

SSEN Transmission's North of Scotland: Delivering a Pathway to Net Zero Webinar March 2022

Summary of Questions & Answers

On Tuesday 29th March 2022, SSEN Transmission hosted a regional webinar, providing an overview of our projects in construction and development across the north of Scotland (Highlands, Islands & Aberdeenshire) and describing the role of the north of Scotland in delivering a network for net zero.

We would like to thank all stakeholders who took time to join us and for the many questions which were submitted during the event.

This document summarises the responses to the questions asked during the webinar and provides answers for those additional questions received which were not addressed during the event. For ease of understanding we have grouped the questions into key themes.

During the event and in the post event survey, feedback was given by stakeholders on the event and their preferences for future engagement. This feedback will be applied in the design of future engagement plans for the projects covered by the event. This feedback includes:

- The inclusion of breaks in online seminars running for more than an hour
- Inclusion of a brief introduction to how the network works
- Providing an explanation of the differences between Distribution and Transmission

A copy of the presentation slides and a full recording of the webinar can be accessed via our [Recent Stakeholder Publications](#) page on our website.

If you have any queries on the webinar or the information provided below you can contact us on transmission.stakeholder.engagement@sse.com.

Delivering Net Zero, Protecting the Environment and Exploring Emerging Technologies

1. What do you see as the three biggest challenges to achieving net zero for SSEN Transmission?

Early certainty in investment, timely regulatory approval, and early engagement with the supply chain are three important challenges to successfully delivering net zero. We are clear on the reinforcements and investments we need to make but there are some big challenges to delivering them, so the sooner we have certainty the sooner we can start talking to the supply chain and communities and start the regulatory approval process. The regulatory approvals process has 5 steps, each taking between 3 and 6 months and we believe this needs to speed up if we are going to be able to deliver net zero.

2. How critical will low carbon and the associated infrastructure be in delivering energy independence and what benefits do you think that might provide and do you think you will be adequately supported in order to deliver the upgrades in a timely manner?

The UK Government's recent Energy Security Strategy confirms the requirement for accelerated and timely investment in the GB transmission network to support net zero and government energy security

goals. This strategy includes more renewables and faster connections to the networks to get us onto that pathway to net zero and energy independence more quickly. The delivery of net zero will ultimately help with security of supply and long-term affordability, as we will not be reliant on volatile global fossil fuel prices and this in turn helps with decarbonising the GB economy

To unlock the full potential of the north of Scotland's abundant renewable energy resource and delivering it to where it is needed all across GB, we will continue to work with the UK and Scottish Governments, Ofgem and our wider stakeholders to support delivery of the strategy and maximise the socio-economic opportunities presented for our collective low carbon future.

3. What is SSE's view on investments in Green Hydrogen technologies? As well as using batteries for storage, are other technologies also being considered such as solid weight gravity storage which may be cheaper, more durable, and just as responsive?

As a business and as a network company we're technology agnostic. We don't prefer one technology over another, and we have a license requirement to treat every customer and every connection equally. We connect any form of generation looking to connect to the grid, and we're very focused and committed to net zero. Ultimately it is a political policy decision as to the type of technologies that will meet our future electricity generation mix, with both UK and Scottish Government's setting ambitious net zero targets for 2050 and 2045 respectively. In general terms, whether you're an offshore windfarm, onshore windfarm, hydro power station or a solid weight gravity storage provider, we will treat you equally and provide a connection based on the existing industry frameworks.

It is the National Grid Electricity System Operator (NGESO) who is ultimately responsible for balancing the system, but we clearly see there will be a role in the future for battery technology, whether that's traditional batteries or nature's battery in the form of hydro-electric pumped storage. We're seeing a lot more interest in hydro-electric pumped storage projects which is complementary to onshore and offshore wind, given when there is high wind output, but low demand on the system, we can use that wind output to pump the water, store the water, and then in reverse when we've got low output from wind generation, we can use that storage to balance the system and ultimately power homes and businesses across the north of Scotland.

4. How will you engage with innovators to realise your net zero ambition?

Innovation is a big focus for SSEN Transmission, and we have a number of initiatives in this area. As part of our supply chain approach innovation is one of the key initiatives that our framework contractors support. Our engineering team have also various initiatives with universities to explore innovation ideas. In addition, we are also keen to listen to ideas from the supply chain/innovators through our communication forums. You can find out more about some of our most recent innovation projects [here](#).

5. Does the forecasted expected demand take into account the expected increase in electric vehicle adoption and phasing out of hydrocarbon vehicles?

Yes, both the National Grid Electricity System Operator (NGESO) Future Energy Scenarios (FES) and our own north of Scotland Future Energy Scenarios (NoSFES) take into account the expected increase in electric vehicle adoption and phasing out of hydrocarbon vehicles.

Our modelling is comprised of petrol / diesel, electric and hydrogen fuel types and uses government phase out plans for petrol and diesel cars to determine appropriate uptake rates of electric and hydrogen powered vehicles. We look at all classes of vehicles; cars, vans, motorbikes, buses and HGVs. Our modelling is capable of determining the forecasted demand at winter peak, summer minimum and summer maximum in MW and annual energy demand in TWh out to 2050.

6. The 8GW of renewable power transmitted represents what percentage of total power transmitted presently?

SSEN Transmission's network in the north of Scotland currently has c.9.2GW of electricity generation connected to it, with c8GW (87%) made up of various hydro, onshore and offshore renewable generation. The remainder is largely thermal generation from Peterhead CCGT power station (13%).

7. How do SSEN Transmission manage the impact on the environment and local communities and how do they deliver biodiversity net gain on these projects?

Environmental assessments start at the initial Options Appraisal Process, which looks at high level strategic options of where the best connection points may be, then as the projects develops and we refine the proposals we do increasing numbers of environmental surveys, to minimise effects to the environment but also to the people working and living within the area.

Once we get to detailed proposals, we produce comprehensive Environmental Impact Assessments, working alongside stakeholders such as the regulator, planning authorities, Scottish Environmental Protection Agency (SEPA) and NatureScot. These assessments will propose any mitigations which may be required, to minimise any adverse effects on the environment. For example, for substations this may be landscape screening. Once we then get to the route assessment stage, detailed site surveys are completed to get a baseline for the habitats as they stand, and we also carry out assessments which look at construction impacts.

Biodiversity Net Gain (BNG) is considered closely as part of our landscape screening and landscape management plans. We have commitments to deliver biodiversity net gain on all our projects consented from 2025, building on our existing commitments to deliver no net loss today. To assess our biodiversity impacts we undertake a detailed assessment of the local biodiversity on a site prior to the start of construction. This biodiversity assessment provides us with data on the biodiversity impacts for the projects and identifies to help inform our biodiversity no net loss or net gain measures, identifying where additional work is required. This could include working with external parties to create landscape or habitat management plans, for example using native species of trees or wildflower to create natural habitats; or for example on open moorland, we might complete peatland restoration works, provide bat or bird nesting sites or work to restore native species to increase the biodiversity net gain.

8. Do we have any new technology/innovation ideas to lessen the environmental impact?

We're always looking at ways to lessen any environmental impact we may have; three examples of recent innovations are:

- For many years SF6 has been commonplace in our industry as it has very good insulating properties unfortunately, if it is released to the environment, it is particularly harmful. As part of our wider sustainability commitments, we are looking to reduce the use of SF6 and where

possible use SF6 free alternatives in our plant and apparatus and we're working closing with suppliers and industry experts to employ these alternatives.

- We created an award-winning Biodiversity Net Gain optioneering tool which considers biodiversity at every stage of a project development. The toolkit uses the principles of the DEFRA Biodiversity Metric to quantify the 'potential' biodiversity impact of different options, allowing it to be fully considered in the decision-making process. Following which, a more detailed biodiversity assessment can be undertaken for the chosen option.
- We've introduced 3D visualisations to help stakeholders understand the environmental effects of our new infrastructure and inform optioneering.

9. Could exploring the connection of new geothermal electricity generation from Iceland to the network node at Dounreay via a HVDC be potentially viable in the context of the drive for net zero?

Across the whole GB power system, alongside other transmission owners and working with the NGENSO, we will plan and develop our network to consider all connections, including those from interconnectors to other countries, including where it is most economic to connect them. Whilst there are no current proposals regarding connecting to electricity generation from Iceland, we are aware of proposals to potentially provide a HVDC connection from Norway to the north of Scotland. This is an evolving picture, and we see potential for further growth in the interconnector space going forward.

10. SSEN's digital strategy (Dec 2021) includes 'smart monitoring of critical assets.' Does this include SF6 filled assets?

Yes, it does, and it will be a measurement of Circuit Breakers and Substations.

11. Are there any innovative strategies intended to detect partial discharges through real time monitoring opted?

We are undertaking installation of permanent Partial Discharge (PD) monitoring on sixteen of our transformers as part of our RIIO T2 business plan. We are also installing permanent PD monitoring at a number of new cable connections to our large strategic substations.

Portable PD monitoring is also currently in use by our operations teams to monitor for short durations and has been used across our cable assets over the last 18 months. This allows targeted maintenance operations or installation of permanent monitoring.

12. What plans has SSEN Transmission got in place to use waste heat for Community Heat Networks?

SSE Group, led by its Heat Networks team (separate to SSEN Transmission) are actively developing a test project to recover waste heat from electricity transformers (and other electricity infrastructure such as power tunnels) and to distribute this to nearby homes and businesses through a network of district heating pipes. SSE Heat Networks believe this has real potential to deliver low cost, low carbon heating as an alternative to fossil fuels. The key to a successful project will be the availability of waste heat at any given transformer site, and, crucially, the distance from the site to centres of heat demand. Heat pipes can be expensive to install and so projects will be most viable where there is large, dense heat demand close to the transformer site. SSE Heat Networks will be concluding technical trials very soon

and if they are successful, the next step will be to assess transformer sites to see if there is potential to develop a local low carbon waste heat project.

Future and Current Project Development (incl. undergrounding, site location and new grid connections)

13. Will the increase in the transmission network be underground or overground, and do you have ambitions to underground more of your network?

The decision to overground or underground is fully considered for each project on a case-by-case basis and considers a range of technical, environmental and economic factors.

While undergrounding has less visual impact there some considerations which need to be taken into account, not least the additional costs associated with undergrounding which will ultimately be passed onto the end consumer. Furthermore, the higher the voltage, the more challenging it is to underground due to the increased impact higher voltages have on underground cable corridors and associated environmental impacts, land use impacts and increases costs.

Undergrounding can have significant impacts, including:

- The number of cables and hence the extent of ground disturbance increases as the voltage and capacity of the circuits increases
- We do not simply replace one Overhead Line (OHL) circuit (of 3 wires) with three cables – this can require two or even three cables per wire which results in significant corridors of disrupted and sterilised ground
- Fault finding and repair is much more onerous for cables. OHL damage can be seen via a walkthrough and is generally straightforward – repairing a cable fault can result in extensive excavation and below ground working and may result in longer periods off supply
- At each end of the cables there needs to be a sealing end compound to convert back to OHL – the more cables, the bigger the compound which can take up more space than some of our substations
- Ground conditions are often prohibitive or challenging for underground cabling, for example rock or peat, as well as the terrain
- Future land use, for example for farming, is greatly reduced as a result of undergrounding

However, where there is a clear evidence base to justify undergrounding and it meets key technical, environmental and economic considerations, we are committed to do so, as has been the case on several of our projects across the north of Scotland in recent years.

14. Is there going to be a new overhead line from Blackhillock to Kintore?

Whilst there are currently no proposals for a new overhead line between Blackhillock and Kintore, one of the projects which has been given the ‘proceed’ signal within the NGESO’s 2022 Networks Option Assessment (NOA) report is a new Beauly - Blackhillock - Peterhead 400kV Double Circuit.

This project is in the very early stages of development, and we have yet to determine the route this new proposed connection would take or the preferred technology options. These will be subject to detailed, open and transparent consultation with stakeholders to help inform the options and proposed solution.

15. Is there going to a requirement for additional subsea connections from Peterhead or somewhere else in the north of Scotland, and are 4 going to be required?

The purpose of the NOA, is to identify the reinforcements we have to do now while also keeping an eye on what will be required in the future, and we need to have plans in place to facilitate the capacity on the system which will be required in the future.

In terms of additional subsea cables, over and above the 2GW link, from Peterhead in the north east of Scotland to Drax in Yorkshire in England, which will be taken forward as a joint venture between SSEN Transmission and National Grid Electricity Transmission (NGET) with a targeted energisation date of 2029, Ofgem has also provisionally approved plans for a separate 2GW HVDC subsea link from Torness in south east Scotland to Hawthorn Pit in north east England, which is being taken forward by SP Energy Networks and NGET. Two additional 2GW subsea HVDC links, from Peterhead to South Humber and from south east Scotland to South Humber, are also planned, with both currently having a targeted energisation of date of 2031.

To support the further growth in renewable electricity to meet net zero ambitions beyond that the currently planned four 2GW HVDC links will enable may require additional subsea links, which will be considered as and when the future generation need is known.

16. Would you potentially foresee the needs cases for the island projects being re-opened and would the proposed Orkney connection connect to the proposed HDVC subsea connections currently planned?

We have plans to connect both Orkney and the Western Isles to the GB Transmission System, which have been with the regulator Ofgem for some time. The regulator requires further assurances that the generators looking to connect on the islands are ready to proceed with their projects. We're hopeful that by the summer this year we'll be in a better position to help move these projects forward.

We know that all of Scotland's Island groups have significant resources of renewable energy, and we want to work with stakeholders to try and maximise the potential that they have to contribute to the country's decarbonisation goals. When the Orkney link does proceed, it will connect in to Dounreay and in doing so, will become part of the integrated transmission system which in turn will take power to demand centres across Scotland and beyond.

17. Will the grid connections be available for all the new generation (e.g. ScotWind) in order to meet 2030 targets or are we looking at network reinforcements and connections being much later? Also, will the investments talked about today connect what ScotWind is looking to take forward?

ScotWind has proposed a significantly higher ambition than originally expected which is a huge signal of confidence in Scotland's offshore wind industry. We were initially planning to connect up to 10 GW of ScotWind by 2030 and we now have potentially up to 25GW to connect. The challenge therefore for the industry is to work out how quickly we can connect ScotWind's full ambition and realise its potential.

To do this, we need to begin swiftly on the investments that we've already outlined, but we're going to have to deliver more beyond that to reach the full ambition. This will involve detailed work, working with our fellow Transmission Owners and the NGESO to understand what else we need to do once we

deliver those investments to get the ScotWind licenses connected as quickly as possible, and we've already commenced discussions with other transmission companies progress this.

18. Are you planning an HVDC multi-terminal grid? If yes, with how many stations?

Upon completion, the Shetland HVDC link, which is currently under construction and on track for energisation in 2024, will link into the operational Caithness to Moray HVDC system and in doing so, become Europe's first multi-terminal HVDC system and the world's first outside of China. This sector leading innovation will be key to inform the development of multi terminal HVDC systems and offshore HVDC grids, which are currently being investigated by multiple parties in the GB Transmission industry and are under consideration through the ongoing Holistic Network Design (HND), coordinated by the Electricity System Operator.

19. Is there space at the Peterhead site for all of the developments?

We are currently completing a strategic review of the Peterhead area and the land requirements to cater for the future developments. Fundamentally we are confident there is adequate land available, and we will follow our robust site selection process accordingly.

20. With regards to NE 400kV works, are you going for the biggest conductors possible to future proof as best as possible?

Reinforcements on the Transmission system need to balance future potential requirements with the cost impact to the GB consumer. The long-term considerations are presented to the regulator, Ofgem, through the submission of a Needs Case which seeks to demonstrate that that we are sizing the Transmission system appropriately to demonstrate value to the consumer.

21. Are there any plans for more VISTA projects?

VISTA is a mechanism for UK electricity transmission owners to mitigate the impact of existing electricity infrastructure on the visual amenity of nationally designated landscapes such as national parks and national scenic areas. Older projects were completed prior to the current requirement of Environmental Impact Assessments and the aim is to reassess the visual impacts within these national parks and as such we've undergrounded some of the OHL's. Ofgem have established a fund of £465m for 2021-2025 for this purpose.

We are currently undertaking VISTA projects around Loch Lomond and Sloy, and near Killin, and also in Cairngorms National Park. And while we have no plans for further VISTA projects at this time this doesn't mean we won't explore other opportunities should they become available.

22. Will you be considering Arc Flash relay/quencher protection for new sites, bearing in mind the tragic losses in recent years?

Yes, we mitigate this by equipment design, providing protection and operational procedures according to applicable standards and industry best practice.

Planning the Future Electricity Network and Customer Connections

23. Do you think the UK Government will provide the money required for such substantial reinforcements as recommended in the NOA and how is this approved and paid for?

Transmission investments, whether proposed through the NOA, or our wider investments across the north of Scotland, are ultimately paid for by GB consumers. These costs are recovered via Transmission Network Use of System Charges (TNUoS) which are covered by electricity demand customers and electricity generators across both the north of Scotland and GB.

As these costs are paid by GB consumers and businesses, it further emphasises the need for Transmission Owners to be efficient and economical in our investments. The transmission companies have to demonstrate to the energy regulator, Ofgem, that any proposed investments are necessary, are being carried out in the most efficient and most economical way. We do this by not increasing costs unnecessarily and we aim to ultimately reduce costs by helping the transition away from volatile global wholesale gas markets to deliver a system, underpinned by low carbon generation and flexible generation to balance the system at times when renewable output isn't as high as electricity demand.

24. What happens when the wind doesn't blow? What are the plans for backup power and how is the system managed?

The GB electricity network system is managed by the NGENSO, who manage the balance between generation and demand across the whole of the GB network in real time, matching the available resource to where the energy is being consumed. In GB we have an integrated system, with a diverse range of energy generation technologies (both renewable and thermal) and there's also continued growth in storage technologies such as pumped storage and battery technology that will help GB in the future. This multifaceted energy system ensures that electricity generation is available from a wide range of sources.

25. The SSEN Transmission plans are contingent on significant amounts of generation coming forward - how do you see the NGENSO's market reform proposals for "nodal pricing" announced this week as a barrier or facilitator for your plans?

We believe the proposal is terribly complicated, risks huge uncertainty to existing as well as new users of the system and will take a massive set of reforms to deliver. It is a very theoretical case to put forward, predicated on saving network reinforcement, but the reality is that renewable generation must locate where the renewable resource is. So, the practical effect of nodal pricing in our view is likely to mean that at the extremities of the system, (which is also where you're likely to see the renewable generation), you're likely to see significantly higher prices and therefore will discourage renewable generation to connect, which takes us in the opposite direction of where we need to go. While an interesting concept, in our view it would in fact take us backwards in relation to delivering net zero.

26. Will TNUoS limit the level of generation that will connect to your network, and why are Scottish grid connections more expensive than in the south?

There is a strong renewables pipeline in Scotland however from our engagement with stakeholders and our evidence-based analysis it is clear that one of the main barriers for generators in the north of Scotland is TNUoS charges. Given this it is difficult to determine how much of this pipeline will actually connect, as developers don't find out about what their charges will be until they go through the

connection process with their projects and even then, future forecasting is uncertain and can make projects commercially unviable.

The current TNUoS charging methodology was established nearly 30 years ago and is not designed for an electricity system that will enable a net zero world. Grid charges, in particular wider locational TNUoS tariffs, are many times higher in the north of Scotland than other areas of GB due to a number of reasons. The wider TNUoS tariff is intended to provide a forward-looking signal, it does this by deriving the tariff from the notional level of investment that would be required on the network if generation at that location was to increase in capacity, this results in higher costs in the north of Scotland due to the location of generation versus demand. The volume of renewable intermittent generation versus conventional carbon generation also increases the costs due to the current the methodology of the year-round tariffs within TNUoS. Generators do not pay for their actual use of the transmission system but based on the notional cost of network investment to connect future generation in particular areas, known as generation zones. Consequently, charges can be either positive or negative.

We have advocated for some time that the outdated TNUoS methodology is clear barrier to delivering Net Zero efficiently and at least cost. We welcome Ofgem's recent review of TNUoS and hope that this review can go towards tackling the issues that we have evidenced throughout our work in this area. You can find further details of our work on this area including our engagement and analysis on the TNUoS section of our [website](#).

What are your thoughts with respect to Small Distributed Generation (SDG) being exposed to TNUoS payments?

From a north of Scotland perspective, small distributed generators paying TNUoS would means they are exposed to the same issues currently experienced by large generators. This is that SDG in north of Scotland would now be susceptible to some of the highest transmission charges in GB, and that the forecasting of this cost is extremely unpredictable and volatile. This would impact the viability of SDG projects, and therefore act as a barrier overall in reaching net zero targets where SDG will be required.

Ofgem's Access SCR update in January 2022 stated that for the time being SDG will not be exposed to TNUoS as part of that review. They mentioned however that this will be assessed again within a greater scope TNUoS piece of reform that is expected this year.

27. How are you responding the changing dynamics of the energy system, the move away from the traditional fossil fuel generation and the shift towards more variable intermittent generation and the challenges this has for the system such as for voltage stability?

We have seen the closure of various coal, nuclear and gas plants over recent years, and these large synchronous heavy machines have provided voltage stability for the network. Within our operating area in the north of Scotland we don't have nuclear plants which support this stability, but we do have hydro and thermal which is utilised in the same way.

There are devices that can help us replicate the characteristics of these large synchronous machines and condensers. It is the National Grid as the Electricity System Operator who are responsible for ensuring that the system is balanced, and voltages maintained, and the frequency is to be stable. We are now seeing the expansion of synchronous compensation schemes and the development of this technology with customers looking to connect this onto our network

28. What is the best course of action for pursuing opportunities for large-scale generation projects at the transmission level?

Our Customer Experience Team help customers looking to connect new generation schemes to our transmission network and those who wish to make modifications to an existing connection agreement held with NGENSO.

Typically, all connections in Scotland have an impact on the Transmission System and can connect either via the local Distribution Network Operator (DNO) as an embedded connection or directly on to the Transmission Network.

The customer agreement to access the Transmission network is contracted via NGENSO either directly or the DNO. Our team will process the application and turn this into a Transmission Owner Connection Offer (TOCO) which is used to inform the customer connection agreements.

Regardless of the size of connection, we encourage and welcome customers to have a pre-application discussion with the team. We are available to discuss the connection process at the beginning of the journey, through to project development and delivery and energisation.

- Transmission connection enquiries: transmission.commercial@sse.com
- To make a connection application: www.nationalgrideso.com/industry-information/connections/connecting-electricity-grid-process
- If you are looking for a Distribution connection, please contact SSEN Distribution at: www.ssen.co.uk/GenerationConnectionsHome

29. Is the reinforcement work to the network designed as a direct result of accepted connections and, would these reinforcements free up capacity & connection opportunities onto the distribution network?

Reinforcements consider the long-term impact of both distribution and transmission connected customers. Reinforcements on the Transmission System may allow further connections to the distributions system, however local reinforcements may still be required on the distribution system or at the interface point between the distribution and transmission networks.

30. Is there any plan to create a whole network digital twin similar to the Virtual Energy System project between National Grid NGENSO and Arup?

We have a future ambition to develop a digital twin – see page 20 of our updated [Digital Strategy and Action Plan](#) published last week which describes the development of Building Information Modelling as a foundation for a future digital twin which could ultimately link 3D models of physical asset information to system simulation models and operational real time information.

We are engaged on a number of industry collaborations which will help develop interoperability industry standards and ways of sharing data in line with Ofgem Data Best Practice and the Energy Digitalisation Taskforce [recommendations](#). These include the ENA Data and Digitalisation Steering Group and subgroup activities. These activities will assist in the journey towards a whole system digital twin.

It is also worth noting that the future Independent System Operator will have a role in data and digitalisation and this may possibly be a stronger role than that of the existing ESO - [future-system-operator-consultation-govt-response](#).

31. Is there anything SSEN Transmission can do to make it easier for SSEN Distribution to connect Embedded Generators to their system, such as ANM systems for protecting your transformers at GSP's and allowing technology diversification when assessing GSP ratings?

We continue to work with the distribution network owners to explore flexible connections such as the use of Active Network Management (ANM) systems. These flexible solutions are typically applied to the distribution network to provide non-firm connections.

32. What work is planned on upgrading distributions networks etc. to enable energy produced by large scale renewables to be used locally?

SSEN Distribution (part of SSE Group, responsible for the lower voltage network) has recently submitted their ED2 Business Case. These plans include a large stream of capital projects to support the route to net zero and accommodate the transition to LCT. Also, there is a large pipeline of battery energy storage system (BESS) customers that are looking to connect to SSEN Distribution's network. SSEN Distribution is working on their Network Development Plan (NDP) and has started a consultation on the NDP. NDP includes data regarding headroom on SSEN Distribution's network and this information can be found on this link: [Network Capacity Information](#).

33. With regards to the future Eastern HVDC Links, are SSEN looking at a coordinated approach with offshore HVDC wind projects to establish a multi-terminal HVDC offshore network?

We are working with the NGENSO as part of the Central Design Group that is developing the Holistic Network Design for a coordinated offshore network. The coordinated solutions include consideration of multi-terminal HVDC offshore options which may involve coordination with future eastern HVDC links. We recognise there are potential opportunities in this regard and SSEN Transmission are playing a key role in two Strategic Innovation Fund innovation projects. The DC Networks project is exploring the benefits and application opportunities for DC circuit breakers as a key enabler of an HVDC network and considering the potential for these devices to be incorporated with future eastern links. The Incentive project is looking at the innovative control and energy storage for ancillary services in Offshore wind including HVDC connected offshore wind farms.

34. Have you considered high voltage power transmission without conductors?

Not at this time, the technology is very much in its infancy and only demonstrable at small wattage levels. It is one of several innovation areas that we will watch over the coming years.

Working with Landowners and Tenants

35. How do you work with landowners and is there plans for very long-term compensation for any associated production losses?

When we start a project and landowners are identified as being potentially affected by the project the land manager associated with the project will enter into discussions with all affected landowners to explain the project, the requirements and the timescales. Once the project moves from the development stage to the delivery stage the land manager associated with the project will work with the landowner to agree access for when construction starts and will agree compensation for any damage caused as a result of the works. Landowners have for the length of the project to submit compensation

claims and these will be dealt with as per the [Grantors Charter](#). SSEN Transmission currently offer a 5-year guarantee on drainage claims and windblow claims. If a landowner believes that they have further land claims once a project has completed this will be assessed on a case-by-case basis.

36. Will you plan to hold/manage land in order to deliver new woodland creation to compensate for permanent tree loss resulting from network expansion?

We do not currently plan to own land to secure new woodland creation. Instead, we are in the process of developing and delivering woodland creation schemes with a number of individuals and organisations including, but not limited to, private landowners, forestry management consultants, community trusts, local and national charities, and district salmon fisheries boards to meet our compensatory planting commitments for no net loss of woodland for our new network infrastructure projects. Where possible we seek to secure woodland creation schemes that maximise opportunities for biodiversity enhancement in line with our commitments for biodiversity net gain for all new projects.

Opportunities for the Supply chain, Workforce and Customer Connections

37. Has a procurement route been identified for the delivery of projects and how else can the supply chain get involved and bid for future work across the north of Scotland?

We typically have 2 main procurement routes for delivering project. As a result of the significant portfolio of projects and significant expenditure the only way to secure supply chain resources for our long-term approach is via multiyear framework agreements, typically this will be 5 years for the likes of OHL, substations framework agreements. However, framework agreements may not be suitable for all types of projects as a result of location, technical complexity or project size – therefore we will also have number of schemes that go out for a competitive tender. As SSEN we aim to have a balance between these 2 procurement routes and having certainty for projects helps us develop strategies and secure the supply chain.

For a lot of the new sizable schemes talked about during the webinar these will all be competitively tendered. We try and keep that mixture of framework as continuity is really important, not just for ourselves but for the supply chain, but that combined with ongoing competitive tenders which we believe strikes the right balance. The key features for either of those approaches, is the engagement from the local supply chains, whether it's through 'Meet the Buyer' events, or contacting us via our procurement email address: transmission.procurement@sse.com.

38. Are you checking your supply chain for any connections to Russia?

We, along the rest of the UK's industry, need to comply with the government sanction requirements and we do this on a daily basis across all our supply chain. This is a formal requirement, and we will continue to monitor the sanction list from that perspective.

When it comes to individual projects, we're in contact with the supply chain regarding where they are getting materials from, most notably Ukraine. At this stage there is no potential impact on our projects directly but there is the possibility of indirect impacts as some components are affected. We are aware for example of copper and steel availability being affected by the situation in the Ukraine with potential impacts in terms of both availability and cost, we will continue to monitor this. SSEN Transmission will

continue to support our supply chain in the Ukraine and any colleagues impacted by what is happening there as best as we can.

39. How will you manage with products where leads time may be up to two years?

Where we have certainty regarding our future project activities, our recently awarded frameworks provide us with the flexibility to award contracts and make commitments up to 2026. By reviewing the project pipeline with the supply chain and by understanding their lead times/capacity, we are able to make decisions on this basis. Ongoing worldwide events provides an increased risk to securing products, but our engagement with the supply chain combined with framework awards helps to mitigate this risk.

40. There are considerable delays obtaining engineering works in the north east following the storms and obtaining HV equipment and lead in times currently being suggested 6 months, in the past SSE would hold stocks of transformers etc. but this seems to be no longer, why and what is proposed to reduce these timescales going forward?

SSEN Transmission had no delay in getting any equipment for any storm damage to our network. We already hold a significant number of spares including grid transformers of various sizes, circuit breakers, protection relays and other key items, across a number of sites.

As part of our T2 business plan, SSEN are developing two new warehouses to meet the increased growth of our network. The warehouses will hold transformers and other components required to meet ongoing operational and maintenance activities.

As our network grows and different types of plant and equipment is installed, our spares holdings will also rise to ensure network resilience and we have an approved T2 allowance from Ofgem to ensure these additional spares are procured when required.

41. Are there any supply issues/product shortages that could impact project timelines, and how can you protect against shortages in the future?

No company is immune to worldwide events. As we experienced at the beginning of the COVID 19 pandemic, part of our risk mitigation was continual dialogue with the supply chain and understand their individual concerns with their suppliers and subcontractors who support them. We're applying the very same approach in terms of engaging with the supply chain currently.

While there are pressures, some of the frameworks we have in place have helped provide certainty which allows the supply chain to make long term arrangements for materials commodities and we believe this robust approach will help mitigate against some of the current challenges.

42. In terms of growing the workforce what is the D&I strategy, as the panel today has lacked diversity?

SSEN Transmission has grown significantly in the last three years creating around 500 jobs in Scotland and over the next 12 months, we're looking to recruit for an additional 400 jobs, which with it also provides exciting opportunities to develop our people.

We have a robust Inclusion and Diversity Strategy and a genuine ambition to ensure that the mix of people who join our business reflects the communities in which we serve, you can find out more [here](#).

Rob McDonald accepted the challenge about a slight lack of diversity on the panel as fair and committed to reflecting on this for future events.

SSEN Distribution

Some questions received during the webinar related specifically to the Distribution network in the north of Scotland.

What is the difference between Transmission and Distribution?

The Electricity Transmission network transports electricity at very high voltages through overhead lines, underground cables and subsea cables. It connects large scale generation primarily renewables to the central and southern Scotland and to the rest of GB. The Electricity Distribution network is connected to the Transmission network, but the voltage is lowered by transformers at electricity substations, and then power is distributed to homes and businesses through overhead lines and underground cables. You can find out more about SSEN Distribution [here](#).

43. What level and types of carbon offset are SSEN Distribution considering during their path to net zero?

SSEN Distribution intends to pave a credible pathway to net zero; looking to prioritise tangible reductions by making strategic operational decisions rather than utilising offsets in the first instance. Specifically, work to significantly invest in Natural Capital, enabling carbon sequestering, will ensure this credible net zero pathway is met whilst providing wider value and delivering better longer-term benefits for our consumers. This is the option most supported by our stakeholders. More information surrounding SSEN Distribution's path to net zero, our position on carbon offsets and natural capital investment plans can be found in our [Environmental Action Plan – SSEN Distribution](#).

44. What work is planned for upgrading local networks to allow community generating schemes to move forward and provision of power for EV charging network in Highlands and switch to electric for heating?

SSEN Distribution is working closely with Scottish Government to understand the future constraints on the network in the north of Scotland and on the islands. Our most recent Distribution Future Energy Scenarios have just been published, which includes consultation with local authorities and the Scottish Government – you can view them here: [Smart and local benefits for our communities - SSEN](#). This engagement will form the basis for exploring both flexible and innovative solutions and strategic investment to accommodate the growth in low carbon technologies. Our recent DSO Action Plan (which you can view here - [Our DSO Action Plan - SSEN](#)) also provides detail on the measures we are putting in place to support participation in the smart grid for communities and our whole system support for local authorities.