Net Zero, Energy and Transport Committee

10th Meeting, 2023 (Session 6)

Tuesday, 21 March 2023

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

Note by the clerk

1. In February, the Committee decided to conduct an inquiry into "Scotland's electricity infrastructure: inhibitor or enabler of our energy ambitions?"

   Read more about the Committee inquiry on the Scottish Parliament Website.

2. The Draft Strategy aims to deliver the Scottish Government's vision for a net zero energy system. This inquiry will scrutinise what electricity infrastructure will be needed to realise the ambitions set out in the Scottish Government's recently released Draft Energy Strategy and Just Transition Plan, and what will be needed to deliver that infrastructure.

3. This will be a short "snapshot" inquiry leading to a report to the Scottish Government as it finalises its new Strategy. It will also help inform the Committee's future scrutiny of specific aspects of energy and climate policy and practice.

4. Issues the Committee is likely to consider during the inquiry include—

   - the suitability of the different electricity technologies that the Scottish Government wants to play a role in future energy supply (onshore/offshore wind, marine, solar, hydro);
   - the relationship between technologies (e.g. intermittent renewables, pumped hydro, battery technologies, hydrogen etc.);
   - these technologies' compatibility with the current and planned electricity network;
   - the regulatory regime within which they operate;
   - whether the current planning system is geared to support and enable development of the infrastructure we will need within the right timeframes to reach net zero.

5. The link to the inquiry homepage above sets out 13 key questions the Committee has posed in its targeted call for views to stakeholders.

6. The inquiry is about electricity infrastructure in a broad sense; incorporating supply, transmission, distribution and storage. Substantial investment and changes in all these asset types will be needed for Scotland to meet its ambition to achieve net zero greenhouse gas emissions by 2045.

7. Planning for future electricity infrastructure in Scotland requires simultaneous consideration of the forms of supply, the relationships between supply and storage assets and the readiness of the electricity transmission and distribution networks for change. While the Scottish Government has significant control over the supply sources sited in Scotland, largely through devolved planning powers, the governance of electricity networks is a reserved matter.

8. At its meeting on 21 March, the Committee will have its first evidence session of the inquiry, hearing from two panels of energy industry stakeholders, as shown on the agenda.

9. Submissions of written evidence were received in advance of the meeting from two stakeholders giving evidence—

    - SSEN Transmission & SSEN Distribution (**Annexe A**)
    - Scottish Renewables (**Annexe B**)

10. Later evidence sessions will be held with regulators (Ofgem, on 28 March) and Ministers from the UK and Scottish Government (in April and May). The Committee also plans to gather further views and information through visits and informal stakeholder sessions during the inquiry. The Committee expects to issue a report in early summer. The Scottish Government must then reply to the report.

Annexe A – Written submission by SSEN Transmission and SSEN Distribution, 15 March 2023

About us
SSEN Transmission and SSEN Distribution are part of SSE plc, the clean energy leader that develops, owns and operates low carbon infrastructure to support the net zero carbon transition.

SSEN Transmission, under licence held by Scottish Hydro Electric Transmission plc, owns, operates, and develops the high voltage electricity transmission system in the north of Scotland and remote Scottish islands.

SSEN Distribution, operating under licenses held by Scottish Hydro Electric Power Distribution plc and Southern Electric Power Distribution plc, owns, operates, and develops the electricity distribution networks in the north of Scotland and central southern England.

Our developments and business strategies follow a stakeholder-led approach to deliver jobs and economic benefits, support greater resilience, and create community wealth. Together we are delivering a network for net zero, connecting renewable energy and supporting the increased demand for electricity that is needed to support Scottish and UK emissions reduction targets.

As networks with aligned objectives but differing challenges, SSEN Transmission and SSEN Distribution are submitting a joint response to the Committee's inquiry on behalf of SSE's networks businesses.

Introduction
Scotland's electricity networks have a critical role to play and are arguably the key enabler in delivering Scotland's and the UK's net zero and energy security ambitions.

We do this by planning, developing, building and maintaining the electricity network infrastructure required to connect and transport renewable electricity generation from source to areas of demand across the country, and beyond.

Put simply, if we cannot plug in new renewable electricity generation, or provide the increases in network capacity required to transport that power to where it is needed, Government targets will not be met.

We therefore welcome the publication of the draft Energy Strategy and Just Transition Plan, and we look forward to working with the Scottish Government and its agencies, and the Scottish Parliament, to turn the ambitions contained within the Strategy and Plan into tangible actions.

With short timeframes to meet both Scottish and UK Government energy security, emission reduction and renewable energy targets, the efficient and timely delivery of essential infrastructure which enables Net Zero should be at the heart of regulatory and government policy and embedded within decision making frameworks to provide certainty and investor confidence for critical infrastructure investment.

Decision making for regulatory approvals and project consenting therefore needs to be more timely, streamlined, and efficient to reduce delays for future network investment to unlock renewable energy, decarbonise heat and transport systems (including EVs and rail decarbonization) and achieve legally binding climate targets and energy security ambitions at the scale and pace required.

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.

Both business plans for SSE's Transmission[1] and Distribution[2] businesses during this price control period have been approved by Ofgem and outline a clear strategy for what needs to be delivered during this timeframe.

In the five years of the RIIO-ED2 price control, SSEN Distribution will invest at least £1.2bn across the north of Scotland, an uplift of c. 30% on the equivalent period in RIIO-ED1.

For transmission, the baseline investment totals around £2.6bn over the five-year RIIO-T2 period and mainly covers two types of investment:

- load related expenditure, which covers investments that will increase the capacity of the network to accommodate growth in electricity generation and demand; and
- non-load related expenditure, which covers investments in the existing network, for example asset replacements, maintenance, and refurbishment.

Through Ofgem's Uncertainty Mechanisms, additional infrastructure over and above what is included in baseline plans can be progressed as and when the need for these additional investments can be demonstrated and evidenced.

Based on our forecast of these Uncertainty Mechanisms, we expect total RIIO-T2 expenditure to increase to around £4bn, with this additional investment including expenditure related to the replacement of the Fort Augustus to Skye overhead line, which includes increased capacity to enable the connection of renewable electricity generation along its route; the upgrade of the transmission network in Argyll from 132kV to 275kV to support the forecast growth in renewables in the region; and the Orkney transmission link, which received provisional approval from Ofgem on 3 March 2023.

[1] A Network for Net Zero - SSEN Transmission (ssen-transmission.co.uk)
[2] Home - SSENFuture

Combined, our baseline load-related expenditure and the impact of Uncertainty Mechanism expenditure is expected to increase the capacity of renewable electricity generation connected to the north of Scotland transmission network from around 8GW at the start of the RIIO-T2 period, of which around 7GW is from renewable sources; to around 13GW at the end of RIIO-T2, of which around 12GW forecast from renewable sources, marking significant progress in delivering against the ambitions of the Energy Strategy.

However, 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, or our "Pathway to 2030" projects[3]) 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 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 step 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 zero-carbon 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 (taking a "do it once and do it right" approach). 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.

Our regulatory frameworks need to be much more agile than current processes allow, prioritizing the accelerated delivery of a net zero grid which will form the backbone of our future energy security and decarbonization ambitions. Without urgent investment in grid (both transmission and distribution) it will be impossible to

[3] An overview of SSEN Transmission's ASTI, or "Pathway to 2030" projects, can be found in Appendix 1.

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 also 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.

Our 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 we 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 zero-carbon 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.

<u>System resilience</u>

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?
Our regulatory license requirements mean that we have a duty to offer connections to all customers from all technology types and promote competition in electricity generation. We are therefore technology agnostic and do not provide a view on

what technologies should be deployed on the system and when. This question may be more appropriate for National Grid ESO, who operate the GB wide network, or Government to answer directly.

However, we believe that a range of technologies will likely need to play a whole system role in ensuring security of supply and network resilience as Scotland further decarbonizes the energy sector and as greater renewable sources of generation become even more dominant on the system.

In particular, we believe that we should be planning for prolonged periods of low wind output, in particular during winter when electricity demand is at its highest and will only increase further with the electrification of heat.

Whilst battery technology and flexibility can clearly play a role, long duration storage in particular could help to support system balancing at times when wind output is low and could help to strengthen energy independence to meet Scottish and UK demand, rather than reliance on interconnectors from neighbouring countries which could increase consumer vulnerability to global price shocks and energy shortages.

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

Our generation customers tell us that route to market, transmission charging and planning policy create barriers to deployment for these technologies. We refer to more detailed views shared by Scottish Renewables in their written response.

As we consider whole system planning as a fundamental element in planning our network developments, in our own Future Energy Scenarios (at both Transmission[4] and Distribution[5] level) thought was given to changes in other areas of the energy system such as heat, transport (including rail) and hydrogen. Although, there is still a significant number of unknowns with regards to the deployment and use of hydrogen at domestic scale, hydrogen has the potential to play a significant role in the energy transition. There are multiple pathways available to reach the net zero decarbonisation targets set forth by the Scottish and UK governments and all of them will consist of a mixture of energy sources and technologies.

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

As a Transmission Operator, we are not best placed to comment on proposals for the capacity market and defer to views shared by our generation customers.

However, as the Climate Change Committee's (CCC) report[6] on a *'Reliable, secure and decarbonised power system by 2035'* highlights, alongside using renewable electricity flexibly and boosting electricity storage, low carbon dispatchable capacity, such as CCS or long-duration pumped-storage, will be required to maintain security of supplies during extended low wind periods in a decarbonised power system.

[4] North of Scotland Future Energy Scenarios (NoSFES) - SSEN Transmission (ssen-transmission.co.uk)
[5] SSEN Distribution Network Future Energy Scenarios - Regen
[6] A reliable, secure and decarbonised power system by 2035 is possible – but not at this pace of delivery - Climate Change Committee (theccc.org.uk)

To deliver on clean electricity objectives, feedback from our generation customers suggests that the Capacity Market will need to evolve coupled with bespoke investment mechanisms, to support lower carbon, more flexible capacity, from a range of different storage technologies and demand flexibility options.

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?

Significant and accelerated investment in grid (both Transmission and Distribution) will be a key enabler for the deployment of further renewable generation, to connect the clean energy generated and take it to demand centers across the country. Across our Distribution and Transmission businesses, we are delivering 20% of the necessary upcoming electricity networks investment in the UK to connect renewable energy and enable the electrification of heat and transport. We stand ready to do much more, in partnership with the right policy environment and regulatory direction.

One of the key barriers to achieving the onshore and offshore wind targets set out in the Energy Strategy will be the timely delivery of the network infrastructure required to enable those targets. Early approval of need for these reinforcements, as set out in Ofgem's ASTI decision; alongside certainty of delivery body, i.e., who will be responsible for these works, will be key to timely delivery, particularly securing the supply chain in the global race to decarbonise and secure energy independence.

In its ASTI framework decision, Ofgem confirmed that those 2030 reinforcements will be exempt from proposals to introduce competitive ownership of onshore electricity networks, which are currently being considered as part of the UK Government's draft Energy Bill.

By confirming existing electricity transmission licensees will remain the delivery body for these reinforcements, Ofgem has provided the much-needed certainty required to support timely and accelerated delivery, including early supply chain engagement, which will be key to securing the supply chain in what is an extremely competitive and constrained global market. This is particularly true for HVDC cabling, Convertor Stations and the specialist cable laying vessels.

As we look beyond 2030 targets and the forthcoming HND follow up exercise, we encourage Ofgem to build on its ASTI framework and ensure early approval of need and certainty of delivery. This will be key to avoid delays and associated increased costs for consumers through higher supply chain costs as result of late procurement: and prolonged and increasing constraint payments for late delivery.

Our connection customers tell us that grid is only one of the factors that low carbon generation is dependent on. Other factors include planning, funding mechanisms, market conditions, consenting and network charging.

At a distribution level, the uncertainty mechanisms for the next Distribution price control, RIIO-ED2, will be a good test of Ofgem's recognition that a more anticipatory

approach is required than five-year business planning cycles allow. We continue to work closely with renewable developers, communities and other parties to understand future plans for onshore wind, ensuring this is fully accounted for, alongside other technologies, in our annual Distribution Future Energy Scenarios process which will play a key role in building our evidence case for investment.

At a transmission level, we're focused on delivering our ASTI projects within accelerated programme timescales to unlock the ambitions in the draft Energy Strategy. This £10bn investment will collectively transmit enough power through our wires and cables to power up to 10 million homes, creating billions in GVA and supporting thousands of jobs in the Scottish and UK economies. Over above the economic and energy security benefits, this investment will also deliver industry leading Biodiversity Net Gain[7] and build community wealth in the areas that will play such an important role in supporting the UK and Scotland's legally binding 2030 targets.

The planning and consenting process will be one of the most important drivers in unlocking this ambition at scale and pace and therefore must be enabling of grid delivery within 2030 timescales. The current process has worked well to date, but with only seven years left to deliver 2030 targets there is a collective need for all involved within it (including developers) to think and do things differently to accelerate decision making, whilst retaining those vital checks and balances in the current framework.

It also means creating certainty for grid investment in planning policy and decision making so that complex programmes, that enable Net Zero, can be achieved at scale and on time. The most pressing planning and consenting barriers should be prioritised with urgency, from a TO perspective these can be summarised as:

- **Modernising Section 37 processes in the Electricity Act 1989 (UK Government):** We believe that changes to existing processes, legislation and regulations are required to set out clear and fixed timescales for determining S37 applications, remove the automatic PLI trigger for objections not based on planning policy grounds, and enable TO's to make amends to S37 applications without having to start the process again from scratch. We understand that there are various mechanisms that could be used to deliver amends to existing S37 processes in Scotland and we are open to supporting all options that could effectively deliver this much needed change. However, given short timescales for the delivery of 2030 targets, we believe that including S37 amends to the Electricity Act, via the UK Government's Energy Bill (which is currently going through UK parliamentary approval), presents the most obvious and straightforward opportunity to deliver these timely changes quickly and with urgency. S37 amends are currently not included within the Bill.

- **Amending the ancient woodlands policy in NPF4 (Scottish Government)**: While strongly supportive of the vast majority of the NPF4, we continue to hold significant concerns on the potential implications of the ancient woodland

[7] our-approach-to-implementing-biodiversity-net-gain-.pdf (ssen-transmission.co.uk)

policy wording for future grid development. While avoiding impacts on ancient woodland is our key priority, in some circumstances this will be unavoidable due to the extent of ancient woodland cover in our network area. A change of wording in the ancient woodland policy is urgently needed to ensure that Scotland's precious habitats can be both protected and enhanced whilst also enabling critical national infrastructure to be delivered with considerate environmental mitigation plans when no other feasible option is possible.

- **Coordination of marine and coastal spatial development:** To support the delivery and connection of ScotWind Leasing Projects, the marine and coastal environment, particularly in the North-East of Scotland, is becoming an increasingly busy space. This risks creating delays in the delivery of critical infrastructure projects should site conflicts arise, both with developers but also from other existing marine users that may potentially be impacted. An overarching plan for marine and coastal spatial planning is therefore urgently needed to minimise and mitigate development overlaps and ensure strategic coordination takes place to collectively deliver Energy Strategy ambitions.

Planning delays create unnecessary risk to critical grid investment timescales, and this risk also increases cost – in terms of constraints (which have cost GB consumers roughly £2bn over the last two years alone) - and increases in project spend. Neither of which are in the best interest of energy bill payers, or the climate and environmental crisis. Each project is a vital link in the transmission network chain, and delays to just one project can have much wider system impacts and consequences.

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?

To deliver a pathway to net zero, the ESO's Future Energy Scenarios forecast that between 46GW and 50GW of low carbon electricity generation will be required in the north of Scotland.

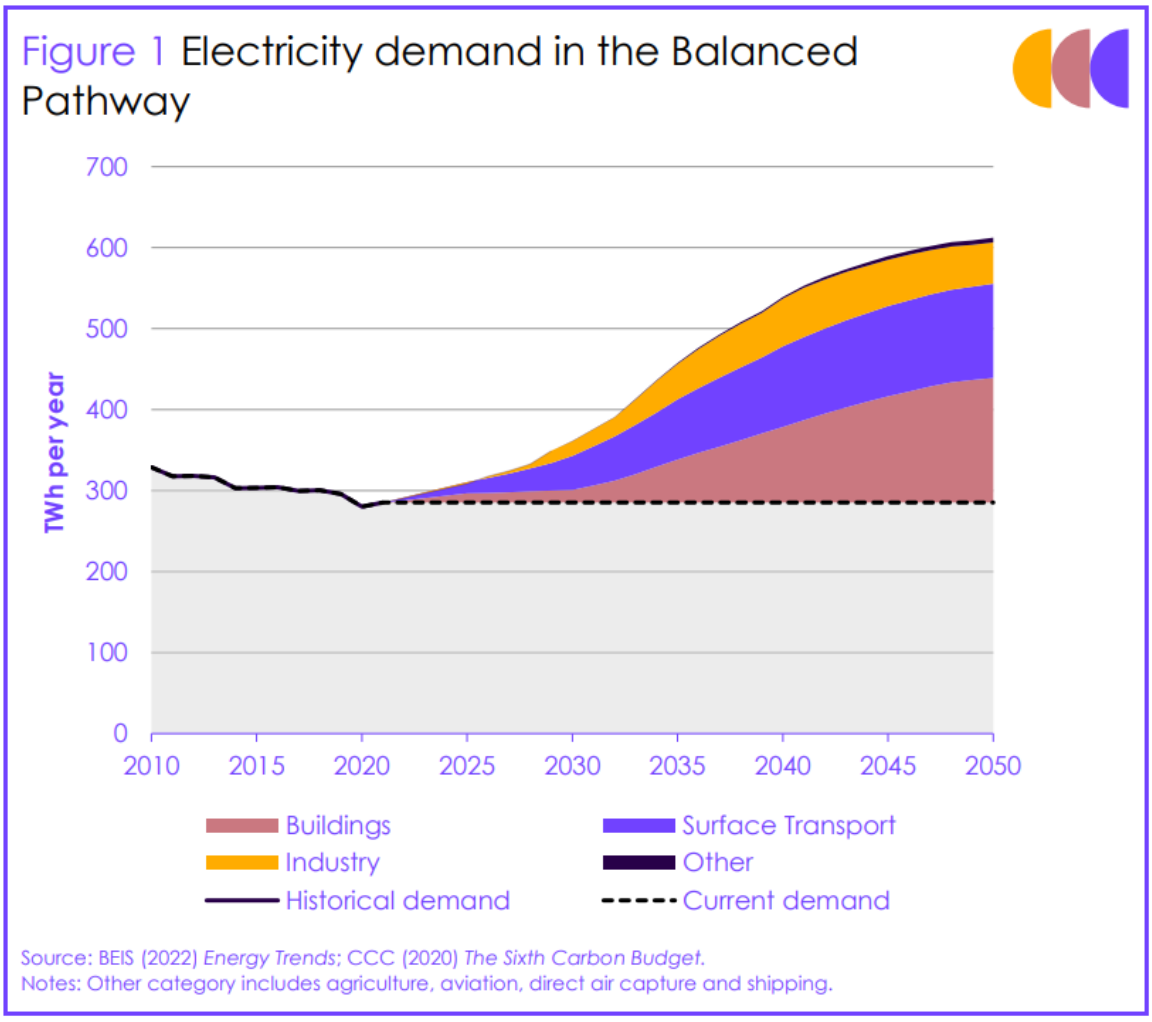
In its draft Energy Strategy, the Scottish Government forecast that 88TWh of renewable generation will be needed by 2030, with 160TWh by 2045 – the equivalent of roughly 37GW of capacity by 2030 and 65GW by 2045. In Scotland we currently have roughly 14GW of capacity across renewable technologies, with 9 GW connected in the north of Scotland. The Scottish Government's Energy Statistics Hub also confirms that there is currently 40GW of renewable energy projects in the planning pipeline, which would more than double the level of renewable generation currently deployed should all of these projects proceed[8].

Therefore, in all credible net zero pathways, significant growth in renewable electricity generation, way beyond that current and future network plans will enable, will be required, with these network investments clearly of low regret in the context of delivering net zero.

[8] Scottish Energy Statistics Hub (shinyapps.io)

This is further evidenced by the CCC's most recent report, "*Delivering a reliable decarbonised power system*"[9], which tells us that electricity demand is expected to increase in the UK with the electrification of key sectors such as transport, buildings and industry. On page 13 of the report, it states that: *In the CCC's Balanced Pathway for the Sixth Carbon Budget, there is a 50% increase in electricity demand by 2035 and a doubling in electricity demand by 2050 (with some CCC pathways projecting as much as a trebling by 2050) (please see Figure 1 graphic below). Alongside this, continued digitalisation is expected to further embed the critical role of electricity to the functioning of the UK economy.*

The CCC's analysis suggests that any projected risk of over-supply in electricity is therefore low, and the push for greater renewable electricity capacity is a low regret option for future climate ambitions and consumers. This also demonstrates that demand for greater network capacity is needed urgently to transport this electricity to where it is needed for the benefit of a zero-carbon economy and reduce network constraints for GB consumers.



Hydrogen and the electricity system

[9] A reliable, secure and decarbonised power system by 2035 is possible – but not at this pace of delivery - Climate Change Committee (theccc.org.uk)

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?
As a regulated networks business, we are technology neutral and do not have a view on how much should be deployed. From a draft Energy Strategy perspective, it's important that investment in grid, to expand capacity for electricity export / import, is also prioritized alongside the progression of hydrogen technology to support a zero-carbon society.

9. What are the key infrastructure barriers to building a hydrogen economy in Scotland and how should they be addressed?
As a Transmission Operator, we are not based placed to provide a view and instead defer to views shared by Scottish Renewables.

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?
We warmly welcome Ofgem's approval of the ASTI framework in December last year which provides a strategic and clear accelerated plan of what grid infrastructure is needed to enable 2030 ambitions. However greater ambition is needed to extend this strategic planning approach for grid investment, reduce reliance on international markets (for both energy itself and supply chain) and build a home grown, resilient energy supply.

Currently Ofgem's statutory obligations do not contain any requirements for enabling Net Zero, and we believe this would be a helpful starting point, alongside its existing consumer obligations, to modernize the regulator's approach to critical infrastructure investment. Including net zero as a primary objective for Ofgem will help to give more balance to their decision making, ensuring future consumers benefit from decision made today whilst consideration should also be given to extend this remit to include economic growth.

We also welcome confirmation that the projects identified in Ofgem's ASTI framework will be exempt from future plans to introduce competition in networks, which is currently being progressed in the UK Government's Energy Bill. We believe this exemption for ASTI projects is the right thing to do to unlock Net Zero goals. Certainty of network investment, and who is delivering it, between now and 2030 will be critical to unlock renewable energy and decarbonisation targets at the scale and pace required for Net Zero.

We remain concerned, however, at the potential impact, and unintended consequences that wider competition in networks could have on net zero delivery due to the risk of fragmentation in the market with little evidenced benefit to consumers on its introduction. We believe this creates risk and cost implications, not only from a net zero perspective but also for future network resilience. As the rest of the world also decarbonises at pace, demand in a global supply chain for key

components become stretched – the importance of future certainty of network investment (who is delivering and when) will be vital to secure this early (securing manufacturing slots which are already booking up fast into the 2030's) delivering projects on time and at an efficient cost for GB bill payers. This certainty, alongside early supply chain engagement, also creates opportunity for inward investment from our international suppliers if there is confidence that a steady pipeline of future projects are forthcoming.

There is also a clear need to learn lessons from the Energy Retail market and it is vital that we do not repeat these risks with national infrastructure. These failings act as a reminder of the need to carefully consider the applicability and consequences of competition in the transmission sector.

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 are actively engaging in the REMA consultation process and will continue to work with UK Government officials to understand how any future Market Reform processes could potentially impact the delivery of critical network investment in the north of Scotland. Our generation customers continue to highlight concerns about proposals for Locational Marginal Pricing which could have a detrimental impact on future renewable investment in Scotland. Further analysis and investigation is needed on the benefits and limitations of this proposal so that its full implications can be identified and that net zero delivery is not put at risk at this critical juncture. On behalf of our generation customers, we also refer to views shared by Scottish Renewables in response to this question.

It should also be recognized that full scale market reform takes time and creates uncertainty for future market investment. It's important that any reforms progressed through the REMA process help to maintain investor confidence and create positive opportunities for further low carbon investment (including route to market for less established technologies) as the UK and Scotland competes globally for decarbonized investment. Without this investor confidence, it may be challenging to achieve ambitions outlined within the draft Energy Strategy and Just Transition Plan.

Community energy

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

As the owner of the Transmission and Distribution network in the north of Scotland, we are obligated to be both technology (and developer) agnostic, offering connections to all parties who request it. We recognise that current connection processes can make it difficult for community schemes to access the grid capacity they need - networks don't necessarily inhibit the connection of community schemes but the framework could be seen to inhibit due to cost (securities and liabilities) and grid access issues. Connection reform is currently underway, led by Ofgem, which could potentially help to address current barriers, particularly for small scale community led schemes.

We strongly support reforming the existing connections process and queue management arrangements which would improve processes for all types of generators looking to connect to the GB network. Around half of our generation customers that hold grid connection agreements are churning, effectively pushing back their connection dates each year rather than progressing their projects. These projects are holding capacity that could be used by projects that are progressing.

We support the ESO's 5-point plan including the TEC amnesty, however have seen limited capacity requested to be released. We continue to actively engage in the Queue Management CUSC modification process, on behalf of our generation customers, and would like to see its implementation brought forward urgently in the context of Net Zero ambitions.

As a DNO, our work is at the 'grid edge' of the energy system, and our service is shaped by local decisions and local challenges. We are currently reviewing the detail in the consultations recently published by Ofgem in relation to future energy system market development and management[10]. We recognise the need for the system to evolve to meet future needs, but we ask that the need to make changes and reform is balanced against the need for network operators to get on with delivering the investment to meet net zero, whilst avoiding any additional costs and delays. With regard to energy system planning, we acknowledge that there is a gap and we strongly support the need for Local Authorities and communities to be assisted with their net zero planning, but believe this is best delivered if driven locally. We will be fully engaging with the industry working groups and local stakeholders looking at these proposals. It will be critical to ensure that any changes to arrangements are considered holistically to avoid an incremental approach, creating delays and increasing costs across the piece.

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?

Grid access reform, as mentioned in response to question 12, could help to address connection issues for community energy schemes, however our connection customers tell us that grid is only one of the factors that low carbon generation is dependent on. Other factors include funding mechanisms, market conditions, consenting and charging. For more detail on the barriers experienced, and on whether a formal mechanism for shared ownership should be introduced, we defer to written views shared by Scottish Renewables in response to this inquiry.

Thank you for providing the opportunity to share our views, and for the invite to provide oral evidence which will be attended by Aileen McLeod, Director of Business Planning and Commercial for SSEN Transmission.

We look forward to discussing the topics above in more detail with members of the Net Zero, Energy and Transport Committee at the session on 21st March. If it would be helpful to provide any further detail on our answers above in the meantime please contact Kirstanne Land.

[10] Call for Input: The Future of Distributed Flexibility | Ofgem
Consultation: Future of local energy institutions and governance | Ofgem

Appendix 1: Map of SSEN Transmission's "Pathway to 2030" ASTI projects

Main north of Scotland Electricity Transmission Network in 2030

Investments currently in discussion with Ofgem

1. Argyll 275kV strategy
2. Fort Augustus to Skye 132kV upgrade
3. Orkney 220kV AC subsea link

Pathway to 2030 Investments

1a. Beauly to Loch Buidhe 400kV reinforcement
1b. Loch Buidhe to Spittal 400kV reinforcement
2a. Beauly to Blackhillock 400kV double circuit
2b. Blackhillock and Peterhead 400kV double circuit
3. Beauly to Denny 275kV circuit to 400kV
4. East Coast Onshore 400kV Phase 2 reinforcement
5. Spittal to Peterhead 2GW HVDC subsea link
6. Peterhead to Drax 2GW HVDC subsea link (EGL2)
7. Peterhead to South Humber 2GW HVDC subsea link (EGL4)
8. Arnish to Beauly 1.8GW HVDC Western Isle link
9. Aquila Pathfinder - Peterhead DC switching substation

Public Consultation to Inform Project Development

All new reinforcements remain subject to detailed consultation and environmental assessments to help inform route and technology options

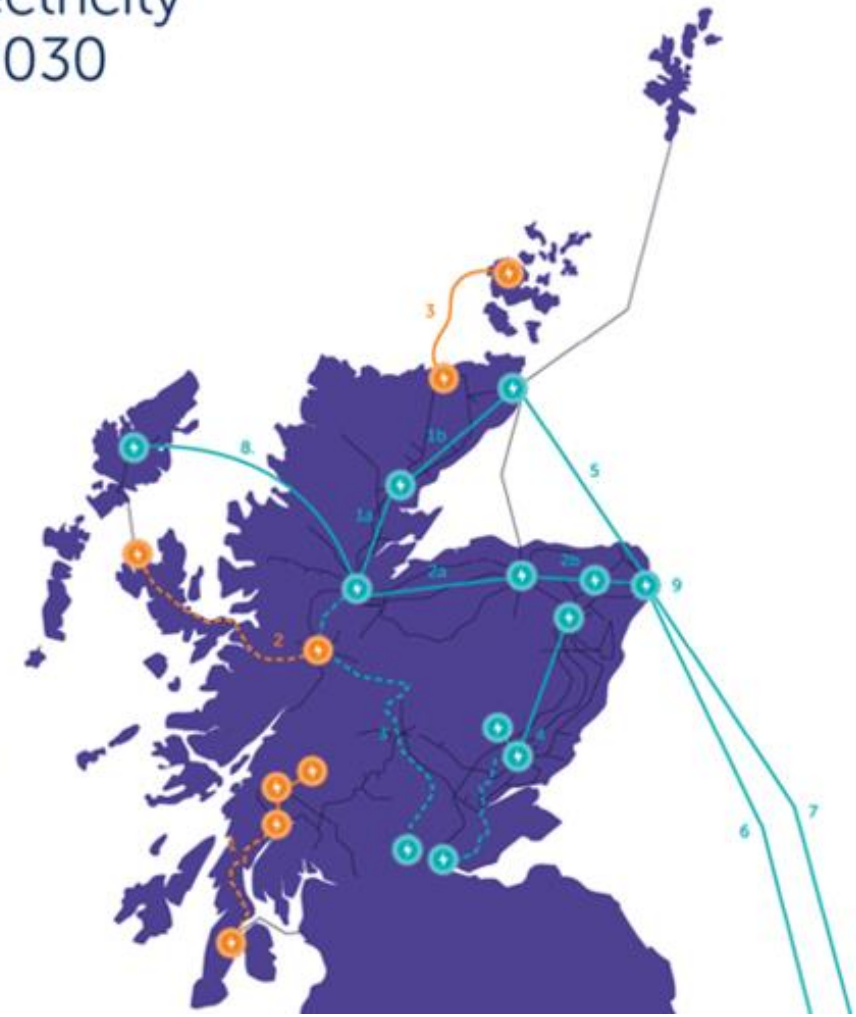
More detail on these projects, including how to sign up for updates, will be made available on SSEN Transmission's website, www.ssen-transmission.co.uk

New Infrastructure (Routes shown here are for illustrative purposes)

Upgrade/Replacement of Existing Infrastructure

Existing Network

Forecast as at 16 Sept 2022



Annexe B – Written submission by Scottish Renewables, 15 March 2023

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.

<u>System resilience</u>

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 electrolysers 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 system[i]. 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 unbated 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. 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 be still be at a disadvantage to other competing technologies with access to the CM (such as interconnectors, batteries, hydrogen, etc).

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[i] 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.

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 is 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 Governments 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.