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NGET response to the consultation on CSNP Stage 1: Modelling Future Supply and Demand

This response represents the views of National Grid Electricity Transmission (NGET) only. As NGET we own the electricity transmission network in England and Wales. We are responsible for ensuring electricity is transported safely and efficiently from where it is produced, reaching homes and businesses safely, reliably, and efficiently. We facilitate the connection of supply and demand customers to the transmission system. We are investing to adapt and develop our transmission network to connect new sources of low carbon and green energy to homes and businesses.

We welcome the opportunity to respond to Ofgem's consultation regarding the modelling of future supply and demand, which will form the first stage of developing the Centralised Strategic Network Plan (CSNP). Electricity networks have a critical role in the energy transition, and timely delivery of the required infrastructure is important to ensure the transition is delivered at the lowest cost to consumers. The pace and scale of change across the sector drives a need to evolve industry arrangements to enable the whole energy economy to transition to net zero.

The work on Holistic Network Design (HND), which formed the basis of the first transitional CSNP (tCSNP1) has shown there is real benefit in thinking about network planning more holistically and considering the dependencies and linkages between projects more effectively to optimise investment decisions. Shifting to a truly strategic enduring CSNP process should take this further, broadening the focus beyond offshore wind and bringing whole system optimisation front and centre.

Overall, we are pleased to see the proposed direction outlined by Ofgem regarding the modelling of future supply and demand pathways outlined in this consultation. This is a positive step to ensure we have a more strategic, effective, and fit-for-purpose approach to meet the challenges we are facing across the sector. The underlying assumptions, data and modelling of supply and demand, and the transparency of these, underpin our ability to build robust network reinforcement strategies and plans.

Given the interactions between each of the four CSNP stages outlined, we are concerned about the approach being taken to consider this first stage in isolation. The approach taken to model future supply and demand must be appropriate for the processes it feeds, and we do not have enough detail about the following stages. However, we have answered each of the questions posed as far as possible in the appendix to this letter.

While work is still to take place to determine the scope of CSNP, we continue to be of the view that the CSNP should be focused on co-ordinating the need for, and interactions between, strategic changes to onshore and offshore networks in the context of the given the importance of these types of projects to multiple customers and stakeholders. The CSNP should effectively consider whole system, cross-vector interactions and how those impact the need for strategic and anticipatory transmission investment on and offshore. It is this scale of infrastructure development where the CSNP adds value, given the need for certainty of requirement, longer lead-times for delivery, complex consenting, and higher environmental and community impacts that may require mitigation. A robust and fully endorsed CSNP would be powerful in supporting these programmes of work. We do not believe it should include all load-related investment.

The CSNP should provide a clear and robust output that can be used by the industry, including TOs, to consent and deliver the infrastructure that is critical to deliver net zero. It is important that each stage of the process is focused on how to achieve that outcome and we must consider how all stages of the CSNP enable the industry to deliver at the pace and scale required to meet net zero and consumer outcomes. Providing certainty to delivery organisations and local communities is important to ensure delivery organisations can focus on progressing at pace, while working closely with host communities. Decisions in the CSNP should not be unnecessarily revisited as this creates uncertainty and has the potential to cause delays that drive up the overall cost to consumers.

Effective future supply and demand modelling is critical to deliver robust network plans but is challenging given the level of uncertainty that exists in the energy landscape. We welcome Ofgem's views on how this might evolve and agree with the following elements outlined in the consultation:

- Both future demand and supply should be modelled robustly **using pathways that focus on delivery of net zero outcomes**. The process should only include pathways which are compliant with net zero by 2050, given this is a legislated target in GB.
- There should be **transparency** in model design, input data, assumptions and outputs as a default position unless there are valid reasons that prevent data sharing. The details and assumptions that are used to build FES pathways are critical to develop the right transmission network plans and all parties should be aware of these, and the impacts of decisions and assumptions made in the pathway(s).
- The process should **be delivered by FSO working closely with stakeholders** and drawing on data from a range of sources to ensure it stands up to scrutiny. It should be developed considering both **the national view and regional requirements** as appropriate.

Future iterations of the pathways should include learning and feedback loops. They **should be informed by the network impact of the CSNP** and how that therefore impacts future supply and demand patterns.

There are two areas that we do not believe are adequately considered in this consultation: that energy policy continues to evolve and is not yet specific in areas that matter when designing the transmission system and that we have a free market where customers can apply to connect in any location, at any time. We therefore propose the following areas need to be considered and the proposals modified as a result:

- **Multiple pathways and sensitivities should be used rather than one pathway, although we would expect there to be convergence in the very near-term.** The proposal to have a single pathway in the short-term (nominally 7-13 years) is not credible. Testing solutions against a range of pathways enables us to understand the impact when the external environment inevitably shifts, and better tooling and automation should be developed to enable this. This allows us to test the 'envelope' within which the solutions in the CSNP hold-true and to deliver at pace with greater certainty.
- **Risks and opportunities associated with different pathways need to be understood:** The level of uncertainty across the energy system drives a need for there to be clear and transparent sharing of underlying assumptions and data in any pathway. The implications of these choices need to be wholly understood by stakeholders including Ofgem and DESNZ to ensure the risks and opportunities of the subsequent network plans are also understood.
- **The roles of DESNZ and FSO in setting energy policy need to be clearer.** The process should not lead to FSO setting energy policy directly or indirectly. It must also not lead to FSO 'picking winners and losers' in the market, which is a risk when developing a single pathway when energy policy has not been set (e.g., on the use of hydrogen, for example in energy transmission or heating).
- **Constraining generation and demand placement based on network capacity should not prevent the right investment signals being made.** While we understand that it could create more credible pathway in the very near term only, there is a balance to be struck to ensure that this is applied in the right way and does not prevent important and timely investment signals to relieve bottlenecks on the network that could provide significant benefits.

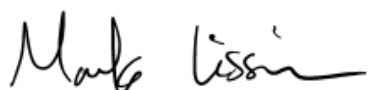
- **There is not sufficient consideration given to demand in the consultation, which remains an area of uncertainty.** A lot of the focus is on generation in the consultation document and certainty of pathways given policy around areas such as offshore wind. The optimisation and impacts of both generation and demand must be given effective consideration when ensuring the overall network design is optimised and the processes developed must work for both. In particular, the detail of how demand evolves both geographically and across the transmission and demand boundary is critical to develop fit-for-purpose network designs.

We would also like to highlight the following areas for consideration that impact and interact overall CSNP policy and process development:

- **Timing:** The current cycle of events (FES, ETYS, NOA) takes place annually and requires 9-12 months to complete. The frequency of the revised end-to-end process is unclear in the consultation which makes it difficult to comment on the frequency and timing of the scenario/pathway publication. Given the potential breadth of the CSNP outlined in previous documents, we would expect CSNP to take longer than the current process, but this will need to be considered once all stages have been consulted on.
- **Interaction with FSNR:** Planning activity for the next price control is well underway and the FSNR consultation highlighted a clear interaction with the CSNP process, but we are not yet clear on how this will work in practice. Given the timings of FSNR, our approach to delivering the transmission network of the future is already being shared with stakeholders including Ofgem's engineering team. The outcome of this and future CSNP consultation stages could result in misalignment of proposed works, leading to greater uncertainty. CSNP policy development should not prevent decisions being made that are required in the very near-term.
- **Interactions with other policy work:** It is important to consider whether any outputs of any ongoing activities such as REMA, connections reform, or RSP development would have any impact on the approach taken to modelling supply and demand scenarios. Consideration should also be given to whether any changes in Government policy may materialise that would impact this process e.g., there will be General Election in 2024 and a future Government may have a different view of near-term decarbonisation objectives or technologies.
- **Focus on Spatial Planning:** As outlined in our recent publication 'Delivering for 2035'¹ a more strategic and holistic approach is required to balance the urgency with which investment is needed with the requirements of local communities. This should be considered in establishing how energy pathways are developed and presented. The creation of a Strategic Spatial Energy Plan coupled with improvements in the consenting process are key to enabling delivery of any energy pathway.

We want to continue to support policy development and shape these critical processes to deliver outcomes that aid the acceleration of the transition and create best value for consumers. If you have any further questions about the content in our response, or anything related to the CSNP policy development more broadly that you would like to discuss, then please contact Nicola Todd (nicola.todd2@nationalgrid.com).

Yours sincerely,



Mark Lissimore
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¹ National Grid Delivering For 2035 Publication: <https://www.nationalgrid.com/document/149501/download>

Appendix: Response to individual consultation questions

Question 1: 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 are supportive of the move towards 'pathways' but there should be a clear definition of how these pathways are built and what they are optimised for e.g., are they targeting net zero at lowest consumer cost or quickest pace etc. Understanding this will help the FSO to work effectively with Government and other industry stakeholders to highlight where there are key choices to be made about elements of the pathways that will impact net zero delivery.

Given the focus on driving towards net zero, and interim decarbonisation targets, it is important that we build transmission network plans based on credible views of future generation and demand requirements. Energy policy in the UK is currently more focused on decarbonising energy supply/generation in the near-term and further consideration needs to be given to demand decarbonisation pathways to ensure the overall solutions are optimised.

We know that any single pathway for the future will be imperfect and will have to be based on a range of inputs and engagement with industry stakeholders to consider how best to deliver decarbonisation outcomes. It may also be beneficial for sensitivities around each pathway to be defined at this stage, or later in the CSNP process, to further test the robustness of CSNP outputs.

Question 2: Do you agree that there should be a single forward view of the near term for all pathways?

We do not agree that there should be a single forward view of the near-term for all pathways as proposed in the consultation.

Given the uncertainty that still exists in key areas of energy policy and across the connections landscape e.g., use of hydrogen or heat decarbonisation, it is our view that a range of pathways will have to be considered to build credible and robust future network plans. Even in the near-term as outlined (7-12 years) there is not sufficient certainty to develop a single pathway. The impact of local policy decisions (clean air zones, strong/weak planning policy against certain generator types) can lead to very different outcomes of what is connected to the network.

Having a single pathway would simplify the process to produce the CSNP, but reality will inevitably stray from this pathway quite quickly. It is our view that multiple credible pathways that test different approaches to decarbonisation should be developed. Effort should be focused on developing digital systems and tools that enable us to test a broader range of pathways more quickly. We would still expect to see the pathways converge in the near term and diverge over time.

By testing different network development strategies and reinforcements against a range of pathways allows us to engage with stakeholders and communities with a greater degree of confidence in the requirement for the infrastructure. It also ensures delivery parties can articulate the impact of 'what if' scenarios on infrastructure requirements quickly, rather than having to retrospectively test the impact of different pathways when the pathway and reality diverge.

Question 3: 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 that pathways should be compliant with net zero, and that we should not 'plan to fail'. The number of potential pathways should be sufficient to create a reasonable 'envelope' for network and infrastructure solutions and proposals to be adequately tested. Including pathways that achieve net zero in

varying timeframes (before and/or after 2050) may provide a useful reference and highlight the importance and impact of different policy positions.

The value of a counterfactual that never achieves net zero is not clear, and it may be more valuable to focus on timing of meeting net zero targets. A non-compliant pathway for 2050 (such as 'Falling Short') may still reach net zero eventually and in a world of constrained supply chain, challenging delivery etc. it may be helpful to understand when net zero would be achieved in this instance. This could be developed as the sensitivity or counterfactual outlined.

Question 4: Do you agree that the pathways should run to 2050, and if not, why not?

As 2050 is the target for net zero across GB, we should have laser focus on it in terms of pathway development and network planning. This makes 2050 a sensible focus currently but as we move forward there will be a time at which we need to start to look beyond 2050.

Shifts in consumer behaviour, technology advancements and UK policy will all shape the future and how and when different decarbonisation ambitions are achieved. This may be sooner or later and extending the horizon marginally beyond 2050 could be beneficial for testing different timings of net zero delivery (as outlined in our response to Q3).

Even with a focus of 2050 for the pathways, we still need to recognise that many solutions, whether provided by a TO or a 3rd party, have a useful asset life that extends beyond 2050. Many transmission assets have a 40-year life and so assets being delivered currently will be in place into the 2060s and potentially beyond, with transmission towers having a life of possibly 80+ years. If the benefits of solutions beyond 2050 are not considered in some way as part of CSNP development, then we may make sub-optimal decisions.

Question 5: 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?

Understanding the potential impact of extreme events is important to ensure that we develop a robust energy system given the criticality of it to society. Exploring extreme data ranges as part of the pathway development or through separate risk assessments or sensitivity studies could provide helpful insights that drive further investment or action. This could include testing how generation and demand may be dispatched across the network to ensure security of supply implications of different pathways are understood.

However, this work is only valuable if it informs decision making in this or other industry processes and it is not clear that this is the expectation in this consultation. It would be helpful to understand if there are other processes outside of CSNP that Ofgem would expect this insight to form part of.

Question 6: Do you agree with our consultation position on modelling network constraints?

We do not agree with the consultation position on modelling network constraints and think this is an area that should be given further consideration and refinement.

We understand that in the very near-term that capacity or capability limitations on the transmission system will impact the ability of different generation or demand customers to be connected. When building credible pathways in the very near-term the ability of specific customers to get connected, influenced by many factors including transmission capacity, should be considered and factored in.

In the short-term there are many solutions that can be deployed to manage network issues and provide additional capacity e.g., circuit reconductoring, deployment of power flow control solutions or commercial solutions. By constraining the deployment of generation and demand across the network in this time horizon it may prevent the right signal being made to TOs and other solution providers to progress with valuable investments that relieve network bottlenecks.

To enable the FSO to offer strategic insights and advice, consideration and an understanding of the role and impact of network constraints will be critical. Future modelling must continue to consider the impact of

generation on transmission and vice versa. Further clarity on how this would align with DFES would also be welcomed.

Question 7: 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 that transparency of data and decision making is important, and that data and decisions generated by the FSO should be shared as far as possible with data assumed to be 'open' as a default position. We do however believe there are important exceptions that would and should prohibit sharing by FSO e.g., commercial confidentiality or market sensitive assumptions. Care should be taken to ensure that any sensitive input data cannot be 'back calculated' using models and data that is shared.

We would expect the ability to share data will vary depending on the recipient of that data and we think it is appropriate that the availability of data would be different for different parties. For example, as a transmission owner we continue to need a granular level of generation and demand modelling to support our network planning and development activities. This level of data is market sensitive and therefore is not publicly available, but it is shared with TOs as required, with processes outlined in the SO-TO Code and associated procedures.

Stakeholders who engage in the FES process and who may provide data to FSO should be made aware from the outset how that data will be used and whether it would be expected to be shared. Consideration should be given to whether any position on this would limit the willingness of third parties to provide valuable data to FSO if they would have concerns over it being shared with other commercial entities.

We support the need for a continual learning process and for ensuring feedback loops and clear linkages between subsequent FES publications and other processes e.g., CSNP development.

We also support consideration of how the FSO would be incentivised and held to account for delivery of a high-quality product to stakeholders and reflect on where there may have been significant changes in assumptions from previous publications. However, in such a highly uncertain energy system context we do not agree that it is appropriate that the FSO should spend time to develop and showcase the resultant cost of any incorrect strategic insights in detail. We would prefer time is spent to ensure this is fed into future FES cycles and how to refine processes and ways of working.

Question 8: Are there specific stakeholder needs cases for publication of data, including the format of outputs?

It is essential to establish clear roles and responsibilities, along with specific handovers and service level agreements for data exchange across the end-to-end process.

As a TO we currently receive detailed outputs of the FES process, and this need endures despite the proposed changes in network planning activities through the CSNP. Both the data itself and the data format are important to ensure it can be used efficiently and effectively, and that we in NGET can also effectively share data and data models with the FSO as required.

It may be appropriate for elements of FES data to be shared with specific stakeholders outside of the broader industry publication, especially if changes in an updated FES process would significantly impact the TO/delivery parties and critical projects that are being developed and delivered.

When considering outputs of the FES process specifically, we require comprehensive data models that are compatible with our network models and defined network modelling platforms (currently DIgSILENT PowerFactory and PSCAD) to achieve the following objectives:

- Model future supply and demand accurately: This ensures that network models used for all TO activities are constructed with the required level of precision and that there is alignment to FSO models to support effective and detailed network planning and development.

- Replicate and build-on FSO findings across identified systems: TO's should be able to replicate and build-on findings from the FSO where required, this may be required to do more detailed project development or to enable us to answer questions that materialise through other processes e.g. the consenting process.
- Assess the wider operability of overall network solutions and configurations: This should include an assessment of dynamic network performance and we need network parameters in time domain models to be provided to enable this.
- Develop appropriate network solutions/options: TO's need to identify system needs and suggest suitable network reinforcement solutions that sit outside of the CSNP process. This requires TOs to have data that enables a comprehensive understanding of the characteristics of each part of the network, enabling TOs to propose the most appropriate reinforcement options at the right time for specific network challenges. This need is even more important before the first full CSNP is published in 2026.

To enhance transparency in broader decision-making processes, it would be beneficial for there to be greater clarity and detail around the CBA process (assuming this will look beyond purely financial issues) and tool being utilised. This will also help ensure there is a better understanding of the factors that drive network plans and enable us to develop better options to feed into the CSNP process.

Question 9: Are there specific data outputs associated with the FES that we should mandate?

Network companies, including incumbent (and potentially future) transmission owners, require potentially greater information provision than other stakeholder groups to ensure that solutions are harmonious and can be effectively integrated with the existing transmission network. We require access to full data models that can be used in agreed modelling platforms, as outlined in Q8 above.

We would highlight the following specific requirements that should be mandated and shared with TOs as a minimum:

- Mandate the publication of detailed information regarding the assumptions, methodologies and model used to develop the FES scenarios. This would provide transparency and enable stakeholders to better understand the basis of the scenarios/pathways and its implications.
- Mandate the disclosure of analysis and data related to the integration of renewable energy sources into the grid. Information such as curtailment rates, grid stability and measures taken to accommodate variable generation output from renewable sources.
- TOs should continue to receive FES Ranking Orders detailing project/customer specific information, it's location and fuel type (Gas, Coal, Wind, etc.). This also includes generation and demand forecasts for each FES scenario/pathway. This information is essential to accurately model the network and ensure compliance with SQSS.
- Provide information of historical performance related to the previous FES publications and where there are key changes in new publications, and what has driven those changes.

Question 10: Do you agree that regional and/or industrial hub pathways should be included in the FES?

It is important to recognise that the current FES process, while focused nationally, is built with a view of specific and local generation and demand connections. We do agree that improvements could be made to better reflect likely regional pathways and requirements, especially given the needs of different stakeholders at a national and regional level. We therefore agree that regional considerations should be included in the FES and believe that the Regional System Planner (RSP) has a foremost role in representing the interests of a region.

In our response to Ofgem's Future of local energy institutions and governance consultation (10 May 2023), we outlined our view that the RSP should be as a "federation" of autonomous bodies housed within the FSO. This separation will be important to ensure conflicts of interest are managed and that RSPs remain accountable to their local stakeholders. The RSP would have sub-national accountability for developing a regional energy system plan which reflects local stakeholders' plans, for example local authorities' energy plans, and ensuring they integrate with other RSPs plans and the overall national plan developed by the FSO.

For this process and relationship between the RSPs and the central FSO to function democratically, there needs to be transparency of decision-making including regional engagement processes and decision-making criteria and publication of the outputs from RSP decision making that will impact many processes, including FES. Until such time that RSPs are created, there needs to be clarity in the transitional approach and links to the DFES in particular.

Question 11: 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?

The consultation approach taken means that we are not yet clear on the end-to-end CSNP development process and the associated scope and complexity of that work. If the expectation is that the pathways are published c.1 year before CSNP publication, then this assumes implicitly that the CSNP takes 1 year to develop. We do not have enough detail to know yet if this is a credible assumption but would expect this is not sufficient given our experience to date across NOA and TCSNP processes.

The timing of the process, and the scope and complexity of it, should be focused on enabling the industry to develop the infrastructure needed to enable net zero. This will need further consideration during the consultation on subsequent stages of the CSNP but we would be concerned if process timing is set arbitrarily, which could result in a substandard output. Consideration should also be given to the timing of other processes that 'hang off' of the development of FES or where there are important dependencies and interactions e.g., network price control or re-opener submissions.

Having smaller annual updates between major FES publications could enable the integration of new data, emerging trends, and evolving policy frameworks that would allow for adjustments and refinements to the energy pathways. This should be limited to material impacts to ensure focus post-publication remains on the development of the CSNP and does not undermine work ongoing to develop network plans unnecessarily. However, we would anticipate that using a broader range of pathways in CSNP development as we propose would help in ensuring any changes that materialise would already have been captured and tested. This should limit the need for these updates to be made.

Question 12: Do you consider that longer-term evolution of energy supply and demand modelling should head in the direction outlined above and if so, how?

We agree that the industry needs to have more flexible and evolutionary processes governing it given the nature of the energy transition and the need to continually evolve and respond to change. It is also important the changes to ways of working and processes are effectively managed and consulted on with the relevant stakeholders to understand the full impact of any proposals.

We also agree that there continue to be a range of uncertainties that will impact the energy system and while not all of these can or should form part of a net zero pathway, our proposal to test a broader range of pathways and sensitivities will help ensure some of this potential uncertainty is understood in CSNP development.

Having the FSO act in an advisory capacity to Government and Ofgem will provide benefit in helping understand the range of potential uncertainties and what decisions may have to be made as a result. This should include inputs from TO's and wider network stakeholders to ensure advice is well informed and reflective of broader industry challenges.