March 2025 / Issue 10.2

Inputs

Annex about inputs to the options assessment process

NESO
National Energy System Operator

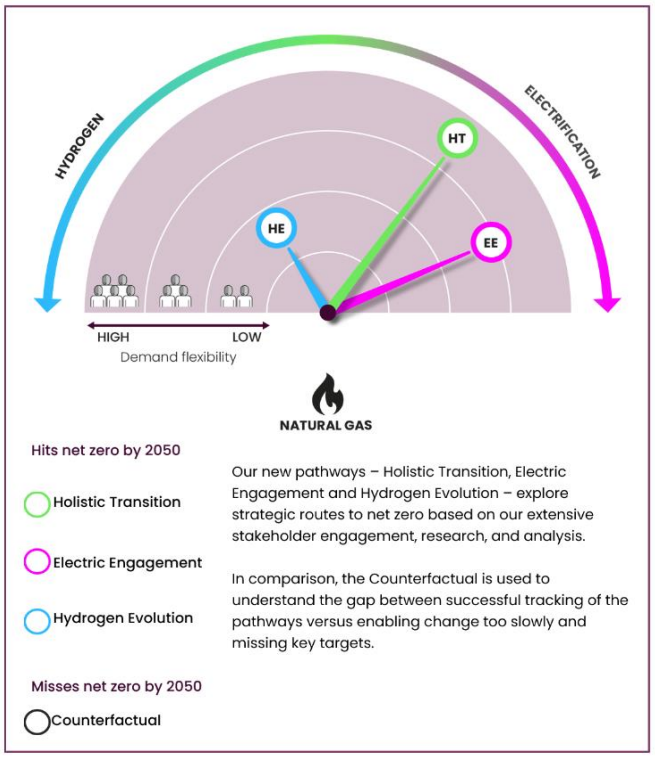
1.1. Analysis inputs

This annex describes the inputs to our options assessment process.

1.1.1. FES generation and demand

1. The first stage of the tCSNP2 Refresh process involves defining the necessary supply and demand background and network for analysis. This year, we use the updated Future Energy Scenarios pathways which provide a credible range of pathways for how energy will be produced and consumed up to 2050.
2. The tCSNP2 Refresh process uses the Future Energy Scenarios to form the background for the analysis. The FES model is subject to change based on stakeholder feedback received through the FES consultation process. The relevant set of scenarios as required by Electricity Transmission Standard Licence Condition C11 (now C12), is used for the analysis. These provide self-consistent generation and demand scenarios which extend to 2050. The future CSNP will use information from the Strategic Spatial Energy Planning and Connection Reform, which are running in parallel. The parallel processes are not due to complete in time to be included in the tCSNP2 Refresh, but the latest understanding of the connections queue will be used to inform the Refresh analysis.
3. The latest FES will be based on the following pathways which consider the rapid changes in the energy market:

Figure 1 – FES Pathways



1.1.2. Offshore designs and the Offshore Coordination Project

1. The generation connections from the Offshore Coordination Project will be reflected through the scenarios used in this analysis, in the same manner as other generation.
2. Our analysis inherits the offshore design from the *Pathway to 2030* and *Beyond 2030* report outputs as well as any changes from completed Impact Assessments and other Offshore Coordination projects. The offshore network will be deployed within each FES scenario differently in a similar way to offshore wind, for example.

1.1.3. GB network modelling

1. To facilitate electrical network analysis, a set of GB network models that represent different future study years are agreed between NESO and the TOs. The TOs submit power system models of their networks to NESO for each appropriate study year. NESO uses these along with FES data to produce combined power system models of the GB network and shares these back to the TOs for analysis. This ensures all parties can use a common network model. Additional models and modelling information for different scenarios and network options are also submitted such that NESO and TOs have adequate information to carry out the necessary option analysis.

1.1.4. Constraint cost modelling tool

1. The constraint cost modelling tool is used to forecast the constraint costs for different network states and scenarios. The high-level assumptions and inputs used in the tool are outlined in the table below.

Table 1 - Assumptions and input data for the constraint cost modelling tool

Input Data	Current Source	Description
Fuel price forecasts	FES	20-year forecast, varies by scenario
Carbon price	FES	20-year forecast
Plant efficiencies and season availabilities	FES	
Plant bid and offer costs	Historic data	Long-term Market and Network Constraint Modelling
Renewable generation	FES	Wind, solar, and tidal profiles for zones around the UK
Demand data	FES	Annual peak and zonal demand
Demand profile	FES	Within year profiles
Maintenance outage patterns	Historic data - TO	Maintenance outage durations by boundary
System boundary capabilities	Power system studies - TO	See text
Reinforcement incremental capabilities	Power system studies - TO	See text

The model is set to simulate 365 days per year, 20 years into the future with an appropriate time resolution. The year in which an option is commissioned can be varied. The primary output from the tool for the cost-benefit analysis process is the annual transmission constraint cost forecast; there are further outputs that help the user identify which parts of the network require reinforcement.

1.1.5. System Requirement Forms

The details of network requirements and of each network development option are exchanging using System Requirement Forms. Details of these can be found in the System Requirement Form appendix.