

Consultation response

Ofgem: Future System Operator supply and demand modelling

Response from Regen and the Electricity Storage Network

June 2023

About Regen and the Electricity Storage Network (ESN)

Regen is an independent centre of energy expertise with a mission to accelerate the transition to a zero carbon energy system. We have 20 years' experience in transforming the energy system for net zero and delivering expert advice and market insight on the systemic challenges of decarbonising power, heat and transport.

Regen has over 150 members who support our mission including clean energy developers, businesses, local authorities, community energy groups, academic institutions, and research organisations across the energy sector.

Regen also manages the Electricity Storage Network (ESN) – an independent business network established in 2008 to provide a voice for the UK storage industry and to promote the use of energy storage and flexibility to support the net zero transition.

1. Introduction

1.1 Background

Since 2015, Regen has pioneered and led the development of Distribution Future Energy Scenarios (DFES). We work with National Grid Electricity Distribution (NGED) and Scottish and Southern Electricity Networks (SSEN) to undertake detailed, evidence-led scenario analysis for the South West, South Wales, East Midlands, West Midlands, North of Scotland and Southern Central England distribution licence areas.

We spend a lot of time digesting and using the FES every year, from liaising with the FES team to a deep digest of the data workbook and suite of reports. When delivering the DFES, Regen carries out comparisons and reconciliations of bottom up DFES data to the top down FES data, considering connected baselines, near-term pipelines and long-term projections.

We also extensively reference the FES in wider policy and market insight work we do at Regen, in line with [our mission and strategic goals](#).

1.2 Continuing engagement

We would like to offer our help and insight to Ofgem and the ESO as the Future System Operator reform processes continue following this consultation. As the market leaders in DFES analysis, we would also welcome the opportunity to remain closely engaged with the evolution of the FES framework, data and publication.

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2. Regen response to consultation questions

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?

Yes – moving away from multiple scenarios to a central pathway in the near term would be valuable to provide some clarity and prioritisation of network investment.

Regen agrees that multiple scenarios are useful to provide concurrent credible views of the transition to net zero, due to a broad range of policy, technological, societal and systemic uncertainties needing to be considered. However, there is much more clarity and certainty on a number of energy system policies and development pathways for energy generation, storage and demand in the near term. Aligning the FES to produce a central pathway for the next 5 years (akin to the Best View scenario already considered by network operators), would be a reflection of this near-term certainty.

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

Yes – a single shared short-term forward view for all pathways would be a positive and clear signal to policy makers, developers, network companies and local authorities. However, the practicality of developing a single view, considering the scale of the current live pipeline of prospective generation and storage projects, would be difficult and would need a transparent process, assumptions and method. A clear framework from government on the role of hydrogen and electrification in decarbonising heat will be required for this single forward view to be achieved.

This pathway will need to be based on evidence of technology deployment pipelines as well as policy decisions. This will require more engagement with the existing DFES 'bottom-up' project pipeline analysis. Regen has delivered multiple DFES assessments for six GB distribution network licence areas. This analysis has involved deep research into the pipeline of contracted generation and battery storage projects, looking into spatial planning application status, Capacity Market activity and direct engagement with individual project developers. The outcome of this research shows that whilst there are sources and 'tests' of development evidence, landing on a single, definitive view of what projects will connect even in a single licence area, is very difficult. For the FSO to determine a single forward view of demand and supply load growth, for the next 5-10 years, down to a useful geographic granularity, the proposed assumptions and methodology used to create this view would need to be clearly communicated. The FSO would also likely need to lean heavily on the local knowledge and information that the individual network companies hold about the pathway for their licence areas. This should be an extension to the current DFES to FES reconciliation process and engagement that already happens between DFES analyst teams and FES teams.

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?

Yes – counterfactual scenarios remain valuable to show what a lack of demonstrable progress towards net zero looks like, on both a technology and regional level. These could potentially be further caveated to be evidence of failures in effective net zero policy, consumer support and regulation away from unabated fossil fuel use.

In the existing FES, whilst Falling Short appears to be a fairly straightforward scenario, some outcomes for individual technology sectors are fairly unusual. For example, unabated gas CCGT generation remains operational in Falling Short out into the longer term to 2050, but the capacity factors are so low (<0.1%) that the business model for the scale of capacity that is shown to be operational seems unlikely. Therefore, a fresh approach to developing a counterfactual pathway(s) would be an opportunity to increase the systemically technical credibility of such a pathway, whilst demonstrating clearly that it is not net zero compliant.

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

Yes – 2050 remains a sensible end point for long term pathways and scenarios.

Unless reforms to net zero legislation come through, 2050 is a political and sectoral end point for net zero energy system reform. However, Regen would stress the importance of designing pathways to implement early, aggressive action and progress towards 2050, as well as framing the end point of the pathways and overarching framework. Interim net zero targets for devolved governments (i.e. Scottish Government 2045 targets and Scottish Island targets) must be specifically reflected in the regional component analysis of any new net zero compliant pathways.

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?

Yes – but these should be explicitly shown as sensitivities to main pathways.

Extreme network events, weather events and other disruptive data points will need to be factored into pathway and scenario modelling. With the effects of climate change creating more frequent extreme weather days, what is deemed as extreme in the 2020s may become more frequent in the 2040s, depending on progress to net zero. Also, global political events such as the pandemic, the war in Ukraine and other seismic geopolitical shifts are impacting gas prices, fuel prices and therefore other energy consumer behaviour.

The inclusion of these types of events could become part of a pathway analysis. However, The application and modelling of extreme data ranges should be considered/modelled as sensitivities and shown as such in the outputs to the FSO and anything that is published.

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

No, we strongly disagree. By definition, pathways and scenario projections that are consistent with progress towards a net zero energy system should not be tethered to the network infrastructure planning, design and engineering processes of today.

The pathways that are developed, even in the near-term, should be a view of what the scale and speed of project development/load growth needs to be. The outputs of pathway and scenario analysis should, by definition, be used to inform where and when network investment needs to be prioritised to enable energy project development. Therefore, to apply existing constraints and current planned network build-out timelines would be at odds with the aim that near-term pathway analysis is supposed to be informing network planning, not the other way around.

Regen undertakes detailed analysis on project pipelines from delivering DFES assessments for six of the UK's DNO licence areas. The status of this pipeline already, to some extent, accounts for in-place network constraints. To re-apply these constraints at a holistic level in the pathways could be doubling up the impact of constraints on network and project development.

Also, with significant policy and regulatory reform underway for network connections (spearheaded by the ESO's Connections Reform process announced in June 2023), the current status around constraints (and investment plans to alleviate them) could see a significant shift in the coming years. This reinforces the consideration that ambitious net zero compliant scenarios and pathways should not be hampered by current regulatory structures and financial instruments that may be subject to reform. This can be considered, for example, against the potential for an ambitious net zero pathway that reflects a direct government intervention to fast-track strategic network investment across the UK.

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?

Yes – we strongly support the move to increase the transparency of modelling methods, assumptions, input data sources and approach to feeding in stakeholder input.

The FES data workbook and report suite is already a rich and detailed source of information. The incremental improvements to the quality and accessibility of FES data, alongside an increase in spatial granularity, has been welcomed by Regen and other users.

Developing this further to a 'presumed open' approach is something we would strongly support. The FES is arguably one of the most useful systemic overviews of the net zero energy transition, so increasing the access to data, assumptions and stakeholder input would

have direct benefits to national, regional and local governments, developers, market analysts and consumers.

As part of delivering DFES analysis, Regen currently undertakes a direct reconciliation process with bottom-up DFES projections at distribution network licence area level, to the equivalent FES datasets (using amalgamated GSP data for each technology building block). An increased level of available projection data, input data and assumptions would enable this reconciliation process to be even more accurate and useful.

Regen would welcome the opportunity to further improve the feedback loop and consultation cycle between DFES and FES analysis, to ensure that they can feed in to each other, and further land on consistent pathways for individual regions and licence areas, as well as being cognisant of national GB outcomes.

A core part of the DFES is stakeholder engagement. We make use of direct local stakeholder input from a wide range of sources, through a number of different engagement methods. We would also, therefore, strongly support additional information about the engagement that FES undertakes and how that engagement is used to feed in to the pathway/scenario modelling assumptions.

A timeline, outline approach and plan for the FES team to develop this enhanced data and engagement transparency would be crucial.

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

Yes – DNOs (and DFES delivery contractors) make direct use of FES data at GSP level.

GSP level projection data, by technology building block, by network tier, by year, by scenario, is data that is directly used to inform and reconcile to DFES analysis. We would want to see this level of data provision retained, and would welcome additional or more easily accessible iterations of this data. For example, the FES heat modelling data is currently completed to LSOA level, so there is an opportunity for the output data to be made available at LSOA.

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

Yes – a number of different aspects of the FES data delivery should be mandated.

This should include:

- Consistent technology building blocks (as currently defined)
- Pathway/scenario framework information about net zero compliance
- Regional and GSP datasets as well as GB wide data – DNO licence area datasets would be a welcome evolution

- Distinction between transmission and distribution network level data for all technology building blocks
- Retain existing capacity (MW), generation (GWh) and demand (GWh) units.

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

Yes – regional FES data enables a direct reconciliation to regional DFES datasets. But the accuracy of GSP level projections could be improved by more direct linkages to real-world project baselines and pipelines.

As discussed above, DFES and FES reconciliation processes rely heavily on regional projections in the FES workbook. We would like to see this continue. We do not feel that there is any value in FES analysis going any deeper than GSP. This would duplicate (with a lower degree of accuracy, local data and local stakeholder input) DNO analyses (that go down to 11 kV and LV level). A more consistent and digestible approach to regional pathway/scenario projections in the FES data workbook would be welcomed, by licence area, voltage tier and technology building block.

Industrial pathways should not be considered as an alternative to regional pathways. The potential for parallel pathway analysis for significant industries would be an interesting development and additional analysis within the wider FES framework. This could add additional insight and complement demand and generation load growth in particular regions, by providing a viable pathway for hard-to-decarbonise industry sectors.

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?

Yes – a dedicated annual FES publication should be retained, alongside the CSNP.

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?

Yes – the evolution of the FES should be the primary method for the ESO to adapt and consider how to communicate energy system pathways and guidance to Ofgem and Government.

Managing uncertainties and communicating potential policy decisions to inform sector pathways should be achieved by a well-executed and intuitive FES publication. Capturing certainty through central pathways and reflecting uncertainties through sensitivities in the near-term and scenarios in the longer term should be areas that the FES adapts to. Annual updates to policies and regulatory steps that create new ‘certainties’ should be reflected in central pathways.