Scottish & Southern Electricity Networks

TRANSMISSION

SSEN Transmission's electricity transmission infrastructure

Why this infrastructure is needed and how that need has been assessed

Introduction

SSEN Transmission's investment programme in new and upgraded electricity transmission infrastructure forms part of a major upgrade to the high voltage electricity network across Great Britain (GB). Upgrading the grid is essential, if Scotland and the UK's energy security, clean power and economic objectives are to be delivered. In simple terms, this infrastructure is needed to connect homegrown, low-carbon renewable electricity to the network and transport it to where it will be used right across the country - building a cleaner, more secure and more affordable energy system for homes and businesses.

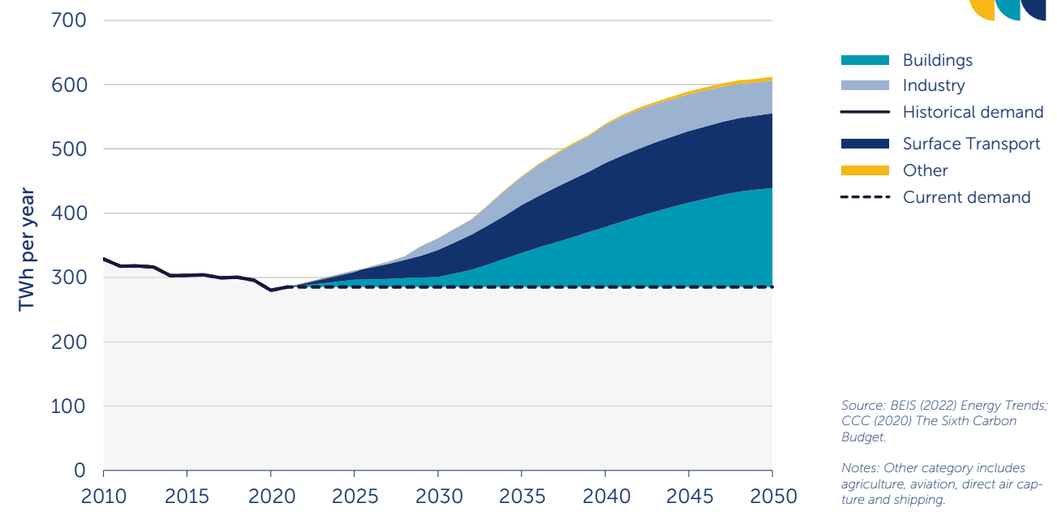
This booklet outlines the policies and targets driving the need for new clean power and the transmission network required to enable it. It also explains the electricity network planning processes that have established the need for both our near-term reinforcements and the longer-term "beyond 2030" investments that will be required as the energy system continues to evolve.

Energy security and clean power targets

The UK and Scotland have committed to deliver net zero carbon emissions by 2050 and 2045 respectively.

To put the scale of this challenge into context, the Climate Change Committee – the independent statutory body advising the UK and devolved governments – forecasts that electricity demand will double by 2050 as transport, heating and industry increasingly electrify.

Figure 1 Electricity demand in the Balanced Pathway



Source: BEIS (2022) Energy Trends; CCC (2020) The Sixth Carbon Budget.

Notes: Other category includes agriculture, aviation, direct air capture and shipping.

This is as a result of forecast changes in electricity use across the UK, for example, through the electrification of transport and heating.

Meeting these targets, and the associated increase in electricity demand, will require significant and unprecedented investment in new low-carbon electricity generation - and the network infrastructure that is needed to connect and transport that power. Further investment is also required to replace the generation capacity lost as fossil-fuelled power stations close.

To maintain progress, the UK and Scottish Governments have set a number of interim targets. These include the UK Government's ambition for 50GW of offshore wind by 2030 and a fully de-carbonised electricity system by 2035.

The Scottish Government's Draft Energy Strategy and Just Transition Plan sets a target for an additional 20GW of new low-carbon renewable electricity generation by 2030, including 12GW of new onshore wind. The Scottish Government has also consulted on increasing its current offshore wind ambition of 11GW by 2030. Publication of the final Energy Strategy has been paused, with the Scottish Government undertaking further work on Scotland's long-term energy policy, future energy mix and system planning.

Although the Draft Strategy focuses on 2030 targets, it also recognises that Scotland's renewable energy potential extends far beyond this date. It highlights the scale of future offshore wind development, Scotland's long-term role as a major exporter of clean electricity, and the expected growth of hydrogen production, industrial electrification and wider de carbonisation. These long-term changes will require substantial additional transmission infrastructure throughout the 2030s and 2040s, supporting the need for a series of "Beyond 2030" reinforcements.

Energy Security

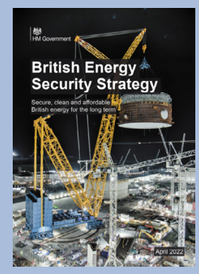
Alongside climate targets, there is a requirement to secure the country's future energy supply and reduce dependence on volatile global wholesale energy markets.

The British Energy Security Strategy

In April 2022, the UK Government published its British Energy Security Strategy (BESS). This set out plans to secure the country's future energy independence by reducing exposure to global gas markets. This will be achieved by accelerating deployment of homegrown, affordable low-carbon electricity generation and the transmission network infrastructure required to connect and transport that power.

There is currently around 16GW of offshore wind across the UK and around 15GW of low-carbon renewable generation in Scotland. To meet 2030 targets, this needs to more than double or treble. With the existing transmission system already at full capacity in many places, particularly in the north of Scotland, substantial investment in new grid infrastructure is an imperative.

After 2030, further offshore wind leasing rounds, re-powering of existing sites and new low-carbon technologies will require additional transmission reinforcements to support long-term energy security.

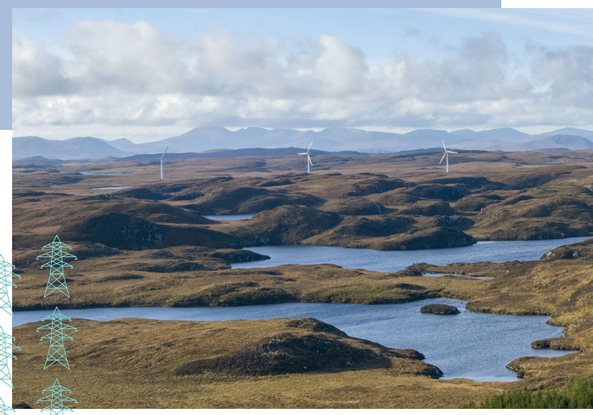


UK Government
British Energy Security Strategy
April 2022

"This plan comes in light of rising global energy prices, provoked by surging demand after the pandemic as well as Russia's invasion of Ukraine. This will be central to weaning Britain off expensive fossil fuels, which are subject to volatile gas prices set by international markets we are unable to control, and boosting our diverse sources of homegrown energy for greater energy security in the long-term."

"Accelerating our domestic supply of clean and affordable electricity also requires accelerating the connecting network infrastructure to support it."

The BESS included the UK Government's increased ambition for offshore wind of 50GW by 2030, up from its previous 40GW target. Around 11GW of this target will be met from new offshore wind in Scottish waters granted seabed leases in January 2022 by Crown Estate Scotland through the ScotWind leasing round[4].



‘Beyond 2030’ - the next phase of strategic transmission investment

Scotland’s renewable energy potential, particularly offshore wind, extends well beyond the 2030 targets set by the UK and Scottish Governments. The scale of the ScotWind leasing round, Innovation and Targeted Oil and Gas projects and future offshore wind development means that much of Scotland’s new generation capacity will connect in the early to mid-2030s and beyond.

The independent system operator’s strategic planning processes have identified the need for a further phase of major transmission reinforcements in the 2030s. These “Beyond 2030” projects are required to:

- **accommodate additional offshore wind and other low-carbon generation**
- **reinforce key north–south and east–west transmission corridors**
- **support the growth of hydrogen production and industrial electrification**
- **maintain security of supply as the energy system evolves**
- **replace and modernise life expired network assets**

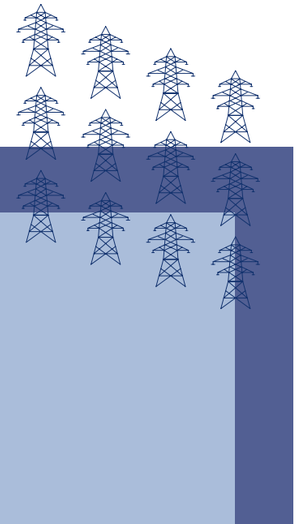
Ofgem has already approved early regulatory funding for several of these reinforcements, enabling SSEN Transmission to progress development, engagement and environmental assessment work.

Strategic network planning

To enable delivery of Government ambitions for offshore wind, onshore renewables and wider electrification, the NESO is responsible for coordinating electricity transmission system planning across GB.

This includes identifying the onshore and offshore transmission infrastructure required to connect and transport low-carbon generation to areas of demand. Strategic planning outputs have confirmed the need for a wide range of SSEN Transmission’s infrastructure investments, including both near-term reinforcements and “Beyond 2030” projects.

The NESO’s assessments consider technology choices, including a combination of overhead lines, underground cables and subsea links. These plans have been endorsed by the UK and Scottish Governments as meeting the requirements of the Offshore Transmission Network Review.



The National Energy System Operator (NESO) Beyond 2030

“Britain’s electricity needs are set to rise substantially (by up to nearly 65%) by 2035, as our everyday lives become more digitally intertwined and we move towards more electrified heat and transport options. Coupled with this, the UK Government have set an ambition to have a fully de-carbonised electricity system by 2035. This means producing more electricity and transporting it in a smarter, cheaper, and greener way.

“The current electricity grid is reaching its capacity and is unable to transport much more electricity without reinforcing the network.

“Investment in renewable energy generation has exceeded investment in transmission capacity over the past decade, resulting in bottlenecks on the electricity network. Because of these bottlenecks, as the system operator, we sometimes have to ask wind farms to switch off to prevent the grid becoming overloaded – wasting cheap, sustainable, homegrown wind power.

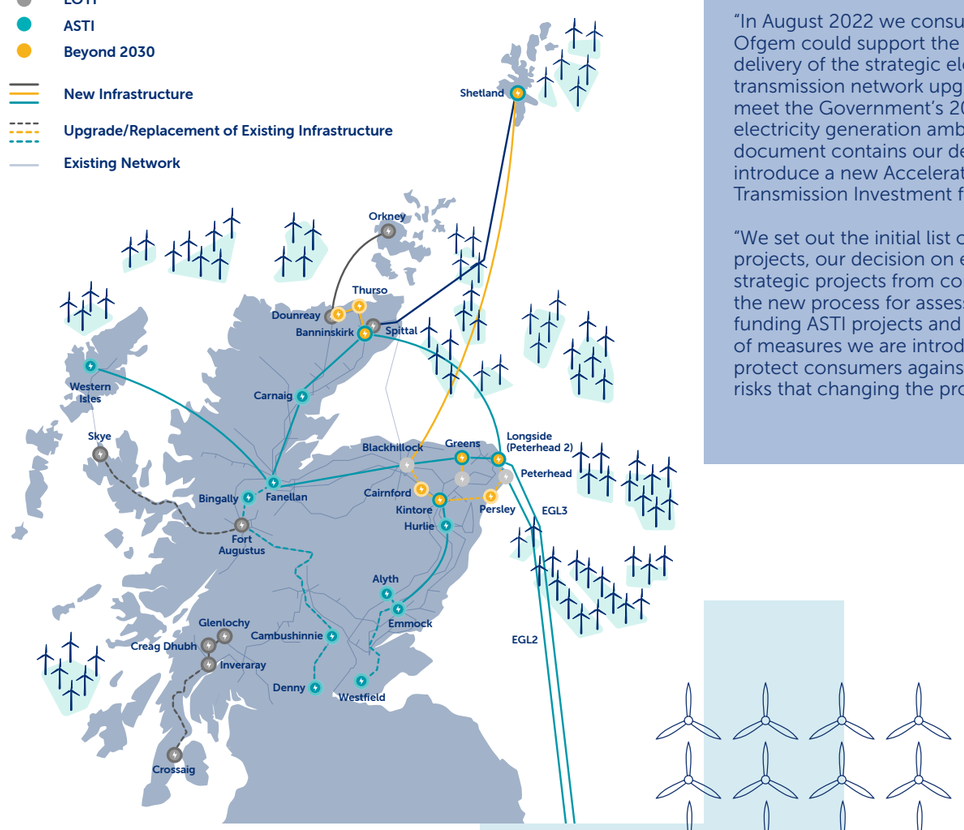
“To facilitate further offshore wind capacity off the North East of Scotland, this plan has identified that it is necessary to further strengthen the network in the area. This will require additional, high-capacity pylon routes to transport power from the coast to the existing transmission corridors.”

Accelerated Strategic Transmission Investment (ASTI)

Following publication of these strategic plans, the independent GB energy regulator, Ofgem, approved the need for a suite of strategic transmission projects through its ASTI framework. This decision confirmed the regulatory need for SSEN Transmission’s near-term reinforcements and set out the framework under which they will be taken forward.

Ofgem has since approved further regulatory funding for the next phase of “Beyond 2030” transmission infrastructure, enabling SSEN Transmission to progress development and engagement on new, upgraded and replacement projects required in the early 2030s.

PATHWAY TO 2030 & BEYOND



Ofgem Decision on accelerating onshore electricity transmission investment

“The British Energy Security Strategy set out the Government’s ambition to connect up to 50GW of offshore generation to the electricity network by 2030. Facilitating this ambition will require significant reinforcements to the onshore electricity transmission network and a change to the current regulatory framework in order to accelerate delivery of large projects.

“In August 2022 we consulted on how Ofgem could support the accelerated delivery of the strategic electricity transmission network upgrades needed to meet the Government’s 2030 renewable electricity generation ambitions. This document contains our decision to introduce a new Accelerated Strategic Transmission Investment framework.

“We set out the initial list of ASTI projects, our decision on exempting strategic projects from competition, the new process for assessing and funding ASTI projects and the range of measures we are introducing to protect consumers against additional risks that changing the process brings.”

Further background to GB electricity transmission network system planning processes

This section explains the system planning processes overseen by the NESO, which establish the need for new transmission infrastructure. These processes involve extensive analysis and power system studies to identify both the drivers for network investment and the specific reinforcements required.

Future Energy Scenarios (FES)

The NESO's annual FES publication sets out credible pathways for future electricity generation and demand across GB. These scenarios consider all major energy technologies and provide the foundation for network planning, including needs emerging beyond 2030.

Electricity Ten Year Statement (ETYS)

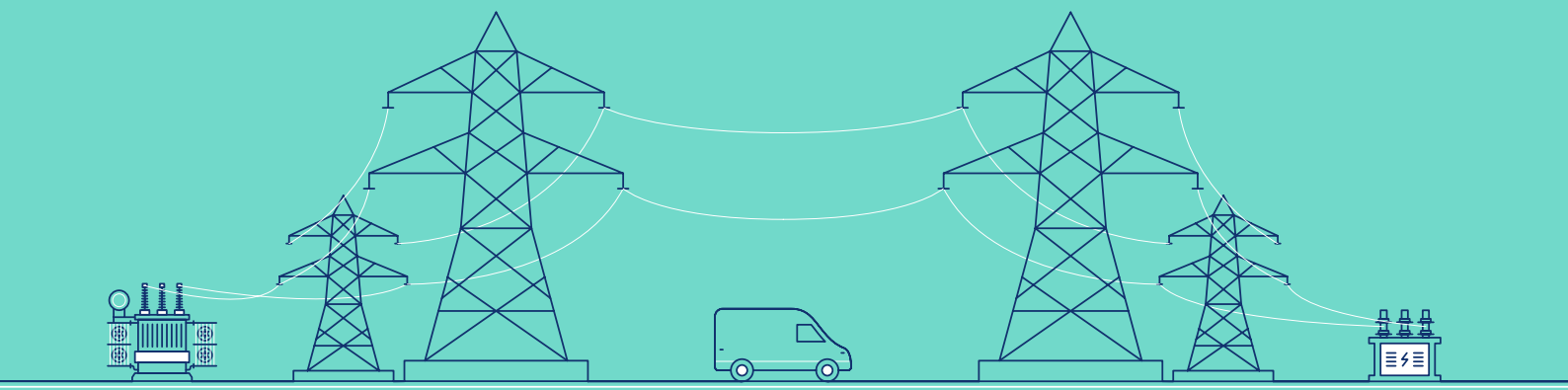
Outputs from the FES publication are assessed against the existing transmission network, including planned reinforcements, to identify constraints on predefined system boundaries. This ETYS process identifies where bottlenecks exist that would prevent the transportation of electricity to meet local and wider demand.

Where bottlenecks occur, the NESO must intervene to balance the system, with associated costs ultimately passed to consumers.

Centralised Strategic Network Plan (CSNP)

To address these constraints, the NESO evaluates a range of potential network reinforcements submitted by Transmission Operators. This process – transitioning from the former Network Options Assessment (NOA) to the new CSNP – assesses options on a GB-wide basis to determine which reinforcements are required and when.

The CSNP includes both near-term and "Beyond 2030" reinforcements and has informed the strategic network upgrades now being progressed by SSEN Transmission.



Conclusion

In conclusion, the need for SSEN Transmission's electricity transmission infrastructure is underpinned by UK and Scottish Government energy policies and targets.

The independent NESO has assessed the need for these projects and recommended that they proceed, including the proposed technology choices, through its strategic network planning processes. Ofgem has approved the regulatory need for these reinforcements through the ASTI framework and subsequent funding decisions.

For SSEN Transmission, the need for this infrastructure is clear. Our focus now is to develop and deliver this critical national infrastructure as sensitively as possible, minimising and mitigating community and environmental impacts while maximising local and national economic opportunities and jobs.