Scottish & Southern Electricity Networks

TRANSMISSION

Innovative Solutions

DC Networks

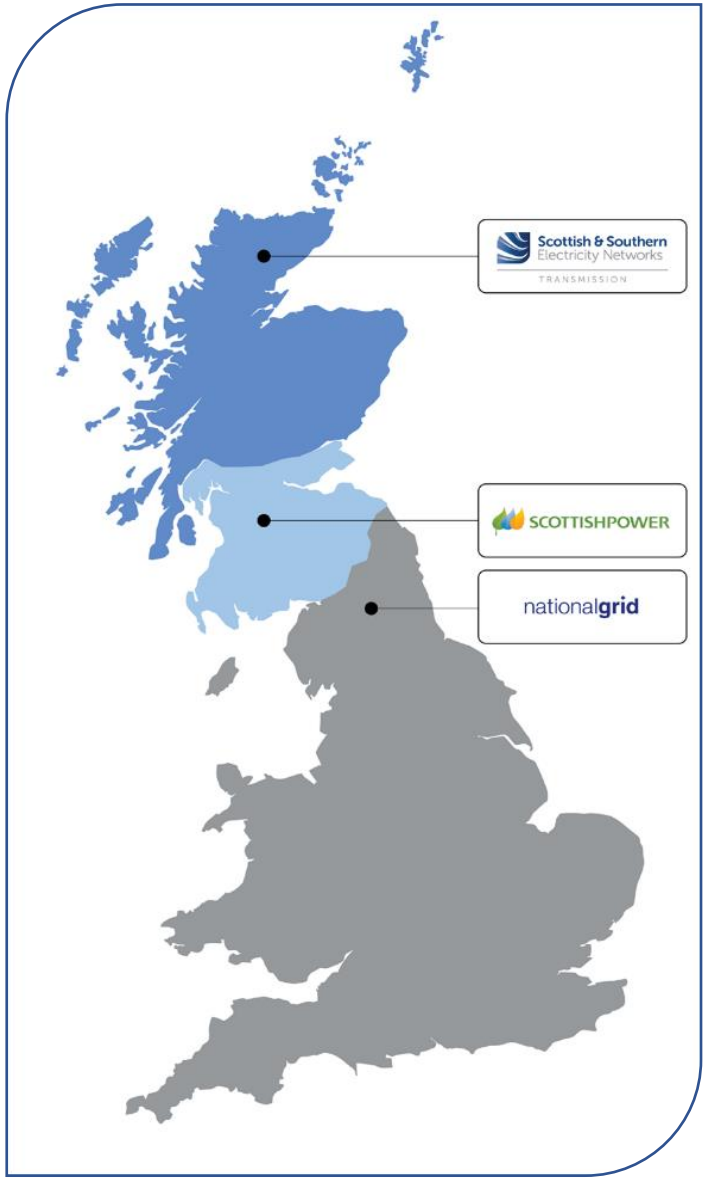
Who we are

SSEN Transmission is responsible for the electricity transmission network in the north of Scotland, maintaining and investing in the high voltage 132kV, 220kV, 275kV, and 400kV electricity transmission network.

Our network consists of:

- Underground and Subsea Cables
- Overhead Lines – Wooden Poles & Steel Towers
- Electricity substations

It extends over a quarter of the UK's landmass, crossing some of the most challenging terrain. Transporting power over long distances for onward distribution.



Energy System Change

In 2019, the UK Government set an ambitious target to achieve net zero greenhouse gas emissions by 2050

Achieving this will require a **significant shift** in the way we generate, transport and consume energy in the UK

A critical step will be the phasing out of high pollution, non-renewable types of electricity generation, such as gas-fired power stations

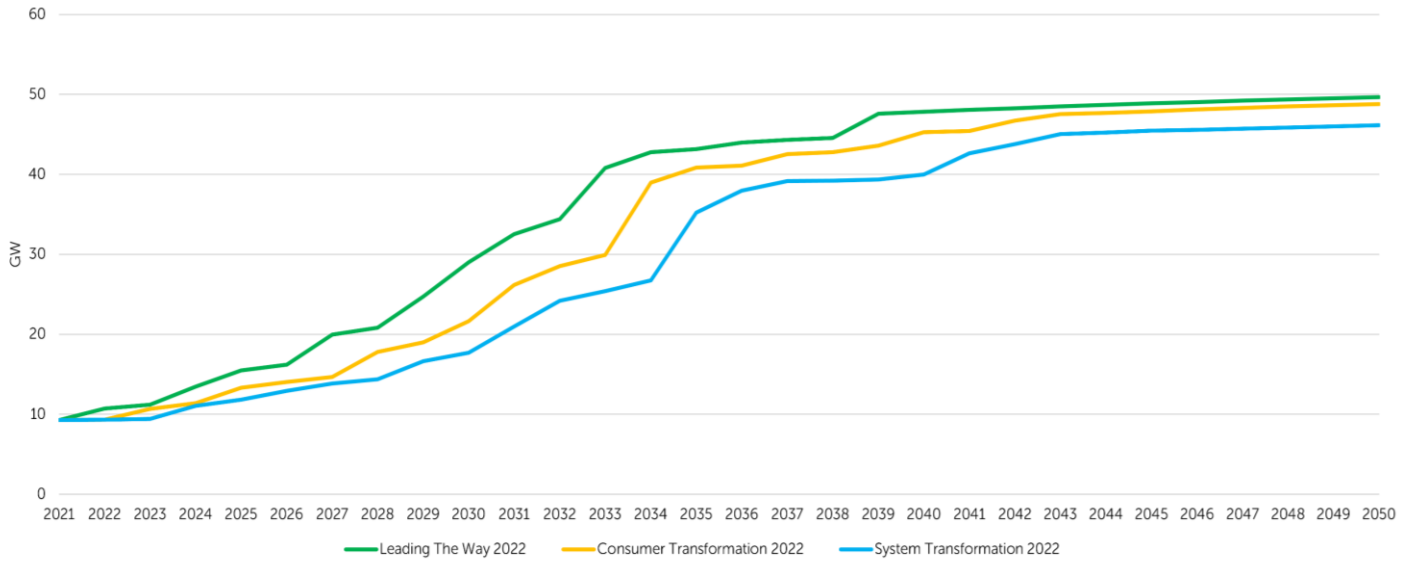
The energy system needs to transition to put in place, new, clean low-carbon sources of energy like wind and solar

Accommodating this means the UK power system needs significant **modernisation** and investment to deliver the necessary reinforcements to support this growth

Pathway to Net Zero

As part of the Energy System Operators' (ESO) Future Energy Scenarios, a projection has been given that clearly illustrates the scale of growth needed for the energy sector to meet the government's Net Zero targets.

FES 2022 Total Generation: SSEN Transmission (SHET) Area Only



Source: Future Scenarios 2022 | National Grid ESO

Scottish Hydro-Electric Transmission (SHET) is part of SSE plc and operates under licence as SSEN Transmission

The SSEN Transmission network area is projected to generate 10% of the UK's overall renewable energy required for Net Zero, with only 2% being consumed in Scotland.

DC Networks

To achieve this, significant investment is being made in High Voltage Direct Current (HVDC) technology.

- New capabilities to connect larger volumes of energy are replacing conventional AC Transmission
- HVDC is an efficient way of transmitting power across very long distances, especially for subsea
- Will be a critical part of UK infrastructure for moving wind power from the North of Scotland to demand centres in the south

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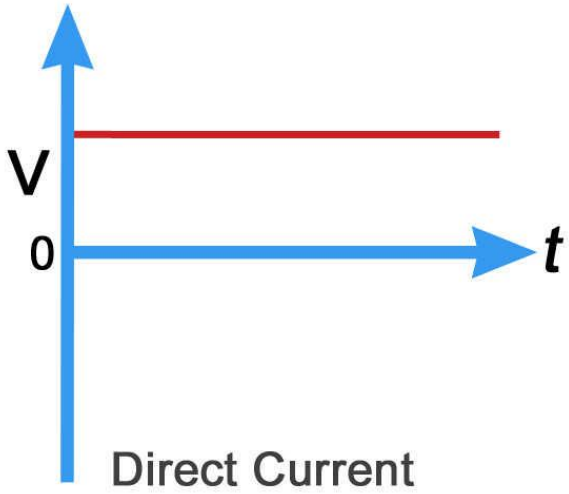
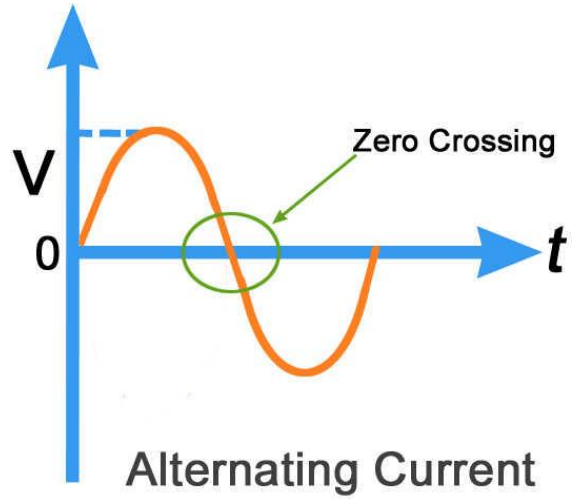
The Challenge

- Circuit Breakers (CBs) are a way of isolating parts of the system in the event of a fault
- Prevents the need for taking large parts of the system down, however;
- Breaking a DC current is more technically challenging because, unlike AC transmission, there is no ‘Zero Crossing
- Large amounts of effort are required to break HVDC circuits, and sophisticated arrangements are necessary to provide full system protection.
- So costly point-to-point connections are currently used, where DC is converted back to AC



Direct Current



Alternating Current

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Our Innovation

Funded through Ofgem's Strategic Innovation Fund, our Network DC project aims to explore the concept of deploying the first DC Circuit Breaker (DCCB) on the GB transmission system

Network DC

- DCCBs are proposed in previous work as a potential means for **enabling a streamlined HVDC network**
- As an emerging innovation, DCCBs have **a high level of uncertainty** around them, leading to hesitancy
- How they can be **integrated into the GB system** is not yet defined
- The **size of the benefits and costs** have not been quantified for the GB system
- There is **no defined process** for how a DCCB could be designed, procured and implemented in the UK

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Thank You

Contact Us

Would you like to know more?

If you are interested to learn more about innovation at SSEN Transmission, you can reach the Innovation Team direct at the following email address:

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