Making a positive difference
for energy consumers

Net Zero, Energy and Transport Committee

Scottish Parliament

Edinburgh

EH991SP

By email only

Date: 22 March 2023

Dear Mr Mountain MSP

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

Thank you for your invitation to attend the Net Zero, Energy and Transport Committee session on Scotland's electricity infrastructure on 28 March 2023.

Appendix 1 to this letter contains our written responses to most of the thirteen questions you posed ahead of that session. Unfortunately we are not well placed to answer questions 7, 8 and 11, but have provided the limited information that we can.

I look forward to attending the Committee next week.

Kind regards

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Appendix 1: Ofgem responses to the Net Zero, Energy and Transport Committee's questions on Scotland's electricity infrastructure

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?

We are confident that they do, yes.

On the distribution networks, our approach to setting RIIO-ED2 allowances, in particular combining the Future Energy Scenarios (FES)[1] with DNO's own locally focussed forecasts, allowed us to protect consumers from higher costs than may be necessary while ensuring **a base level of allowances that are sufficient to enable net zero**. The two distribution networks in Scotland (SSEH and SPD) have been provided with a combined allowance for Load Related Expenditure (LRE)[2] of £312m. This represents a reduction of roughly 17% against their combined ask for RIIO-ED2, but **we have put in place a suite of uncertainty mechanisms[3] that will enable these allowances to increase**, often automatically without regulatory oversight, if more demand emerges than expected. See question 2 below for further detail on these uncertainty mechanisms.

On the transmission networks, in addition to the substantial RIIO-2 allowances that were set two years ago, the recently announced **c.£20bn Accelerated Strategic Transmission Investment (ASTI) framework is designed to accelerate the delivery of the onshore infrastructure** required to connect the 50GW of offshore wind planned for 2030. Broadly half of that investment is on infrastructure that will be built in Scotland. ASTI is planned to introduce a range of consumer protection measures, including a new financial incentive mechanism to reward/penalise the transmission companies for early/late delivery respectively. ASTI is a framework that can be used for further investments beyond the 50GW and 2030 should there be consumer value in doing so.

As shown by ASTI, we recognise the importance of moving to **system planning with anticipatory investment** as the foundation for future network regulation. We are continuing this process with the Electricity System Operator (ESO) developing a Centralised Strategic Network Plan (CSNP) for transmission which will identify the network upgrades needed to meet 2035 and 2050 targets for the decarbonisation of the energy system. We are separately consulting on doing something similar – potentially through the introduction of Regional System Planners - to produce whole system plans for the distribution grid. This is much earlier in development and will take longer to put in place. However, the ambition is the same: coordinated whole-system plans, which

[1] The FES are published annually by the ESO to set out a range of different, credible ways to decarbonise our energy system: https://www.nationalgrideso.com/future-energy/future-energy-scenarios

[2] LRE is the investment in the network to meet increasing demand requirements. On distribution networks in RIIO-ED2 this will largely be driven by increases in electric vehicle and heat pump numbers.

[3] Uncertainty mechanisms allow us to adjust a network company's allowance in response to changing developments during the price control period. The two most common forms of uncertainty mechanism are re-openers, which involve a detailed review of a company's proposals (for high cost, low volume works) and volume drivers which provide a guaranteed unit rate to complete low cost high volume works.

enable long term anticipatory investment to be made to meet 2035 and 2050 targets. In the meantime, price controls have uncertainty mechanisms in each sector to adapt to unforeseen changes.

The RIIO regulatory model is predicated on the expectation that all network companies will design their networks to consider future system needs. We have always accepted that works may need to be anticipatory, and it is for the companies to make that investment case.

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

We know that fundamental changes are required to accelerate the transition towards cleaner, cheaper, and more secure sources of energy. Accordingly, Ofgem is doing everything we can to forge flexible, adaptable regulation through our RIIO-2 price controls to speed up the building of our network infrastructure while protecting consumers. The design of these controls are flexible and agile, allowing investment to respond rapidly to changes in policy over time.

Late last year we concluded our settlement for the local electricity distribution networks, with an expected initial investment programme of over £22 billion – around £2.7bn of which is in Scotland - over the 5-year period from April 2023 to March 2028.

The aforementioned in-period funding mechanisms in **RIIO-ED2 will enable the DNOs – including SPEN and SSEN – to increase expenditure on critical local infrastructure** in Scotland to support electric vehicle (EV) and heat pump uptake automatically and without delay if and when additional demand emerges. This will be done through two 'volume driver' mechanisms, which provide DNOs with up-front certainty of unit rates for specific types of work on the local networks which can then be used without regulatory intervention throughout the period.[4] We also have two 're-opener windows' during RIIO-ED2 in which DNOs can ask Ofgem to increase LRE allowances for more substantial network reinforcement on their higher voltage networks, including to support the connection of more local, cleaner energy sources.

ASTI is another clear example of our flexible and agile approach to price controls at the transmission level. In under a year, we have established a framework that will build on the existing price control to enable **£20bn of investment on top of RIIO-ET2**. For projects not captured by ASTI, the transmission networks have multiple re-opener mechanisms within RIIO-ET2 that can facilitate additional funding for network reinforcements that weren't originally envisaged when the price control was set. These have been highly utilised in the first two years of RIIO-ET2, with additional funding of over £5bn (including £3.4bn on the eastern HVDC bootstrap) already approved through the LOTI[5] and MSIP[6] re-opener mechanisms.

Ofgem's regulatory framework is just one part of the chain however and meeting our collective objectives requires a coordinated effort. Accordingly we are working with

[4] We have included metrics against which we can check, ex post, that the volume drivers are being used appropriately, ie when there is increased demand on local networks.

[5] Large Onshore Transmission Investments re-opener

[6] Medium Sized Investment Projects re-opener

government to accelerate planning approvals and the network companies to ensure they can deliver a step change in their capacity to build new connections.

We are aware that SSEN and SPEN raised concerns at their Committee hearing on 21st March regarding whether we are sufficiently resourced to deal with the volume of re-opener requests that may come forward during RIIO-2. We do not share this concern and have built these reviews into our business planning. Examples of our ability to manage flexibility in the price control in a timely manner include:

- delivery of the ASTI framework in December 2022, following the UK Government's Energy Security Strategy in April 2022;
- our ongoing review of up to five LOTI projects each year of RIIO-ET2, none of which have been delayed as a result of our reviews; and
- our current review of this year's MSIP submissions, which we will be consulting on imminently, having received the submissions in January 2023.

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?*

At the recent Parliamentary Select Committee[7] the ESO stressed the need for a **diverse mix of generation technologies** to ensure network stability and security (ie not relying on any one technology), which we agree with. Similarly, all four of the ESO's FES show the country's power supply coming from a wide variety of technologies. As referenced in our response to question 1 above, at both transmission and distribution we are putting in place the tools that will facilitate better coordination of network design to ensure that whole system requirements, such as those you've listed, are catered for by the network.

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

See response to question 6 below, as connections barriers will also be relevant here.

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

Yes, based on the published consultation and the updates that we have had from BEIS/DESNZ via the Capacity Market Advisory Group (CMAG), **we are confident that they do**.

In addition to strengthening security of supply and improving the operation of the capacity market, the reforms propose to align the electricity Capacity Market (CM) with net zero principles. The current proposals under consultation consist of:

[7] Committees - UK Parliament

- Significantly reducing the emissions intensity limits for new build plants from 1 October 2034, to end the inconsistency between decarbonisation commitments and the 15-year CM agreements currently available for unabated fossil fuel generation
- Creating pathways that allow those participating in the CM to leave their multi-year agreements early to decarbonise
- Improving access to multi-year agreements for sources of low carbon capacity with low capital expenditure
- Updating the reference cost levels for the CM's capital expenditure thresholds to ensure these reflect the capacity mix anticipated for a transition to a net-zero power system
- Evaluating the relationship between the CM and large-scale long-duration electricity storage, and looking at how government energy policy can support projects with long build times.

These align well with the broader goals of accelerating decarbonisation and increasing the proportion of renewable electricity that feature in the Draft Energy Strategy.

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?

We are considering all the offshore wind deployments first in the Holistic Network Design (HND[8] – HND1 was published last year and is now being implemented through the ASTI framework; HND2 is under development and will consider 25GW ScotWind, likely to be published later this year).

Thereafter, the ESO will commence work on the CSNP, which will make recommendations on the entirety of the electricity transmission network across all technologies (including onshore and offshore wind) for the 2035 and 2050 decarbonisation targets. The first edition of the CSNP is expected to be published in the mid-2020s. In the meantime, our re-openers remain available for use by transmission owners (TOs) to take forward any other projects they consider need development including to support onshore wind in Scotland.

Meeting Scottish and UK government ambitions will require a **concerted and coordinated effort across the whole value chain**. Governments need to accelerate planning approvals and ease supply chain concerns, and network companies need to deliver a step change in their capacity to build new connections.

For networks to avoid being a blocker to decarbonisation, **we must ensure that processes for managing connections between the transmission and distribution systems evolve** to remain capable of accommodating the volumes and location of

[8] The HND sets out a single, integrated design that supports the large-scale delivery of electricity generated from offshore wind, taking power to where it's needed across Great Britain.

electricity transported across networks, given the accelerating pace of change. Currently, there is over a 320GW of new generation planned nationally at GB level, and there are ever-increasing constraints emerging on the transmission system with quoted connection dates of 2035 for some projects. At the distribution level, there has been significant growth in large new (demand) connections being requested for developments such as data centres, energy storage facilities, and EV rapid charging hubs.

We are taking action with industry and government to identify short- and long-term solutions to speed up connections to the grid, with two main areas of focus for us:

- reducing network congestion by expanding the size of the networks; and
- urgent reform of the connection processes and the connections queue, ensuring that projects that are viable and ready to deliver can connect as quickly as possible.

We are pursuing the first of these objectives (i.e., reducing network congestion) through our network price controls and, in particular, the ASTI framework. We are confident that through these mechanisms, we will enable the delivery of the onshore infrastructure required to connect the 50GW of offshore wind planned for 2030.

The second objective (of reforming the connection processes) will involve removing non-viable projects from the queue, improving accuracy and timeliness of connection offers, better coordination across transmission and distribution and, in the medium term, consideration of whether the current 'first come first served' methodology remains appropriate.

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?

Ofgem is not in a position to provide a view on this question. Such questions will need to be considered as part of a holistic planning of the energy system by the ESO.

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?

Ofgem is not in a position to provide a detailed view on this question. The relative abundance of renewable power inputs in Scotland, especially from offshore wind, will likely incentivise 'green' hydrogen production projects. Resilience of hydrogen supply in the future may well require a diversified balance of supplies, with the caveat that 'blue' hydrogen supply will retain dependence on global gas markets.

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

There are a range of issues which need to be addressed to building a hydrogen economy in Scotland. Frameworks for supporting hydrogen production are being developed by the UK Government. **Economic and safety regulatory frameworks** for future hydrogen transport networks and storage are not yet developed. We are working closely with

colleagues in the Department for Energy Security and Net Zero in understanding their evolving work in developing these. The Department announced in the British Energy Security Strategy that business models for hydrogen transport and storage would be developed by 2025. These business models will apply throughout Great Britain.

A **greater understanding of the economics, feasibility, supply and end uses** is needed before appropriate network infrastructure can be built or repurposed. For example, green hydrogen projects will require renewable power inputs. Will electrolysers be co-located with renewable generators and hydrogen transported, or electricity supported to where hydrogen is needed? In addition, how and where will hydrogen be generated? There is some speculation that electrolysis projects currently in development in Scotland could make green hydrogen at lower costs, by accessing cheap electricity from renewable generators at times of surplus supply, when the generators would otherwise be curtailed, but whether the economics of this work over the longer term, or whether dedicated resources will be required is yet to be determined.

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?

Front and centre of our work to support the delivery of net zero is the work of our network price controls that has been described in response to questions 1 and 2 above. Our **RIIO-2 price controls have set a base level of expenditure that we are confident is sufficient to meet net zero**, whilst also building in mechanisms that will allow this investment to increase if necessary. The **HND, and the resulting ASTI framework, will be key enablers of net zero** through the work that they do to enable the connection of significant amounts of low carbon generation.

We have also made reforms to how costs for electricity upgrades will be paid for, and by whom. In particular we have **removed a significant portion of the upfront connection costs** for wider network reinforcement that might be needed result of new electricity demands – for example electrification of transport or heating. This is critical to help remove barriers to net zero. As described at question 6 above, we are currently working to make it faster to obtain connections to the grid, which will also be an enabler of net zero.

We have worked with government, who have introduced a 'smart charging default' for EVs which will ensure that the electrification of transport can be a benefit to wider electricity consumers, rather than a cost.

However, we are not complacent. We are undertaking a fundamental look at our approach to network regulation to ensure that it is best able to enable net zero at lowest cost to consumers. We would like to talk to all interested stakeholders as we consider the options.[9]

[9] https://www.ofgem.gov.uk/publications/consultation-frameworks-future-systems-and-network-regulation-enabling-energy-system-future

In addition, we are **ensuring that the UK builds the necessary energy infrastructure for net zero by designing and implementing 'bankable' regulatory investment models** for the development of nuclear power stations and carbon capture, utilisation and storage (CCUS). Our work around regional system planners and enabling flexibility, described further at question 12 below, will also be key contributors to net zero.

Finally, to comment on our role in facilitating net zero, while we already have a mandate from government to facilitate the reduction of greenhouse gases emitted by the energy sector, and continue to work to do so, we recognise that the challenge of reaching net zero requires a fresh look at institutional roles. We are open to the UK Government setting an explicit duty for Ofgem to support the delivery of net zero at least cost to energy consumers, if it wishes to do so, though it would be important to manage any unintended consequences, particularly our ability to protect consumers and follow a least cost pathway. It is though worth stressing that we interpret our duty to current and future consumers, and our duty to ensure sustainable development of the energy sector, as entirely consistent with the net zero mandate.

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?

The Review of Electricity Market Arrangements (REMA)[10] is led by the UK government, although Ofgem is closely involved with this work. Ofgem's focus over the past 12 months has been to establish whether there is a benefits case to introducing locational wholesale pricing[11], and the key trade-offs that would need to be carefully considered if such an approach was taken. Ofgem is looking to provide independent, evidence-based expert opinion for government to consider.

It is too early for us to provide meaningful comment on REMA beyond that.

Community energy

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

We fully support the involvement of community and locally-owned energy projects in the energy system transition. Such schemes will be key in developing new business models and exploring innovative technologies and approaches to low carbon development.

The challenges (and solutions) related to the **connections queue** that are set out in response to question 6 above are also relevant here, and are equally relevant for a lot of connection customers regardless of ownership structure. There are some examples, such

[10] https://www.gov.uk/government/consultations/review-of-electricity-market-arrangements

[11] https://www.ofgem.gov.uk/publications/locational-pricing-assessment#:~:text=Ofgem%20is%20undertaking%20an%20assessment,electricity%20market%20design%20in%20GB.

as the Fintry project,[12] of community and locally owned projects that have succeeded under existing arrangements, but we are aware that many face challenges.

In addition to resolving issues with the connections queue, decentralisation towards regional and community scale energy production and consumption means that we need new approaches to system operation. **Local system planning**, on which we have just published a consultation, will be key to ensuring that networks function effectively for community and locally-owned projects in the future.

The first part of this will be to develop a framework for local energy system planning which is almost an exact analogue of what we are doing at the transmission level, where the ESO is developing a holistic network plan for the transition system. We would like to see similar system plans being developed in each of the distribution areas, but it is a little more complex in the local arena, because they need to work with local authorities to understand the nuances of each area, which will include plans for community and locally owned projects.

We also want well facilitated markets, particularly for flexibility, which can unlock its full value. We will clarify roles and responsibilities for local market facilitation to simplify it and make it easier for flexibility service providers to access. Ultimately, this supports households and businesses to be rewarded for flexing their demand. We have also published early-stage proposals to develop a stock exchange equivalent for flexibility that would help realise the full value of flexibility to the system.

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 key barriers, and how we are working to help address them, are covered in our responses to questions 6 and 12 above. It would not be within Ofgem's remit to have a view on whether it is enough for Scottish Government to "encourage" shared ownership models, or whether a more formal mechanism should be implemented.

[12] https://www.theguardian.com/environment/2009/may/10/windpower-energy