

Great Britain's Electricity Transmission Network Planning Cycle

Key Messages

- The changing nature in how we use and make electricity in Great Britain (GB) requires widespread upgrades to our electricity network.
- In addition to keeping the electricity system in balance, the Electricity System Operator (ESO) is responsible for the GB wide electricity network design process.
- The ESO doesn't generate or sell electricity and it doesn't build, own or maintain infrastructure – that's down to other companies.
- The ESO will shortly publish a plan for recommended electricity network build that could enable a decarbonised electricity grid by 2035.

The Electricity System Operator

- As the Electricity System Operator for Great Britain, our mission is to drive the transformation to a fully decarbonised electricity system by 2035 in a way that is reliable, affordable and fair for all.
- With the passing of the Energy Act 2023, the ESO is transitioning into an independent, public corporation¹ in 2024. The National Energy System Operator will have additional responsibilities, including providing expert, impartial advice to the Government and Ofgem across the whole energy system as it transitions to net zero. The body will lead on strategic network planning for electricity and gas, as well as the coordination of regional energy system planning.

Britain's evolving electricity system

- GB has one of the fastest decarbonising electricity grids in the world. GB's energy needs are set to rise by up to 67% by 2035 through digitalisation and the electrification of heat and transport.
- There is a growing need to transmit large volumes of electricity from new offshore sources, primarily off the coast of Scotland, and other onshore renewables spread throughout Britain, to the south of the network where the demand for electricity is greater. Currently proposed grid upgrades only get Britain part way on its journey towards producing and transporting the greener and cheaper electricity that will be needed for net zero².
- To deliver secure, clean and affordable power to GB and meet government decarbonisation targets, the electricity system needs to expand.

Electricity transmission network planning

- Network planning starts with the ESO forecasting supply and demand over the medium and long-term. This forecast identifies regions where we expect supply and demand to increase.

¹ Publicly owned, but with operational independence from the UK Government.

² This network planning cycle is following on from the ESO's recommended Holistic Network Design published in 2022, a recommended electricity network to enable the delivery of the Government's offshore wind targets.

- The ESO then identifies what these regional changes mean for power flows on GB's electricity network. Where the forecast power flows exceed the capacity of the existing network, the Transmission Owners³ develop options to increase capacity and the ESO can also propose options.
- These network infrastructure options are high level proposals to connect two points on the electricity network. At this stage, no decisions on the route of the network or chosen technology are made.
- The ESO examines these options to ensure that they provide the technical capability needed, and identifies which options best meet its four design criteria:
 - Delivered in an economic and efficient way, ensuring the best value for bill payers.
 - Can be delivered and operated in the associated planning timescales.
 - Minimise the impact, where possible, on the natural environment.
 - Minimise the impact, where possible, on the communities that host this infrastructure.
- After the ESO has put forward its recommendation of which options should be taken forward, Transmission Owners start their detailed design process to refine these options further. This includes determining technology and routing options before beginning the consenting and planning processes with potentially impacted communities.

What to expect from the current planning cycle

- Following the Scotwind⁴ leasing round, the ESO was tasked by the UK Government to connect 20 GW of offshore wind to Britain's electricity network in a coordinated, holistic manner.
- These increased north to south power flows could mean upgrading existing circuits, new circuits on and offshore, or locating large electricity demand, such as hydrogen production or data centres, where it is of strategic locational benefit to the electricity network.
- The ESO is currently part way through this assessment process and will publish its recommendations by April 2024.

³ National Grid Electricity Transmission (NGET) in England and Wales, Scottish Power Transmission (SPT) in southern Scotland and Scottish Hydro Electric Transmission Ltd (SHETL) in northern Scotland.

⁴ ScotWind was the first round of offshore wind leasing round in Scottish waters for a decade. Run by Crown Estate Scotland, it resulted in 20 projects securing seabed option agreements.