Reference
CNSP Modelling Future Supply and Demand

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Cadent
Your Gas Network

Centralised Strategic Network Plan: Consultation on Stage 1 –modelling future supply and demand

We welcome this consultation as the modelling, analysis and advice given by the ESO/FSO will be absolutely critical in delivering a least cost and timely transition to a net zero energy system.

We have provided our response to the individual questions in the Annex below. In addition we would like to share a high level observation.

Whilst we note the references to whole system, this consultation is focussing on solving electricity system problems. The evolution of the FES process will need to be clearly whole system, as each vector cannot exist in isolation. We really value the work undertaken by National Grid over the last few years to recognise the role of natural gas and hydrogen. The painting of an effective whole system picture is something that must continue, if not accelerate under the FSO.

We note in particular that even electricity network challenges, such as the move to net zero operation, cannot be achieve without a joined up whole system plan, with hydrogen supplied power generation playing a critical role.

In developing Licence Conditions and the FSO Guidance, Ofgem's will play a critical role in building a successful new planning and advisory function.

We would be happy to discuss any of our comments further if useful, so please do not hesitate to contact us.

Yours sincerely

S Easterbrook

Stuart Easterbrook
Head of Net Zero Energy Frameworks, Cadent

Annex 1

Cadent's responses to the 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?

Yes, we believe this is the right direction of travel although we note that in the longer term it is hard to see how a pathway would look radically different from the current Future Energy Scenarios, unless each pathway has a robust measure of deliverability. We would support the FES Guidance setting out a clear definition of what constitutes a pathway, how they are to be differentiated, and what measures will be provided to enable their comparison.

We do support the move closer towards a delivery plan than a range of scenarios as this will be critical when decarbonisation steps up with the full decarbonisation of heat.

We believe the planning process will need to be designed to accommodate the emerging challenges of wider energy system decarbonisation. The primary problem currently being solved by the process is the conversions of power generation to alternative renewable forms. It is not designed to deliver a managed large wholesale conversion of demand. To decarbonise heat efficiently and within the challenging 2050 timescales, will require a significant level of strategic planning from a building level upwards. This plan would include the new sources of energy production being brought on line in coordination with each step of heat conversions. For example, if 600,000 heat pumps are to be installed each year, this could add in the order of 2GW to peak demand per annum. Without a plan to ensure additional generation is also built in parallel, and in the right places, with the associated turbine to heat pump grid enhancements completed, the power system will become increasingly less secure and resilient.

To deliver heat decarbonisation, we believe the CSNP will therefore need to continue the move away from scenarios to become a detailed delivery plan, in coordination with Regional System Planning.

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 plan for the shorter term, and this would help provide clarity for investments including regulatory business plans. We would note however that the duration needs to consider multiple energy vectors. A duration for the electricity system, may not be appropriate for the gas grid or hydrogen systems. Interaction with price controls and any other time constrained processes will also need to be considered when selecting a duration.

It should be noted however that a heat policy decision is expected very early in the development of the FSO, and this may drive a different approach to managing short and longer term whole energy system uncertainty.

Care must be taken to ensure that the single short term views are appropriately whole system, and do not result in closing off future pathways. Biased decision making in favour or one vector over another must be avoided, and outputs must also be coherent and consistent. For example, demonstrating the requirement

for a level of hydrogen powered generation but without an optimised plan including hydrogen infrastructure, would not be coherent.

With the production of a single shorter term view, it is likely that this will play a role in the development of network regulatory business plans. Clarity on the linkage with the price control process at an early stage would be valuable, and may change the networks requirements into and out of the process.

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?

Yes we agree with the proposal for all pathways to achieve net zero. However, it should be clarified whether the net zero targets to be met are final 2050 targets, or do they also include regional targets, and the phasing of the Carbon Budgets?

We also support the preparation of the counterfactual with detailed modelling information also provided.

We would welcome much clearer principles being established to drive the shape and number of pathways. The consultation refers to an 'optimum' number of pathways, but without clear principles or objectives we do not know what the FSO is optimising to achieve. Leaving this entirely down to the FSO, albeit based on stakeholder engagement, would risk the credibility of the process and the FSO's reputation, as well as creating more uncertainty and inefficient processes. The clearer the purpose and structure around the definition of each pathway, the more credible and efficient the process is likely to be.

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

Yes, we agree that until there is a clear deliverable plan in place to transition to net zero by 2050, there is no value in planning beyond that point at this time. There could be value however in requiring the FSO to provide a commentary on what they see as the trends and issues in the period immediately after the end of the current planning window e.g. 2050-2060.

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 that the FSO should be able to respond to model extreme event impacts when requested. However, we also believe high impact, low probability events need to be factored into the overall assessment of each pathway. It should be very clear to see how each pathways may differ in terms of their resilience. Otherwise, there is the risk the process will result in us sleep-walking towards a lower resilience energy system. If there is no assessment of overall resilience, the default assumption will be that all pathways are equally resilient and will be as resilient as they are today.

When considering high impact low probability events, the volume of incidents over a long period should also be assessed. For example, in a specific area an

extreme weather event may have a very low probability, but across the UK the chances of an event occurring will be much higher. The resilience of different pathways should be measured in terms of the likelihood and duration of a network supply failure.

If a design standard for resilience was in place, this would ensure all pathways were of comparable resilience. Such standards would also support clear accountabilities should failures occur when there are low probability, high impact events.

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

We do not agree with this approach. Whilst we can see that such an approach can be accommodated in a world where the problem being solved is largely one of converting existing high carbon power generation with zero carbon alternatives, as soon as the networks need a plan to decarbonise heat, an integrated strategic plan will be required including network infrastructure and production.

Whilst work is well developed to show how the existing gas network can be converted to hydrogen, there is no comparable work to show what would be required to deliver and operate a compliant electricity network, should electrification be the primary route to decarbonise heat. As a strategic advisor, we believe it is critical and urgent that the FSO develops such a plan to inform Government policy. This would require detailed network modelling to show, in sensible time periods, what the network could look like.

A conservative estimate of the impact of heat electrification suggests at least a doubling of the size of the end to end power grid. For such a scenario, we would expect the FSO to provide a clear indication of what would be required in terms of physical works on the ground, and a view of how deliverable it would be.

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?

Yes, we agree.

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

Part of the networks need for data from this process will be dependent on the role of the pathways in the regulatory planning process. It would therefore be sensible to provide ongoing flexibility for Ofgem to direct specific information requirements as part of each regulatory cycle.

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

As a gas network we would request data to be published in a way that supports how we need to use if. For example, for gas networks a breakdown across our offtakes would be helpful and practical. For whole system modelling and stakeholder engagement, cuts across DNO, GDN and Local Authority levels would also be of huge value.

We would also want to receive peak demand, and profiling information. FES in can tend to focus on annual figures which are not helpful for network planning and operation.

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

We support the provision of regional and sector pathways, but would request the shape of these regions is determined based on a whole energy system approach and not driven solely by convenience for the electricity sector.

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?

Yes – we support this approach, but would suggest provision is made to allow out of sequence major updates, subject to suitable regulatory approvals.

It would also be sensible to align these to the expected regulatory business planning processes, although this may mean flexibility is required should the timetables for these move.

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?

Broadly we agree with the high level direction outlined, but as noted above, we expect decisions on the decarbonisation of heat to drive a move even further away from scenarios, towards an overall strategic plan. To understand the impact of this, we would recommend that a piece of work is undertaken as a matter of urgency. This would allow the FSO and RSPs to be set up in a way that can enable heat policy implementation. If this is not achieved, there is the risk that development work over the next few years becomes redundant is the much bigger challenge of heat decarbonisation is addressed.

Unsurprisingly as a gas network, we have given heat decarbonisation a lot of thought, and would be happy to share our thinking, which may be more developed than that of the electricity sector which is focussing on other shorter term challenges.

Whilst we have not reached any firm conclusions, we do believe that delivering heat decarbonisation will need to be subject to a whole system strategic plan. This must be built on informed decisions taken by each consumer, including the millions of homes connected to the gas grid. Whether these homes will switch to hydrogen, or an electric solution is unknown at this time, but either way, their decisions will drive the production, storage and network requirements, all within an overall conversion plan. A process would therefore be required to engage with every consumer, explain the options, and capture their individual decisions. A plan would then need to be formulated and the implications for each consumer fed back to them.

If hydrogen is an option, a deliverable plan will need to know at an early stage how much hydrogen will be required and where. Any opt outs for electric

alternatives would also need to be identified, so that the infrastructure upgrades and additional generation can be planned, built and commissioned before the go ahead can be given for each consumer to complete their own appliance conversions. A similar approach would be required if hydrogen is not a credible option nationally or regionally, so that the additional infrastructure can be planned and installed efficiently, before appliances are switched, and if required, sections of the gas network decommissioned.