Invitation to give evidence – Scottish Parliament Net Zero, Energy and Transport Committee – 21 March 2023

Introduction

- Based in Glasgow, ScottishPower is one of the largest developers of renewables in the UK and part of the Iberdrola Group, the world's leading renewables developer. Iberdrola, is a global leader in tackling climate change, with a commitment to reaching carbon neutrality by 2050.

- ScottishPower are the UK's first 100% Green vertically integrated energy utility, generating 100% renewable electricity from 40 operational windfarm sites with over 2.8GW installed capacity throughout the UK. Building on our 714MW East Anglia ONE offshore wind project, we have ambitious offshore wind development plans with work underway on taking forward a 3.1GW offshore wind East Anglia Hub, as well as a substantial development portfolio of onshore wind, solar, battery storage and green hydrogen to establish innovative hybrid 'energy parks'.

- ScottishPower was awarded the rights to develop three new offshore windfarms through the Crown Estate Scotland's ScotWind Leasing – including two floating wind sites in partnership with Shell – generating up to 7GW of clean green electricity in Scottish waters.

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?

The changing electricity generation landscape in Scotland has seen the closure of conventional power plants and the integration of significant volumes of low carbon renewable generation. As we continue through this shift in electricity generation towards Scotland's net zero ambitions, the need to ensure renewable generation contributes to both security of supply and system resilience becomes ever prominent.

Historically, renewable generators have been perceived to be inflexible and without the ability to provide critical grid services such as inertia, short circuit current and system restoration services. However, recent innovative solutions have proven the contrary; challenging the need for these services to be only made available from conventional generation sources.

To enable a stable, resilient, and secure electrical infrastructure in a net zero system, low carbon generators must provide:

- Flexibility Services: balancing supply and demand, constraint management.
- Operability Services: Frequency response, reserve, stability, restoration, and voltage services.
- Support in the optimisation of network investment.

In order to provide such services, renewable generators would co-locate with storage systems (inc. long-duration storage), low carbon technologies such as CCUS, hydrogen electrolysers and fuel cells.

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Renewable assets can also provide services on their own when strategically located and of suitable scale.

Additionally, with technology enhancement, renewable generators can also now provide a similar level of stability and system resilience services of that gained from conventional generation sources. Indeed, ScottishPower Renewables (supported by financial aid from the Scottish Government) have led the global industry in demonstrating such technology at its Dersalloch wind farm in 2020, proving a suite of different network services, including full system restoration (aka Black Start). This led to a number of policy and code improvements, paving the way for future renewable generators to provide the same. When considering system stability and resilience, two things are vitally important: 1) that our industry can continue to innovate to enable services from renewable technologies such as system restoration, and 2) that NGESO are fully engaged and supportive of the progress being made in our industry and to enable grid operation that ensures significant advancements such as those demonstrated at Dersalloch to become business as usual.

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

The deployment of storage, hydrogen, pumped hydro, CCUS and other low carbon technologies that enable system flexibility and operability services, depends on:

<u>Financial incentives and balancing services markets that provide certainty on return of investment.</u>

There is currently no defined market to incentivise flexible services, for example little support exists to incentivise investment in large scale storage options that can complement a system with a high volume of renewable generation. Therefore, there is a need to have flexibility further incentivised through the Balancing Mechanism (BM) and the Capacity Market (CM). Ancillary service markets also require to be redefined and aligned with Contracts for Difference (CfD) and CM mechanisms to enable operability services from low carbon generators. For example, the current competitive nature and structure of the CfD means that developers are not incentivised to build or retrofit, more expensive, grid forming capabilities into their projects.

<u>Clear policies and alignment to enable a whole system approach.</u>

The ability of a flexible asset to participate in critical grid services is currently limited due to the existing CfD framework which only allows co-located flexible storage assets to be charged from the CfD generator (and not from the grid). In order to co-locate renewables assets to ensure optimal dispatch, there is a need to review a number of policies and standards that govern CfD/RO mechanisms, BSC and metering and operational data availability. Current metering arrangements do not support but rather prohibit the opportunity to use hydrogen assets to unlock flexibility services. Yet hydrogen was presented in the 2022 FES (Future Energy Scenarios) as a means to unlocking flexibility.

<u>Identification of strategically beneficial locations in the power system.</u>

The location of flexible assets will affect their ability to provide essential grid services. The type and volume of services required will vary dependent on the type of generation connected in that part of the network and the network assets themselves. Hence, it is imperative for network companies to perform detailed analysis and provide locational flexibility and operability requirements. This will aid developers in siting flexible assets in the right locations on the network.

<u>Availability of grid connections and capacity that determine whether assets should be co-located or standalone.</u>

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Varying grid applications from flexible assets will require different network connection needs, i.e. standalone and co-located assets may perform different roles on the network.

Currently, storage is modelled on the network as a generator and therefore may trigger a network reinforcement need. Ideally however, storage could be modelled as a flexible resource which will help ensure network design and reinforcement is optimised in line with and while increasing the use of flexibility.

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

The Capacity Market (CM) continues to be an important mechanism for maintaining capacity adequacy and security of supply cost-effectively. The recent UK Government consultation on the CM - 'Strengthening security of supply and alignment with net zero'[1] - aligns with the Scottish Government's ambition to deliver energy security through the development of our own resources and additional energy storage.

However, there is currently insufficient support for large scale long duration storage (LLES) such as pumped hydro storage in the CM. The Scottish Government's ask, as stated in the Executive Summary of the Draft Energy Strategy, for the UK Government to provide appropriate market mechanisms for hydro power will help ensure the full potential of this sector is realised. The introduction of a Cap and Floor mechanism for LLES would support the level of investment required, however, the UK Government must speed up progress in this area to help deliver Scotland's decarbonisation ambitions.

In terms of longer-term CM reform, the 'Optimised CM' option in the UK Government's Review of Electricity Market Arrangements aligns with the Draft Energy Strategy as it aims to ensure that the CM can provide capacity adequacy now and remain fit for purpose in the future. In addition, a review of the de-rating factor methodologies would help increase the reliability and cost-effectiveness of procured capacity.

Ofgem

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?

What are the most important issues for the UK Government's Review of Electricity Market Arrangements to address?

As part of the REMA workstream, the UK Government must consider options for reform in the context of delivering a decarbonised power system in the 2030s in a cost-effective manner, whilst maintaining security of supply. To do this, there a number of key issues with current market arrangements that will need to be addressed:

1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1140189/review_of_electricity_market_arrangements_summary_of_responses.pdf

Invitation to give evidence – Scottish Parliament Net Zero, Energy and Transport Committee – 21 March 2023

- It will be crucial to ensure that the pace of deployment of low carbon capacity and associated network capacity continues at scale and increases in the 2020s. In this context, we would note that price cannibalisation presents a significant long-term challenge for investment and will need to be addressed to avoid increases in the upfront cost of renewable deployment.

- There is a need for smart and flexible low carbon technologies to complement a renewable dominated power system. Government must ensure sufficient investment in low carbon flexible generation and large-scale storage options to help facilitate a smart and cost-effective system.

- The lack of liquidity in the forward GB power market has also become an important issue. We consider that effective market arrangements need to recognise the value that suppliers and consumers, especially those in the industrial and commercial sectors, place on price certainty and being able to hedge forward to achieve this.

- To deliver a decarbonised power sector by the mid-2030s will require a stable and operable network and energy system. This will involve incentivising the development of 'grid forming' renewable projects in a cost-effective way, to replace our current sources of ancillary services with low carbon alternatives.

What are the benefits of the current system, and the potential pitfalls of moving away from it?

The Transmission Owners and the System Operator have a robust and structured approach to system design and development proposals, rooted in the SO-TO (System Operator, Transmission Owner) Code that enables the production of the Network Options Assessment (NOA). The NOA is widely understood and provides industry the ESO's economic recommendation for when and where future network reinforcement is required. Additionally, the Accelerated Strategic Transmission Investment (ASTI) framework will ensure strategic network investment is given suitable priority to make progress. While it is recognised that the basis of network design (GB Security and Quality of Supply Standards (SQSS)) requires a refresh, the methodology and approach to ensuring network development proposals are efficient and economic, and are proven and well established. More recent initiatives include The Pathway to 2030 Holistic Network Design (HND), which have been developed to efficiently deliver large scale generation from offshore wind.

A move away from the current methodology that determines the need to invest in a network based on, say, dynamic, intra-day wholesale prices, e.g. under a Local Marginal Pricing (LMP) model, will delay network investment and reallocate risk from the system operator to generators, increasing cost of capital and therefore potentially causing an investment hiatus. LMP alone will not resolve the problems faced with networks, particularly around planning, building and operation.

In addition to the impacts resulting from LMP, there are a number of potential undesirable implications from moving to an LMP model which have been identified in a report produced by Strathclyde University: *Exploring Market Change in the GB Electricity System: the Potential Impact of Locational Marginal Pricing*[2].

[2] https://www.strath.ac.uk/whystrathclyde/news/2023/researchersadvisecautiononrushingtoadoptlocationalmarginalpricingofelectricity/

Invitation to give evidence – Scottish Parliament Net Zero, Energy and Transport Committee – 21 March 2023

What are the implications for the Draft Energy Strategy of the Review?

As part of REMA, the UK Government has proposed a wide range of options for market reform. The UK Government's decision to discount a small number of options from the next round of assessments has helped provide some clarity for investors[3]. However, there still remains a number of significant and fundamental options for reform under consideration and the risk of radical reforms creates investor uncertainty and could hinder progress towards the proposed ambitions set out in the Draft Energy Strategy.

It is important that reforms in REMA are progressed incrementally and holistically to avoid unnecessary disruptions and minimise the risk of unintended consequences. Radical reforms to arrangements that underpin the wholesale market, such as market splitting and LMP, will likely result in an investment hiatus and stall the transition to the net zero energy system set out in the Draft Energy Strategy.

To create the conditions for a net zero energy system in Scotland, the reforms proposed in REMA need to be assessed carefully with time taken to consider the complexities and the risks of unintended consequences. The UK Government must consider how current issues can be holistically addressed through incremental changes, instead of considering large-scale and disruptive reforms that may negatively impact the energy sector in Scotland.

[3] Review of Electricity Market Arrangements Summary of responses to consultation (publishing.service.gov.uk)