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23 June 2023

Dear Joanna,

Centralised Strategic Network Plan: Consultation on Stage 1 – Modelling Future Supply and Demand.

Thank you for the opportunity to share our views on modelling future supply and demand in the Centralised Strategic Network Plan (CSNP). At SSEN Transmission¹, we support the intent and the overall direction of travel within the proposals being consulted on by Ofgem. In our response we offer additional recommendations on how those proposals could better serve the objectives of the CSNP together with our future energy security and net zero commitments. We set out our views in more detail in our responses to the specific questions asked in the Appendix to this letter.

We have identified five key priorities that we believe must be considered across the six stages of CSNP development. In our view the end-to-end CSNP process must provide.

1. **A target led single pathway for 2035 to underpin network investment planning.** The CNSP must develop a single 2035 target pathway for key strategic low-carbon technologies to drive cost-effective transmission networks investment. The strategic net zero technologies include offshore wind, onshore wind, storage, solar, hydrogen and nuclear. The near-term single pathway to 2035 will then broaden in the longer term into multiple pathways considering differing contributions/behaviours in each pathway necessary to achieve net zero by 2050.
2. **A spatial pathway for each region.** The strategic net zero technologies are not spatially homogenous across GB. The critical drivers underpinning their potential contribution vary, in particular the locational availability of the resource underpinning the technology, planning considerations and accessibility of a cost-effective network. Bespoke area spatial plans are needed to inform holistic network development, protect and enhance the natural environment and deliver benefits to communities.
3. **Clearly defined roles and responsibilities.** The CSNP roles must develop in a way that optimises all organisations' complementary and existing core competencies. In this framework SSEN

¹ We are SSEN Transmission, the trading name for Scottish Hydro Electric Transmission. Following a minority stake sale which completed in November 2022, we are now owned 75% by SSE plc and 25% by Ontario Teachers' Pension Plan Board.

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Transmission maintains and enhances our role as North of Scotland (NoS) Area System Planner (ASP) for our transmission system license area, including defining the NoS contribution to the FES spatial pathway for 2035 and the future networks options identification process. The Future System Operator (FSO) should facilitate, coordinate and independently evaluate a GB CSNP across vectors, underpinned by options designed and developed by the ASPs (i.e. the TOs).

4. **Cost-effective network development.** A cost-effective network goes beyond one that only considers constraints. The CSNP should adopt a 'cost-effective analysis' (CEA) that defines our core purpose (achieving net zero) and seeks the most cost-effective way of achieving it. This considers a wider evaluation of benefits to ensure we achieve a just transition to net zero, including socio economic impacts, planning considerations, security of supply and community benefits.
5. **Innovation, performance, and operability.** A network for net zero is one that requires innovation for enduring performance and operability. We must continue to innovate as an ASP and developer of our area network to ensure it remains a safe, secure and high performing renewable network that forms part of the fully decarbonised power system.

Expanding, on point 3 above, and as previously set out in our consultation response to the ETNPR workstream, we are particularly concerned about proposals for roles and responsibilities in the future stages of CSNP and wider strategic system planning. The challenge of scaling up the ESO to deliver a wide new range of functions under the FSO model is enormous and, when combined with a potential requirement to consider all load related transmission network planning (Stage 2 Options Identification), becomes unrealistic.

The FSO's role will be most beneficial as a cross vector, national coordinator assessing the strategic investments required to ensure the UK is on a single pathway to meet shorter-term targets and develop longer-term pathways to meet legislative 2050 net zero commitments. Some of the potential roles and responsibilities outlined for the FSO are unnecessarily duplicative, requiring the ESO to undertake an excessive costly and intensive scale-up with little benefit. The FSO is also taking on gas network strategic planning and system balancing roles, to meet demand, in a challenging market moving away from reliance on gas. We believe this additional responsibility is a higher priority for the FSO to deliver benefits to consumers rather than overloading the FSO with additional responsibilities in all elements of electricity strategic planning.

There are highly effective systems within the current system planning model and the insight from the TOs from their extensive experience and knowledge of local stakeholder engagement and system planning functions must not be lost. The TOs provide a useful check and balance to the ESO and vice versa – maintaining this system of positive challenge resulting in enhanced outcomes should not be lost as we move forward.

Furthermore, we must not lose the ability to collaborate, where it is in the consumer interest to do so. We work collaboratively with the ESO, where our area system planning expertise combines with the ESO's 'macro' GB view, examples include the Isle of Skye project developed under the Ofgem Large Onshore Transmission Investment (LOTI) mechanism. Here we evaluated supply and demand in the Skye area and modelled resulting power flows across our 'trunk' roads feeding into the strategic GB motorway modelling evaluated by the ESO. Such a collaborative approach is indicative of how the roles and responsibilities of the FSO/TO relationships should continue under the CSNP.

A truly holistic whole system approach requires a clear assessment of current roles and responsibilities and how the existing planning framework can be modified to support an FSO role that focuses on those areas where it can add strategic value.

Overall, we remain committed to delivering a cost-effective network for net zero. We therefore also remain supportive of the outcomes of the Electricity Transmission Network Planning Review (ETNPR)² and the decision for a FSO to develop a CSNP, requiring it to take a whole system view of the strategic investment required to meet our net zero targets.

The wide range of energy policy, regulatory and governance reforms currently underway are inherently interlinked and cannot be considered in isolation. The CSNP will sit at the centre of many of those reforms; it will be a key role for the new FSO, bringing together the onshore and offshore domains and across multiple energy vectors, and its outputs will flow through into new regulatory frameworks. The CSNP is also likely to provide strong locational signals for future connections and this should be considered in wider market reforms, including REMA³. Therefore, we welcome that this consultation sets out clearly the principles and pathways to the development of the CSNP and the commitment to provide an opportunity for stakeholder input at each stage of CSNP development, but ask that the five points above are given considerable deliberation.

Please find our answers to the individual consultation questions in Appendix 1 below. We would welcome the opportunity to meet with you, to further discuss any of the issues raised in this response.

Yours sincerely,

Rebecca Middlemiss
SSEN Transmission

² <https://www.ofgem.gov.uk/publications/decision-initial-findings-our-electricity-transmission-network-planning-review>

³ <https://www.gov.uk/government/consultations/review-of-electricity-market-arrangements>

Appendix 1 – Consultation questions

Q1. Do you agree that we should move towards pathways instead of scenarios, to provide greater clarity on the type of investments required under the CSNP?

We welcome the proposal for pathways instead of scenarios. Whilst the historical use of scenarios has been helpful in stress-testing the assessment of different options against a range of apparently plausible future outcomes, the use of **annual rolling** scenarios to make long term investment decisions necessary to meet net zero is paradoxical. There are two key issues:

- While the annual FES process has the upside of being able to capture evolving policy development, the overriding downside is an acute ‘present day’ bias in each FES collection. Each set of FES is highly influenced by the prevailing sentiments of the day, often driven by short-term policy responses to interim economic issues. Therefore, while the UK has long term, legally binding 2050 commitments, the annual FES are developed based on ‘today’s’ view of scenarios outlining ‘if and when’ the UK will meet this commitment, rather than necessarily ‘how’. The annual FES have always included a pessimistic scenario that assumes our 2050 commitments will not be met. This scenario is based on the prevailing ‘present day’ assessment of ‘no progression/falling short/slow progression/steady progression.’ As all scenarios are considered equally plausible when using them to evaluate the ‘need’ for network investment at a ‘snapshot’ in time, the pessimistic scenario drives ‘high regrets’ in the Cost Benefit Analysis (CBA) process for larger capacity options more compatible with meeting net zero. This has been an issue with all CBAs undertaken by SSEN-T to date.
- In terms of supply, the FES are highly influenced by generation currently holding transmission entry capacity (TEC). This means that the FES in any year are driven by the ‘present day’ prevailing pool of TEC, with the scenarios broadly differing in terms of how much TEC will emerge and how quickly. As annual rolling scenarios this should not be an issue as TEC changes annually. But, when the prevailing FES are used to make a ‘snapshot’ decision to go/no go a particular network investment, or to inform the CBA for any reinforcement as part of an uncertainty mechanism, there is tremendous present-day bias in evaluating the contribution of future generation capacity. Using prevailing TEC/approximations results in the scenarios that are broadly ‘capped’ by this ‘certain’ generation – with the result that the scenarios are inherently biased towards the present day.

The outcome of the two issues above is twofold, first there is a desire to ‘wait and see’ what the next FES say to provide greater ‘certainty’ around the development of supply. The result is to slow network development needed. Second, the ‘present day snapshot’ may result in a smaller network, intrinsically influencing the volume of new generation that can therefore connect in the future, potentially a self-fulfilling prophecy. Any future assessment of ‘need’ must ensure that present day bias issues do not prevail.

At SSEN Transmission we are committed to delivering a cost-effective network for net zero. To do this we believe targets for key **strategic net zero technologies** should be set by UK and devolved governments in line with the Climate Change Committee (CCC) recommendations and the UK’s legislative requirement to meet net zero by 2050 and 2045 for Scotland. These key technologies include offshore wind, onshore wind, storage, solar, nuclear and hydrogen.

The targeted pathways will provide clear strategic vision on **how the UK electricity sector will meet net zero rather than if**. There are currently interim net zero targets for offshore wind, hydrogen, nuclear and solar – with varying dates and commitment. The Scottish government has also set a target for onshore wind. The UK and devolved governments' targets for these technologies need to be coherent and aligned. To deliver against Government targets, we need to act now and act with speed. This requires clear and consistent signals to the market, with certainty that those signals will be acted upon.

The timing of the targets should be influenced by the CCC's Carbon Budgets, with net zero targets and timings forming the basis of the FES pathways. The CCC has provided clear direction for the contribution of the strategic technologies by 2035 and underlying demand, including the impact of electrification. These should form the basis of a **single short-term pathway to 2035**. In the longer term the pathway to net zero broadens as the FES consider differing contributions over the period to 2050.

While current legislation limits pathways to 2050 the FES should also consider extending its timeframe beyond 2050, particularly as network assets have an engineering life in excess of 40 years.

As the consultation sets out, scenarios can only provide investment recommendations. We welcome acknowledgement in the consultation of the shift required in FES outputs to inform network requirements rather than make recommendations. Not only is this beneficial for the purposes of certainty, but it also feeds into acceleration of regulatory process, whereby need is further investigated beyond the recommendation before regulatory approval is provided. This provides certainty across our regions to ensure optimal and efficient planning & design processes, gives clarity and certainty to local stakeholders - a co-ordinated approach that avoids going back to the communities repeatedly. It also provides a strong signal to the supply chain, who need long-term certainty of demand to scale-up to meet the challenge of delivery.

Such pathway led approach has already been successful for multi-GW offshore wind through the Holistic Network Design (HND).

Q2. Do you agree that there should be a single forward view of the near term for all pathways?

We agree there should be a single forward view of the near term for the longer-term FES pathways, in particular for strategic net zero technologies. We consider a reasonable 'near term' single pathway is 2035 – this aligns with the CCC's sixth carbon budget's recommendations. Having a clear pathway for these strategic technologies will provide a framework for the FSO to plan the system to ensure stability and capacity adequacy.

However, it is important to note that within this pathway the strategic net zero technologies are not spatially homogenous across GB. The critical drivers underpinning their potential contribution vary across the country, in particular the locational availability of the necessary resource underpinning the technology, land availability, planning considerations including environmental, community and historical impacts and accessibility of a cost-effective network. As a result, the near-term pathway should be based on an assessment of the plausibility of a **spatial pathway** for each region where these factors are fully considered including making the most out of repowering and expanding existing sites with updated technology.

With offshore wind targets, locations and network established for 2035, the focus should lie with developing 2035 pathways for the remaining strategic NZ technologies. SSEN-T, as Area System Planner

(ASP) for the North of Scotland (NoS) is best placed to consider the spatial distribution of the strategic technologies in the NoS, together with evaluating the cost-effective network necessary to deliver them. The NoS' contribution to the GB 2035 pathway will consider all strategic net zero technology projects with the potential to develop by 2035 determined by stakeholder engagement on issues including planning, environmental and community sensitivities and developer interest, including repowering.

For networks, meeting the forward view while also considering options for the longer term is linked to the spatial distribution of the strategic net zero technologies required. The availability and development of a cost-effective network will inevitably shape the spatial plan. This 'chicken and egg' approach to strategic planning is important to recognise and will need the process of spatial planning and evaluating network development to be iterative and interdependent - a role best performed in our TO area by SSEN-T as Area System Planner. The result will be a holistic area view of the network required to meet this forward view that will be agreed with the FSO and feed into the CSNP.

Case Study 1: ENTSOE and ENTSO-E Ten-Year Network Development Plans (TYNDPs)

Having a single forward view for the near term would be consistent with the EU approach through TYNDPs. As can be seen in the framework below¹, the TYNDPs has a singular 'Best Estimate' pathway which provides a short- and medium-term view. To reflect the increasing uncertainties further in the future, multiple pathways are considered for the long-term. The National Trends pathway is created to be in line with national energy and climate policies which are derived from European targets, with the other two pathways aimed at reaching the 1.5°C target set out in the Paris Agreement. This case study provides evidence of both a singular short-term view and a 'target-led' pathway approach.

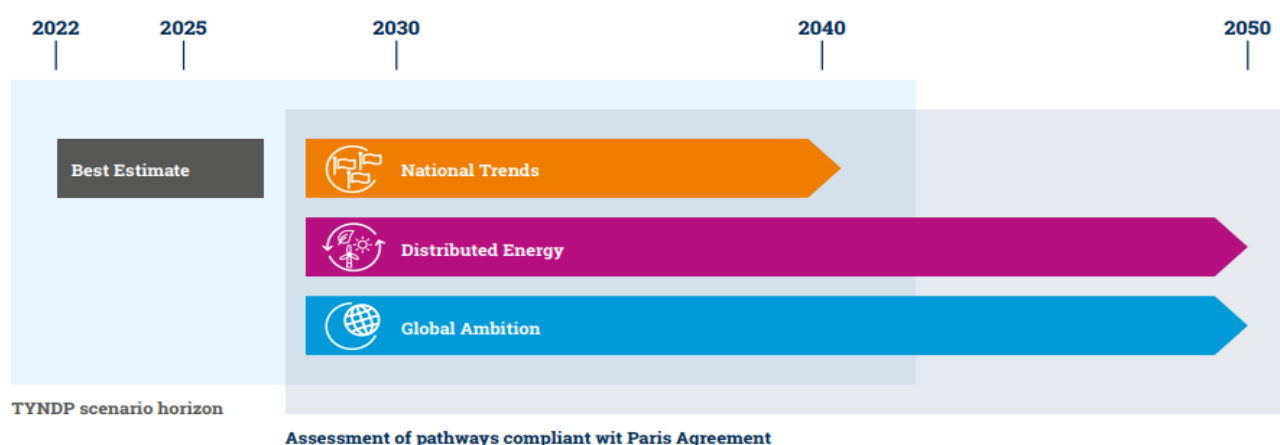


Figure 1: Scenario framework for TYNDP 2022

Q3. Do you agree with our proposal to have Net Zero compliant pathways (number to be determined by FSO), with a separate counterfactual demonstrating the scale of activities and investment that falls short?

We agree with the proposal for Net Zero compliant pathways and the exclusion of any headline pathway that falls short. Counterfactuals are often biased towards inaction, assume a light touch and suffer from present day bias. None of these qualities support the strategic planning of a long-term network to deliver net zero. As we set out in our response to Q1, the issue for system planning is how we get to net zero and not if.

Falling short is not an option if we truly consider achieving net zero is not only a legal obligation, but a value that drives policy and the investment needed. Aligning the near-term pathway with 2035 requirements of the CCC's sixth carbon budget shows a clear commitment towards planning to deliver a net zero pathway. Ensuring all the longer-term pathways meet our legal net zero requirements is a central to planning a cost-effective network for net zero.

If a counterfactual is included, there must be essential clarity on how it is defined and how it will be used in the CSNP. Counterfactuals to date have been used as part of the cost benefit analysis – with the 'benefit' of any network reinforcement assessed against a 'do nothing' counterfactual, with benefits limited to constraints avoided compared to a counterfactual. There are two problems with assuming a failing counterfactual:

- There are few 'do nothing' or even 'do little' options for electricity network planning for net zero.
- Even if the set of benefits is widened to include e.g. local environmental issues and socio-economic impacts, if we adopt a failing counterfactual we are de facto defining society's 'values' by assuming a pathway that does not meet net zero is satisfactory.

Instead, we should undertake a 'cost effective analysis' (CEA) which defines what our core purpose is (achieving net zero) and seeks the most cost-effective way of achieving it, including a wider evaluation of benefits that ensure we achieve a **just transition to net zero**. So, the inclusion of a counterfactual must be based on a very clear understanding on what is considered a 'reasonable' counterfactual and how it will be used within the CSNP.

Case Study 2: Impact of Fall Short Scenario on CBA

In 2021 SSEN-T undertook a cost benefit analysis under the RIIO-T2 LOTI framework for replacement and reinforcement of existing transmission network on Skye. The existing FES at the time (2020) for Skye identified up to 320 MW of new generation that could emerge over the period to 2050, adding to around 100 MW of generation currently existing in the Skye area. The FES 2020 new generation for the Skye area over the period to 2050 is shown below.

SSEN-T worked closely with the ESO on a combined approach, evaluating constraints on the Skye network with the ESO then modelling the impact of Skye's power flows on the GB transmission boundaries. This collaborative approach, based on the area system expertise of the SSEN-T evaluating options on its 'trunk' roads feeding into the strategic motorways evaluated by the FSO is indicative of how the roles and responsibilities of the FSO/TO relationships should continue under the CSNP.

If the CBA used the prevailing FES, then the lowest capacity network option under consideration was the option of least worst regret. This option simply replaced the aging Skye network with a similar network capacity given the low levels of generation growth outlined in the FES, particularly ST and SP. However, the reality based on SSEN-T's area system expertise and stakeholder engagement led to a considerably different outcome – with Ofgem approving a significantly higher capacity reinforcement allowing the connection of larger volumes of generation. Had the prevailing FES been used the Skye network would not be fit for the 2035 target pathway.

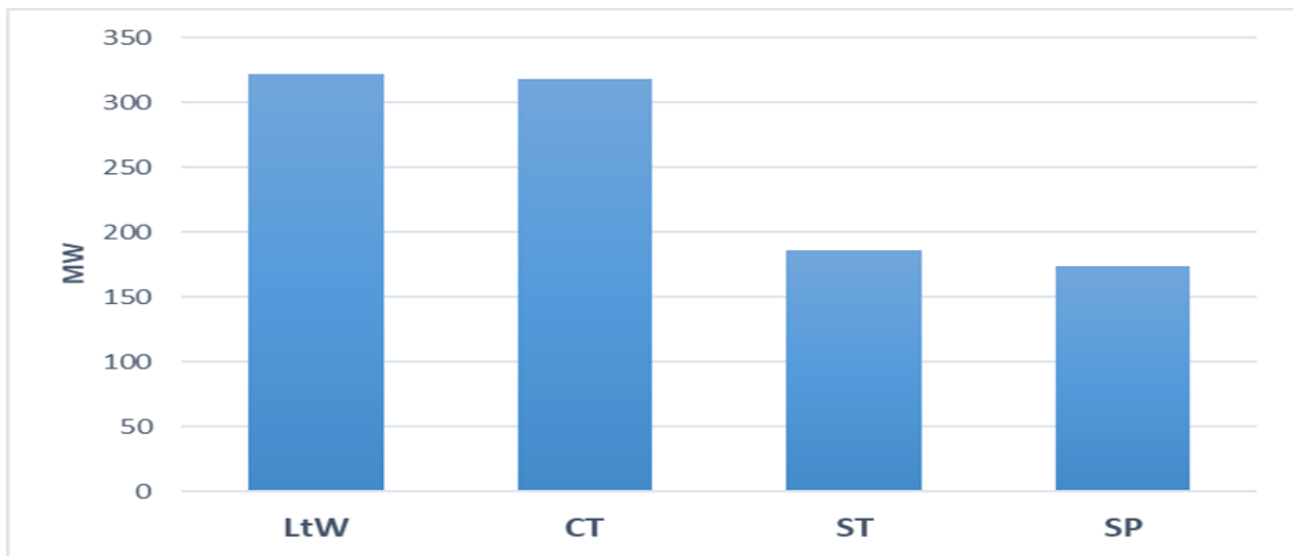


Figure Showing FES Generation Capacities

However, as GB scenarios the FES are not intended to capture the specific detail of generation development at a more localised level, such as the relatively small Skye network. Therefore SSEN-T undertook a stakeholder engagement exercise to help determine the 'local' level of potential generation seeking to connect to the Skye network. Four additional scenarios were developed based on this stakeholder engagement. These scenarios, and their comparison to the 2020 FES are shown below.

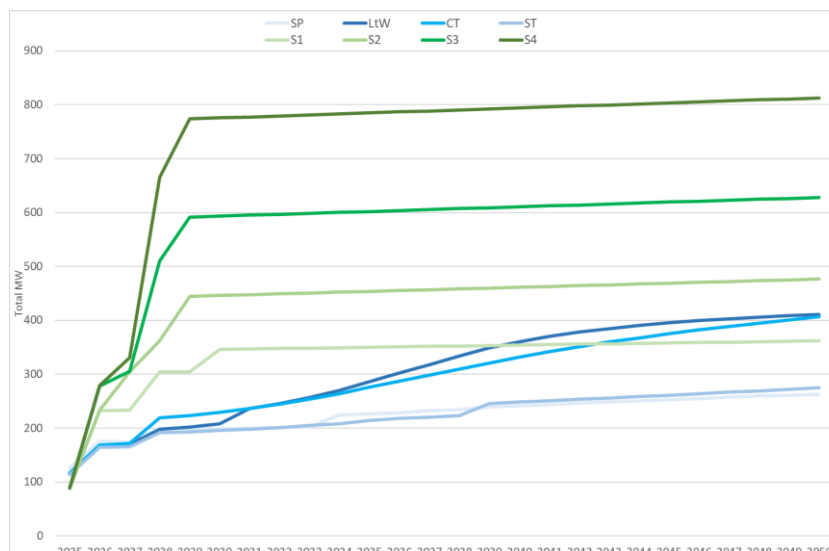


Figure Showing Localised level Generation Capacities

Q4. Do you agree that the pathways should run to 2050, and if not, why not?

Yes, we need a long-term vision to cost effectively meet net zero. 2035 is a steppingstone but the need to strategically develop the energy sector to deliver net zero does not stop there. It is imperative we have a long-term direction to 2050 to provide necessary investment signals. The 2035 strategic technology pathways should form the basis of input into the longer-term FES pathways where greater divergence will emerge in the role of the technologies and changing behaviours as the UK decarbonises.

The pathways running out to 2050 will allow for the network to be planned more cost effectively and with more holistic system thinking. A cost-effective approach should include investment options that can be built out if needed in the longer term, but they need to form part of the plan. This 'options' approach will ensure that evolution of the network is planned with long term cost effectiveness in mind and not with an ad hoc, piecemeal approach that has characterised network development based on the FES to date.

Q5. Do you agree that the model should develop the capacity to include extreme data ranges when requested of the FSO in its role as strategic advisory body?

We agree the model should have the capacity to include extreme data ranges. Because the FES suffer from present day bias and confirmation bias, including 'extreme' data ranges is inherently challenging. For example, no FES has ever modelled the impact of gas prices rising to 400p/therm, as this 'high impact low probability' event was not considered 'plausible' based on what was then the present day. Extreme data ranges should be used for 'stress testing' the scenarios that feed into network planning, in particular including tests for price volatility and resource issues. Such stress testing is particularly important to assess network performance and operability across the network – with a set of common planning assumptions and stress tests used. A well planned and resilient system should include such planning to ensure it is resilient in the longer term, including a certain degree of 'planning for failure'.

However, planning for failure does include the assumption that net zero is not met. Achieving net zero is a driver and not a stress test.

Q6. Do you agree with our consultation position on modelling network constraints?

The FES, as GB scenarios, should focus on strategic pathways that will ensure the UK meets net zero. If the FES inherently assume a constrained network, then this assumption will de facto become a key driver of the potential contribution of the UK's strategic net zero technologies given the 'chicken and egg' position regarding network availability and the role of strategic net zero technologies. Instead, the role of the UK's strategic net zero technologies should be a key driver of the FES and assessing the cost-effective role of these technologies includes the network required to support them.

It is not clear what the consultation is referring to when it references a 'constrained network model.' The ESO currently considers only constraints on the main transmission boundaries when modelling the FES and network options. Going forward, many of the strategic net zero technologies in SSEN-T's area will be connected 'behind' the main transmission boundaries on the 'trunk roads' that feed into the main transmission motorways. Evaluating these area network impacts, flows onto the transmission motorways and the impact of the strategic technologies should continue to be a key role for SSEN-T working in collaboration with the FSO.

To date calculating constraints and the role of network investment in relieving them has been the main ‘benefit’ of network investment. However, focusing on constraints alone is too one dimensional. As outlined in our response to Q2, accessibility to the network is an important consideration in evaluating the potential contribution of the strategic net zero technologies for the 2035 FES pathway and beyond. But there are other critical considerations that will influence the role of these technologies, including the underpinning ‘resource’ required (for example wind resource), land availability/planning considerations and community acceptability. The combined role of resource, planning and network (including planning considerations for the network) means that the siting of the UK’s strategic net zero resources is not spatially homogenous. Considering limitations ***in addition to*** constraints on the network must form part of the 2035 and longer-term FES pathways.

So, while we agree that the FSO should be able to advise government and Ofgem where new generation should be located, the advice must consider issues in addition to network constraints.

There is an inevitable ‘chicken and egg’ situation around network availability and the contribution of the strategic net zero resource – with network accessibility attracting generation (see case study below). Therefore a holistic view is needed that recognises the spatial heterogeneity of the strategic net zero technologies to ensure we cost-effectively achieve net zero, including network development and alternatives to new electricity infrastructure. A near-term pathway should be based on an assessment of the plausibility of **spatial pathways for each region** where the contribution of each region to the 2035 pathway is considered, along with evaluating a cost-effective network required to facilitate them.

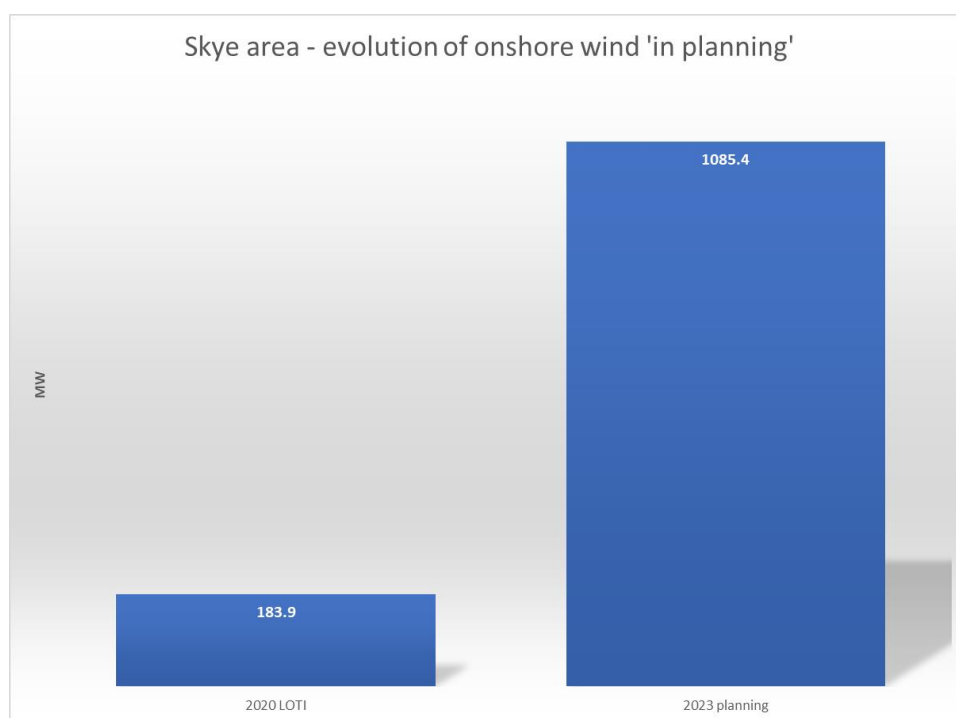
SSEN-T, as the Area System Planner (ASP) for the NoS, is best placed to undertake such a holistic assessment, including the spatial distribution of the strategic technologies in the NoS and evaluating the cost-effective network necessary to deliver them in our area. These plans will feed into the CNSP and be subject to the FSO’s approval. As outlined above, it is important to note that the ESO does not currently plan and model the network ‘behind’ the main transmission boundaries – this is a TO role. In adopting a 2035 spatial pathway and longer-term pathways for strategic net zero technologies, then the ‘trunk roads’ of our network will be holistically planned by SSEN-T, considering issues beyond only constraints, to feed into the strategic highways planned by the FSO.

To compliment the holistic spatial planning approach for all strategic net zero technologies the FSO should work with Crown Estates and ScotWind for optimal siting given the combination of planning, resource and grid (constraints and cost of reinforcement). A critical benefit of this approach in the longer term will be to signal to the market where cost-effective 'headroom' is available on the network for the connection of strategic net zero – providing a more systematic approach to connections.

Case study 3: – Impact of plans for network reinforcement

The chart below shows the onshore wind projects identified in the Skye area in 2021 that were in the planning process or had already been approved. The second bar shows projects around the area currently within the planning process or approved.

The Skye case clearly highlights the impact of plans to strategically reinforcement the network on developer interest. Without the prospect of securing connection developers are reluctant to undertake the considerable expenditure necessary to secure planning.



Q7. Do you agree with our consultation position, and do you have a view on which data principles should be possible to adopt for the first FES?

We agree with the consultation position that energy system input and output data used in the FES should be open by default. We agree that the data best practice licence obligation should be carried over to the FSO. Guidance documents should be iterative and updated regularly to reflect the expected learning from the CSNP lifecycle.

Q8. Are there specific stakeholder needs cases for publication of data, including the format of outputs?

See response to Q9. The FSO should consult on data workbooks, to ensure data is useful to stakeholders without advanced data capabilities. Specific consultations should be held with DNO's and Local Authorities and other key stakeholder that will consume CSNP data.

Q9. Are there specific data outputs associated with the FES that we should mandate?

The data outputs need to be in a consistent and commonly used format that can be easily accessed and used by all relevant stakeholders. In a world where the CSNP is providing a view of required infrastructure, we need to ensure that all parties directly delivering the CSNP, or indirectly involved in, and using a common set of planning assumptions and outputs.

Q10. Do you agree that regional and/or industrial hub pathways should be included in the FES?

Yes, although these should be the responsibility of the TOs who already have the knowledge, skills, and experience of doing so within their areas. The FSO should create pathways based on the principles of evaluating resource, planning and cost effective network. And this will include inputs from the DFES (GSP supply and demand) and then our combined assumptions will feed into the FES. This will need more than 'high level guidance.', clear roles and responsibilities need defined for a really holistic approach to whole system planning.

Q11. Do you agree with our proposal for a 'major' FES in the year prior to the main CSNP publication, with smaller annual updates in the intervening years?

There is a distinction between the single FES pathway to 2035 and the longer term, more diverging, FES pathways to net zero. The shorter-term pathway established assumes the 'need' (2035 targets for strategic net zero technologies) will be met – including a spatial assessment. Therefore, the driver underpinning network development is to ensure that these technologies **can** connect to the network as it will be ready. The role of ensuring the strategic technologies **will** connect by 2035 is market and policy driven, including the role of government in aligning the 2035 target pathway with CfD auctions and the role of the FSO in ensuring supporting capacity adequacy via, e.g. the capacity mechanism. Having a 2035 target pathway will facilitate provide a clear market signal and provide a framework for the accompanying policy requirements.

Developing longer-term FES pathways is a more evolutionary approach as uncertainties around decarbonising heat, the speed of electrification and the role of hydrogen unfold. Annual smaller updates will provide limited value. Focusing on less frequent FES updates with stakeholder engagement to inform the longer-term view of the CSNP is more appropriate.

Q12. Do you consider that longer-term evolution of energy supply and demand modelling should head in the direction outlined above and if so how?

The approach we outline for a single pathway to 2035, the longer-term net zero pathways and area spatial planning of the strategic technologies will form critical input into transmission network design for the CSNP. The approach also allows the models and processes underpinning the regional system plans (RSPs), the area system plans (ASPs) and the FSO's strategic plans that ultimately combine to form the CSNP to adapt in the future as necessary – but always keeping the focus on achieving net zero.

There is an important distinction to be made between the various uncertainties highlighted in the consultation document. Adopting planning based on a single pathway for the strategic net zero technologies and their spatial location to 2035 inherently 'internalises' uncertainty and in doing so reduces it. Adopting FES net zero compliant pathways in the longer-term increases uncertainty, but again if based around the longer-term requirements of achieving net zero informed by the CCC, then uncertainty is limited.

Those factors that involve 'deeper' uncertainties relate to 'market disruptors', e.g. future costs of storage technologies or active participation of consumers in demand response. These uncertainties should be 'what-iffed' as part of the RSPs, ASPs and the longer-term FES. Then there are system "stress tests" including those 'low probability high impact' events that should form part of network resilience planning.

Adequately addressing and planning for uncertainty is not only a role for the FSO – the RSPs and ASPs should also include such evaluation. The role of the FSO should be to consider those key uncertainties to be evaluated in the RSPs and ASPs.