could be done to support a regulatory regime that delivers decarbonised energy supplies affordably?

Regulation of transmission network costs should continue to be reviewed to enable anticipatory infrastructure investment and longer price control periods to enable long-term supply chain commitments.

In addition, Transmission Network Use of System (TNUoS) charges for Scottish projects are significantly higher than equivalent projects in the south of England. TNUoS costs are an important consideration when making the final investment decision for offshore wind farms, whose location is fundamentally determined by the ScotWind leasing rounds, site seabed conditions, sea depths and prevailing wind yields.

11. What are the most important issues for the UK Government's Review of Electricity Market Arrangements to address? What are the benefits of the current system, and the potential pitfalls of moving away from it? What are the implications for the Draft Energy Strategy of the Review?

We welcome the UK Government's Review of Electricity Market Arrangements (REMA) vision for a future electricity market based on the objectives of decarbonisation, security of supply and cost-effectiveness, is sensible. The most important issues for REMA to address are:

Managing the growing incidence of Zero Marginal Cost Pricing
BEIS' consultation recognised the growing incidence of zero marginal cost pricing in the future GB electricity market. However certain of the proposals for market reform appear to give insufficient weight to the significance of this trend and the serious impact it will have in collapsing generators' revenue streams. This situation will undermine investors' returns and will fundamentally affect the operation and cashflows associated with the current CfD support regime. It is critically important that the REMA process acknowledges this situation, and that the package of market reforms provide a robust and enduring means of sustaining investment under these conditions.

Locational Marginal Pricing
The scope for offshore wind to respond to sharper locational signals is extremely constrained, with siting decisions determined largely by physical and administrative factors. Thus, we do not consider that proposals for nodal or zonal pricing, as proposed in the UK Government's original consultation, present an effective means of achieving efficient investment and dispatch decisions for offshore wind in the GB market. Recognising that the market may need up to four times more generation capacity by 2050 as compared to 2020 levels, the fundamental requirement in the context of REMA is to secure the grid capacity needed to bring the energy that has been generated to consumers.

Capacity payments are a logical cornerstone to any future market arrangements
There is considerable merit in considering a market model that sees generator revenues derived from a combination of capacity payments, that reflect a plant's operational availability, and tolling fees, that allow a plant to recover their operating costs when dispatched. This approach:
Is compatible with the commercial characteristics of most forms of low-carbon generation, with high fixed and low variable costs

- Mitigates the volume risk currently presented by the CfD
- Is capable of incentivising both capacity and carbon abatement
- Can be readily adapted to support a variety of technologies
- Can be structured to ensure system flexibility and operability
- Has the advantage of a relatively simple common structure.

Solutions must be comprehensive, enduring and transparent
Whilst incremental measures may present a lesser bureaucratic challenge and present investors with the appearance of stability in the short-term, the critical test is whether this approach can go sufficiently far to fully address the core challenge presented by increasing prevalence of (near) zero pricing in the medium- to long- term. The reforms have to work.

Reforms must take an holistic approach, that optimises the economic value of the entire low-carbon generation fleet and recognises that the operating life of many renewable assets extends far beyond the duration of their subsidy support. In the TCE's 4th Offshore Wind Leasing Round, seabed leases will be offered for a period of up to 60 years, whereas the lifetime of any CfD is only 15 years. These assets should be incentivised to maximise their system value over their entire operating life.

Community energy

12. Are community and locally owned projects inhibited by the current electricity network?

No response.

13. What are the key infrastructure barriers to Scottish Government community energy ambitions and how should they be addressed? Is it enough to "encourage" shared ownership models, or should a more formal mechanism be implemented?

No response.

Yours faithfully,

Stephen Kerr

Project Director