

Net-Zero, Energy and Transport Committee

Scotland's electricity infrastructure: inhibitor or enabler of our energy ambitions?

Submission From **Scottish Renewables**

Key overarching points

A decarbonised power system is the central requirement for achieving our net zero ambitions. Access to reliable, resilient and plentiful decarbonised electricity – at an affordable price to consumers – is key to a thriving, energy secure economy.

- Scotland's electricity grid infrastructure is a key enabler of achieving the reliable, resilient and plentiful supply of affordable decarbonised electricity essential to achieving our net zero ambitions.
- As a natural monopoly, the operation of the electricity grid and the investment grid operators are allowed to make, are strictly regulated by Ofgem. Ofgem is, in turn, strictly regulated by legislation.
- The operation of the electricity market is regulated by the Electricity Market Arrangements, which are set by the UK Government and implemented by Ofgem and National Grid ESO.
- Both the legislation that governs Ofgem and the Electricity Market Arrangements were established up to 30 years ago and were designed for a fossil fuel-based energy system.
- These rules and regulations need updating to align with net zero and facilitate the infrastructure investment needed to establish a decarbonised power system. This needs to happen urgently and at pace.
- The UK Government has committed to decarbonise electricity supply by 2035, in line with the Climate Change Committee's advice.
- While some work is underway to address this issue, Scottish Renewables fully supports the statement in the Climate Change Committee's report published on March 09 which states "*A reliable, secure and decarbonised power system by 2035 is possible – but not at this pace of delivery....the Government has not yet provided a coherent strategy to achieve its goal nor provided essential details on how it will encourage the necessary investment and infrastructure to be deployed over the next 12 years.*"

Electricity network readiness

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

The current price control period and associated business plan for Transmission (RIIO-T2) runs from April 2021–March 2026; and the next price control period for Distribution (RIIO-ED2) will start this year, running from April 2023–March 2028.

Business plans for both Scottish Power and SSE's Transmission and Distribution businesses during this price control period have been approved by Ofgem and outline the strategies for what needs to be delivered during this timeframe.

However, we believe that the next transmission price control period will arguably be the most important for the Energy Strategy's objectives, 2030 targets and delivering a pathway to net zero. This period will see the delivery of the major reinforcements identified in Ofgem's Accelerated Strategic Transmission Investment framework (known as ASTI) projects which will be critical to enable Scottish and UK Government 2030 targets and unlock the first phase of the ScotWind leasing round.

Ofgem's ASTI framework and approval of need for these investments is a hugely welcome step forward in taking a more strategic approach to network planning, delivering against the recommendations set out in the publication of the Holistic Network Design (HND) Pathway to 2030.

The HND and subsequent ASTI framework establishes the onshore and offshore electricity network infrastructure required to meet 2030 offshore wind targets as a GB-wide programme of reinforcements. This will enable around 11GW of ScotWind's 28GW ambition, with a follow up exercise underway to establish the system requirements to realise ScotWind's full ambition.

Whilst we welcome the change in mindset from Ofgem and clear shift towards strategic network planning, extending this approach to electricity distribution and gas networks will be key to delivering local decarbonisation ambitions, particularly the electrification of heat and transport, unlocking the whole system benefits that grid can deliver for a net zero society.

Sensible and evidenced low regrets anticipatory investment for Distribution would also be helpful to achieve required network enhancement within tight timescales and at the same time reduce costs to consumers, and impact to communities over the long term. Strategic investment in critical infrastructure can significantly help to reduce the UK's carbon consumption and cost to consumers, by lowering the need to constrain off generation in the north of Scotland and turn up gas generators in the south of England, to meet demand when there are periods of high wind. At a distribution level, strategic investment can avoid costly disruption of repeated upgrades in step with gradual increase in demand, or of retrofitting the network after demand has emerged.

Regulatory frameworks need to be much more agile than current processes allow, prioritising the accelerated delivery of a net zero grid which will form the backbone of our future energy security and decarbonisation ambitions. Without urgent investment in the grid (both transmission and distribution) it will be impossible to realise renewable energy and wider decarbonisation targets.

To put the required level of network growth into context, our transmission network in the north of Scotland needs to double in size by the middle of this decade, triple by 2030, and increase by five to six times by 2050 to support UK net zero targets. A significant proportion of this will be connected at a distribution level and the need for a whole system approach to infrastructure investment and deployment will be crucial.

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

Uncertainty Mechanisms are a crucial way of unlocking additional network investment over and above baseline investment cases as and when there is a clear need, such as responding to the forecast growth in generation or demand, and against the backdrop of a fast-paced and dynamic energy policy landscape.

We continue to support the use of Uncertainty Mechanisms in the price control framework as it allows for further and critical network investment that was not certain at the time of business plan approval to be considered by Ofgem when the need becomes clear. This process also protects electricity consumers, with GB bill payers only paying for investment in the network when there is robust and certain evidence of need.

We believe that network operators experience to date is that these Uncertainty Mechanisms are largely delivering as intended and we welcome Ofgem's efficient determination of the main Uncertainty Mechanism reopeners that have progressed in the RIIO-T2 period to date.

However, looking beyond the current price control it is clear that current regulatory approval processes need to continue to evolve to deliver a net zero system, with long term strategic network planning, on a whole energy system basis, essential to support timely delivery and provide the certainty investors, the supply chain and renewable electricity generators need. The ASTI framework is a welcome first step and must be built on with an enduring regime, the Centralised Strategic Network Plan, which we welcome.

At distribution level, given the level of decarbonisation required, it remains unclear whether the Uncertainty Mechanisms associated with the RIIO-ED2 price control will be agile enough to allow for rapid changes in growth at a distribution level or development at a strategic scale. Recognising recent developments undertaken at a Transmission level, most notably the introduction of the ASTI process two years into the RIIO-T2 price control period, we believe Ofgem should keep this under regular review.

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

The integration of intermittent renewable energy generation into our electricity system can be achieved using flexibility and storage technology deployed at two levels – site level and grid level.

Site level flexibility and storage technology enables individual renewable energy projects to become dispatchable. The technology needed to achieve this can vary and is site specific but can include batteries or electrolyzers producing green hydrogen.

Grid level flexibility and storage technology enables the balancing of the grid over periods of four hours to ten days. The BEIS 2021 Smart Systems and Flexibility Plan proposes that 30GW of flexible capacity will be required by 2030 to meet current net zero pathways and suggests that some £10 billion per annum may be saved by 2050 by the introduction of flexible technologies. It is expected that Pumped Storage Hydro and green hydrogen will deliver a sizable percentage of the required flexibility capacity and Scotland is well placed to deliver both.

The key issue is that current Electricity Market Arrangements do not provide an effective market mechanism to bring forward the needed flexibility and storage technologies. Larger infrastructure

projects such as Pumped Storage Hydro also require price stabilisation mechanisms to unlock private sector investment in them. This can be achieved through a Cap and Floor system, which is technology neutral and would support the development of a range of medium- and long-term flexibility technologies. The UK Government put out a Call for Evidence on such a mechanism in September 2021 but is not expected to address this issue until 2024.

* “dispatchable”: energy generation that can be available on demand

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

SR’s [full response](#) to the UK Government’s 2023 Consultation on the Capacity Market is available online and a summary of the key points is given below.

We welcome that the Department for Energy Security and Net Zero is examining the need for improvements to the Capacity Market (CM), ensuring security of supply is maintained while achieving decarbonisation at least cost. By 2035 electricity production must be achieved without fossil fuel generation and vast amounts of new low-carbon flexibility resources will have to replace flexible fossil plant.

The BEIS 2021 Smart Systems and Flexibility Plan proposes that 30GW of flexible capacity will be required by 2030 to meet current net zero pathways and suggests that some £10 billion per annum may be saved by 2050 by the introduction of flexible technologies. Our members are currently developing these technologies, including both short and long-duration energy storage.

We recognise that the current consultation seeks to try and align the CM with net zero, largely by enabling access for potential abated fossil fuel generation. However, we consider that the proposed design has the effect of restricting large scale, long duration energy storage (LLES) Pumped Storage Hydro projects from participating.

Our Pumped Storage Hydro members are currently developing over 7GW of Pumped Storage Hydro projects in the UK that, alongside other low carbon storage technologies, can make a major contribution to providing flexibility needed to enable an affordable, secure net zero energy system¹. The de facto exclusion of these Pumped Storage Hydro projects from the CM means that the policy aim of a technology-neutral capacity market is not being realised.

Our responses to the individual consultation sections are summarised below.

Aligning the CM with Net Zero – we agree that the CM should seek to enable the transition to net zero. We welcome the questions in this consultation that seek to understand how unabated gas CMUs plan to decarbonise. This evidence should inform decisions around the timings of introducing a new emissions limit and how the Government may either reactively and/or pre-emptively procure replacement capacity as high carbon capacity exits or retrofits.

¹ In [our response](#) to BEIS’ 2021 call for evidence on facilitating the deployment of large-scale and long-duration electricity storage we set out in detail the system benefits Pumped Storage Hydro project can deliver.

We consider that this must also include the security of supply and decarbonisation benefits that can be delivered by Pumped Storage Hydro. While the consultation suggests that a separate mechanism e.g., Cap and Floor, will be developed to enable LLES development, the form and timescale of such a mechanism is uncertain and therefore investment in LLES will be chilled until an investable mechanism is introduced.

The proposals in the CM to exclude projects with long construction periods, and to make CM revenues available for unabated fossil fuel technologies until at least 2034 serve to create market barriers which exclude Pumped Storage Hydro projects from the CM. Even if a LLES Cap and Floor mechanism is introduced, Pumped Storage Hydro will still be at a disadvantage to other competing technologies with access to the CM (such as interconnectors, batteries, hydrogen, etc).

Additional improvements to the CM - we agree with the proposals in this area to improve the efficiency of the CM process and reduce the administrative burden. Whilst it is concerning that such a process does not already exist, we support the phased introduction of independent verification of Fossil Fuel Emissions Declarations to ensure security of supply requirements are met in the 2023 auction.

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 key barriers to achieving the Scottish Government's ambitions for onshore and offshore wind are:

- The long timelines for securing consent and capacity constraints within the consenting system
- The Contracts for Difference (CfD) Process
- Securing a grid connection

Please see our answer to Question 1 for details of the processes in place to address issues relating to securing a grid connection and our commentary on these.

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?

While there is a theoretical risk, the realities of reaching a Final Investment Decision (FID) mitigates against this. For a project to reach FID, a clear route to market must be identified. If it is not clear who will be buying the energy produce and by what mechanism, a FID is unlikely to be reached.

The route to market would generally be established through a Power Purchase Agreement (PPA). A PPA is a contractual agreement between two parties, typically an electricity generator and an electricity supplier or large consumer. The contract is an agreement to buy and sell an amount of energy which is or will be generated by a renewable asset. PPAs are usually signed for a long-term period between 10-20 years.

If there are no electricity sellers or large consumers looking to secure additional generation capacity, no PPAs will be available. Projects looking to sell their energy by another route, for example by producing green hydrogen, would also seek to identify an off-taker and enter into a contractual arrangement with them in order to reach a FID.

Hydrogen and the electricity system

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

The Scottish Hydrogen Assessment recognised green hydrogen production as the largest contributor to jobs in all scenarios with between over 70,000 to 310,000 jobs in its most ambitious scenarios relative to less than 20,000 for blue hydrogen.

In contrast to grey and blue hydrogen, green hydrogen is of a higher purity and is zero-carbon, therefore its production should be prioritised as it makes a greater contribution to meeting our decarbonisation targets and offers a long-term solution, compared to other types of hydrogen and is likely to be prioritised in export markets.

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

SR has developed a detailed [policy position](#) statement on green hydrogen in consultation with its members. This statement sets out the views of the Scottish Renewables membership on the significant role and economic opportunity presented by green hydrogen in the developing hydrogen economy and makes recommendations for Industry and Government in realising the potential.

Ofgem

10. Ofgem are “working with government, industry and consumer groups to deliver a net-zero economy”.

Scottish Renewables believe that there must be greater cooperation between Ofgem, the Scottish Government, industry and consumer groups. Key issues and examples of progress are given below but our key message is that there needs to be much more cooperation and that this must deliver much needed changes far more rapidly than has been the case to date.

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?

Scotland’s renewable energy industry has a huge contribution to make because of the strength of resource but transmission charging rules which govern how the electricity network is paid for are restricting the development of major projects. These rules were designed 30 years ago, are no longer fit for purpose and are undermining efforts to achieve net zero.

The Transmission Network Use of System (TNUoS) charges which are levied on Scottish projects mean they are now almost 20% more expensive than equivalent projects in the south of England. TNUoS remains enormously destructive to Scotland’s offshore wind industry and our climate ambitions.

At the start of 2022, Ofgem agreed to reform TNUoS charges and set up the TNUoS Task Force. This is expected to deliver changes in the short term ahead of any REMA reforms. However, the TNUoS Task Force was put on hold over the winter of 2022/23 and is due to re-start in April 2023. It is essential that TNUoS reforms move ahead at pace and such interruptions in progress are deeply concerning.

SR has welcomed the [accelerating onshore transmission investment decision](#) that was made in December 2023, but would highlight that many of those decisions, for example the Western Isles link, could have been made years ago.

The Scottish Government's Energy Networks Strategic Leadership Group (SLG) is an example of good practice with cooperative engagement between Ofgem and the Scottish Government and network companies. In March 2021 as part of this SLG the Scottish Government published its '[Principles for the development of Scotland's gas and electricity networks](#)'. We would like to highlight some points from the principles document:

From the introduction: "These principles recognise the need for network companies and Ofgem to work within the existing GB regulatory system, as well as acknowledging and responding to the democratic mandate of the Scottish Government to deliver policy in areas of devolved responsibility."

Principle 1: [energy Network Companies and] Ofgem will consider the effect of clearly established Scottish Government policy and targets where there is evidence that the policy ambition or target will be achieved, and hence change the volume of energy carried on the gas and electricity networks and the patterns of energy flows.

Principle 7: Network investments and the regulatory framework should consider Scottish Government's ambitions for sustainable economic growth, the development of local supply chains and strategies for decarbonising industry across Scotland.

These examples show there is a willingness on all sides to work together in order to deliver good outcomes for Scotland and GB. Whilst we welcome the words, we are still to see the principles being put into practice in decision making.

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?

SR fully supports the need for a review of the electricity market arrangements, as the current arrangements were never designed nor intended to deliver net zero.

Scottish Renewables submitted a [response](#) to BEIS' opening consultation in the Review of Electricity Market Arrangements (REMA), which sets out our views on the REMA in detail.

REMA seeks to identify market reforms that will enable the transition to a decarbonised power sector by 2035 and net zero by mid-century. In our response we make the overarching argument that REMA must meet two key objectives:

- Scale up low carbon technologies to meet net zero goals

- Scale up flexible technologies to support renewables

For this to be achieved, REMA must deliver long- and short-term price signals to mobilise the required investment in both renewable and flexible assets whilst maintaining security of supply and providing best value to consumers. These signals must safeguard the investor confidence that is critical to ensuring the transition clean energy continues at the pace required.

SR strongly advocates for the evolution of existing arrangements rather than the introduction of radical new ones. Existing arrangements are well understood, and the administrative and financial infrastructure needed for them to operate are already in place.

The introduction of radically new arrangements will require the investment of a significant amount of time and capacity from government, regulators and industry to design and implement. Given the pace at which changes must be made to achieve net zero, the time and capacity investment needed to implement radical change is incompatible with achieving net zero.

Community energy

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

The time taken and the costs involved in securing a grid connection are serious considerations in the financial decision making of all renewable energy projects, including those that are community and locally owned.

As set out elsewhere in our response, these issues are a result of the regulation of our current electricity network being designed up to 30 years ago and so being unfit to deliver net zero. The regulation of the electricity network needs to be urgently updated to align with the achievement of net zero and the pace of change achieving net zero by 2045/50 demands.

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?

The Scottish Government set a target of having 0.5GW of operational renewable energy capacity in community or local ownership by 2020. This target was exceeded in 2015 and subsequently The Scottish Government doubled the target to 1GW of operational community and locally owned renewable energy capacity by 2020 and set a further target of 2GW by 2030.

Our members are committed to the concept of shared ownership and the public would perhaps be surprised how much thought goes into integrating communities into wind projects. A recent report from the Energy Saving Trust shows that, as at end December 2020, 115 projects were under discussion for shared ownership, representing 511MW of the 914MW (56%) of community and locally owned renewable energy capacity in different stages of development.

The challenge developers often have is that communities, who are usually relying on volunteers working in their spare time, do not have the time to get involved with the contractual discussions. These discussions can require a significant investment time and, if a community wishes to engage in shared ownership, money, and this is where the barriers lie rather than with infrastructure.

Schemes like the Scottish Government's CARES (Community and Renewable Energy Scheme) provide communities with funding and advice to help them get through the early stages of shared ownership schemes, but more could be done.