

November 2020

# Summary of the Electricity Ten Year Statement

#ETYS2020

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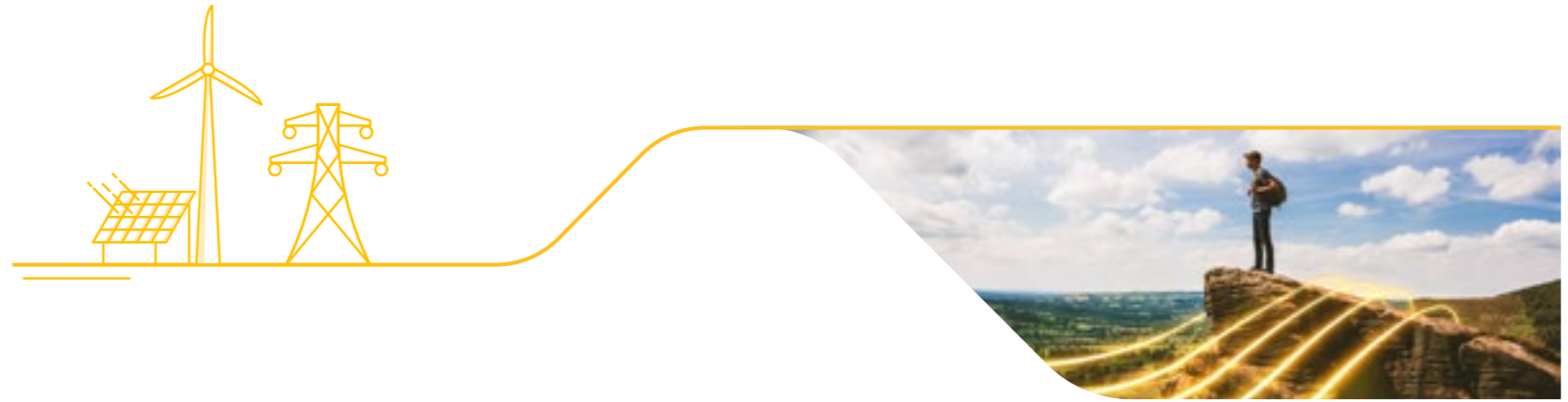
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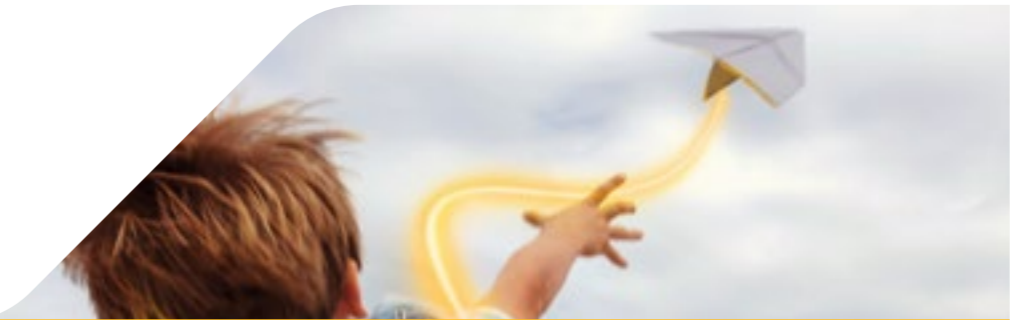
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# We are the Electricity System Operator (ESO)

Electricity underpins our modern lives and National Grid ESO exists to make sure everyone gets access to a safe, reliable and affordable supply.

We bring energy to life.

## What is the Electricity Ten Year Statement (ETYS)?

The ETYS is an annual publication with the ESO's view of future transmission requirements and the capability of Great Britain's National Electricity Transmission System (NETS) for the next ten years.

This is a significant part of our annual network planning process.

This document summarises the main findings from our analysis for the ETYS and the other areas being developed that you can get involved in. More detailed information is available [online](#).



# Our ambition

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To enable the transformation to a sustainable energy system and ensure the delivery of reliable, affordable energy for all consumers, by 2025, we aim to have:



**An electricity system  
that can operate  
carbon free**



**A whole system  
strategy that supports  
net zero by 2050**



**Competition  
everywhere**



**The ESO is  
a trusted  
partner**

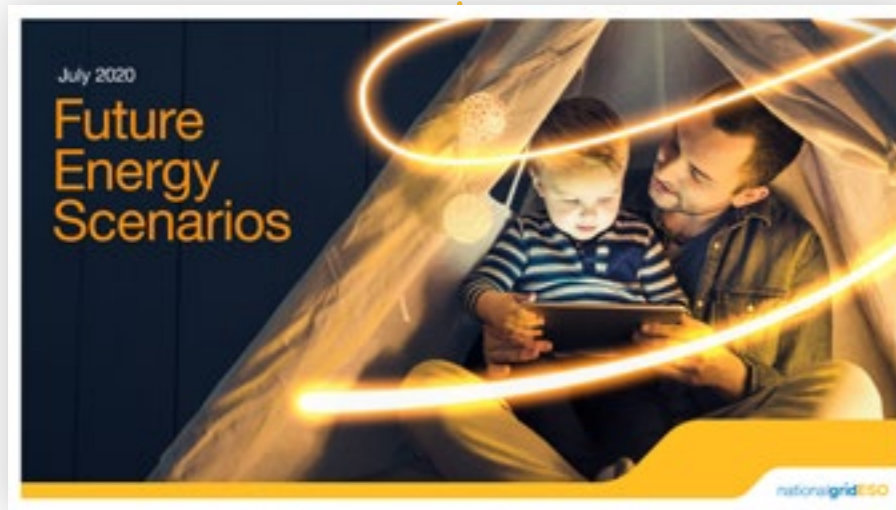
This means we need to fundamentally change how our system is designed to operate. We are working with the industry to integrate newer technologies across the system and increase demand-side participation.

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# About the ETYS

The ETYS sits at the heart of our network planning process. Using the data from our **Future Energy Scenarios (FES)**, we identify the points on the transmission network where more network transfer capacity is needed to help us continue to deliver electricity reliably.

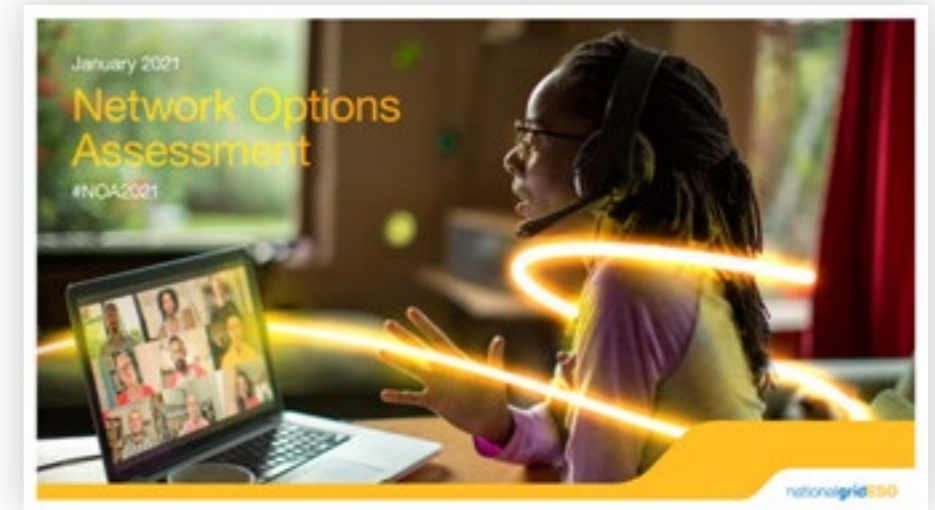
Once we know what the network requirements are, we invite stakeholders to propose solutions that will be needed to meet these requirements. These proposals are then assessed through our **Network Options Assessment (NOA)** process, where the most economic and efficient solution is given a recommendation to proceed, and others told to hold or stop.



**FES** July 2020



**ETYS** November 2020



**NOA** January 2021

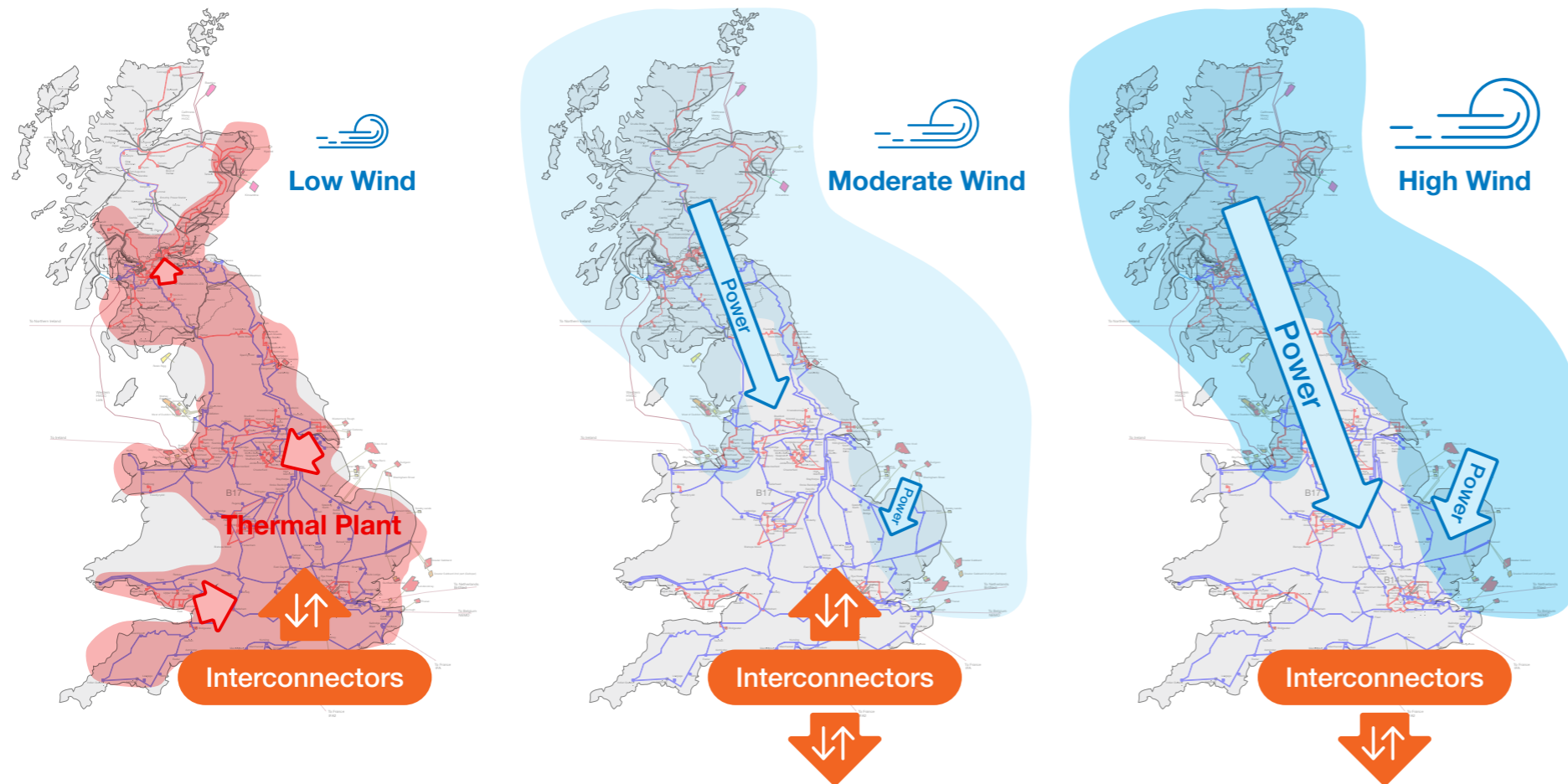
An aerial photograph of a high-voltage electricity pylon (tower) situated in a vast, green agricultural field. The pylon is a complex lattice structure made of metal, with several power lines extending from it across the landscape. The field is divided into neat, rectangular plots, and the overall scene is bathed in bright, natural light, suggesting a clear day.

# Key messages

- 1 - Power flows will become more variable with higher peaks P08
- 2 - Growing need for network reinforcements in a number of regions P09
- 3 - Network constraints expected to rise if no action is taken P10

# Key message 1

## Power flows will become more variable with higher peaks.



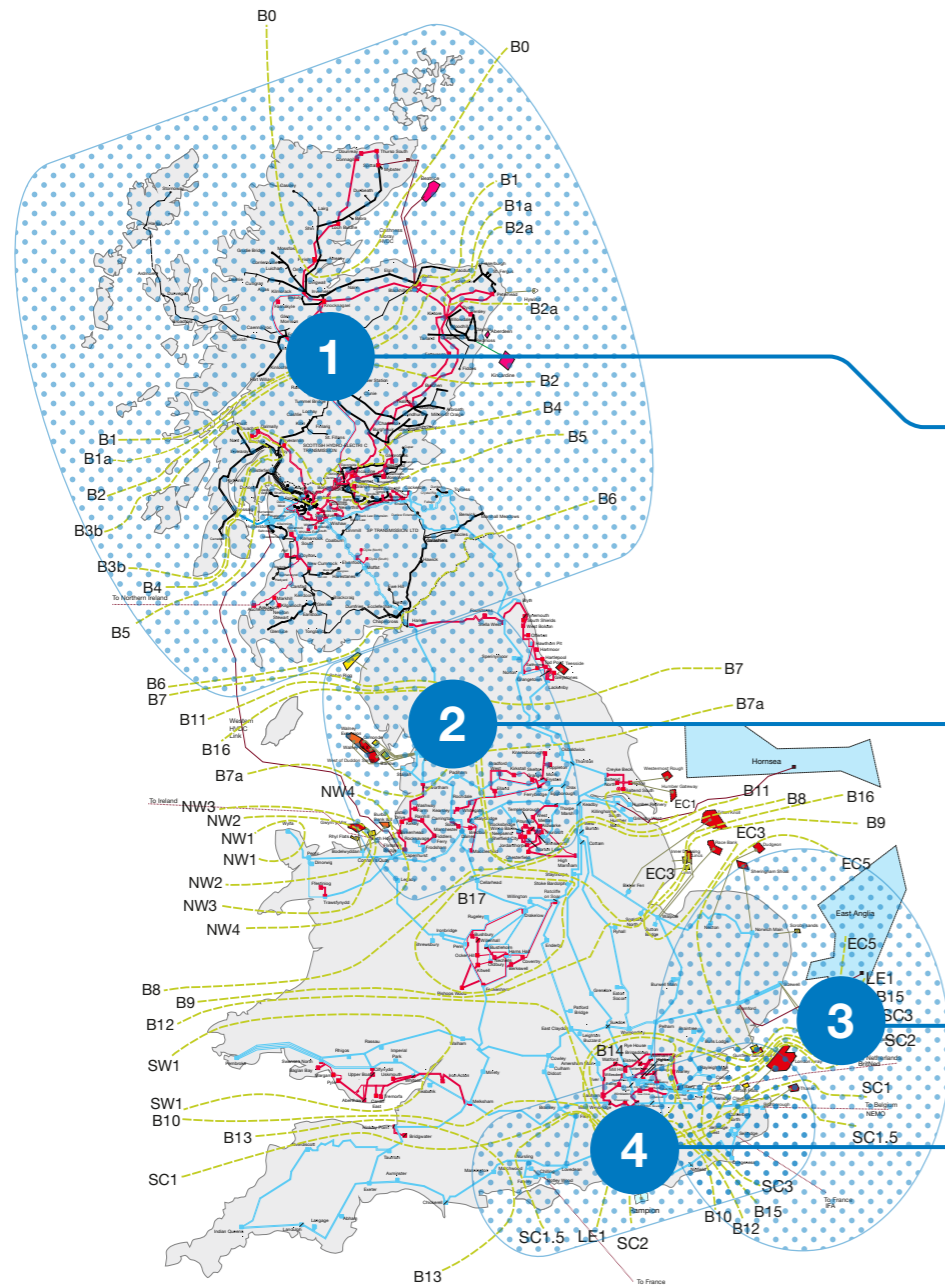
Over the next 10 years, wind generation is forecasted to increase in the north of the country. The demand is predominantly located in the south of the country leading to high north-south power flows with high variability.

Interconnectors connect us to other European markets and either import or export power. As these flows change, it can require further transmission capability on the system especially when interconnectors export to Europe during significant wind output.



## Key message 2

**In the move to net zero over the next decade, the GB Electricity Transmission System will face growing needs in a number of regions.**



Increasing quantities of wind generation connected across the Scottish networks more than doubling the north-to-south transfer.

Additional 4GW of renewables expected compared to last year's scenarios resulting in a total of 18GW of required transfer by 2040.

A potential growth of over 6GW in low-carbon generation and interconnectors in the North of England combined with high Scottish generation, will increase transfer requirements in the Midlands.

25% increase in expected requirements compared to last year's scenarios.

10GW increase expected in generation coming from offshore wind on the east coast connecting to East Anglia, which will increase the need for reinforcement here.

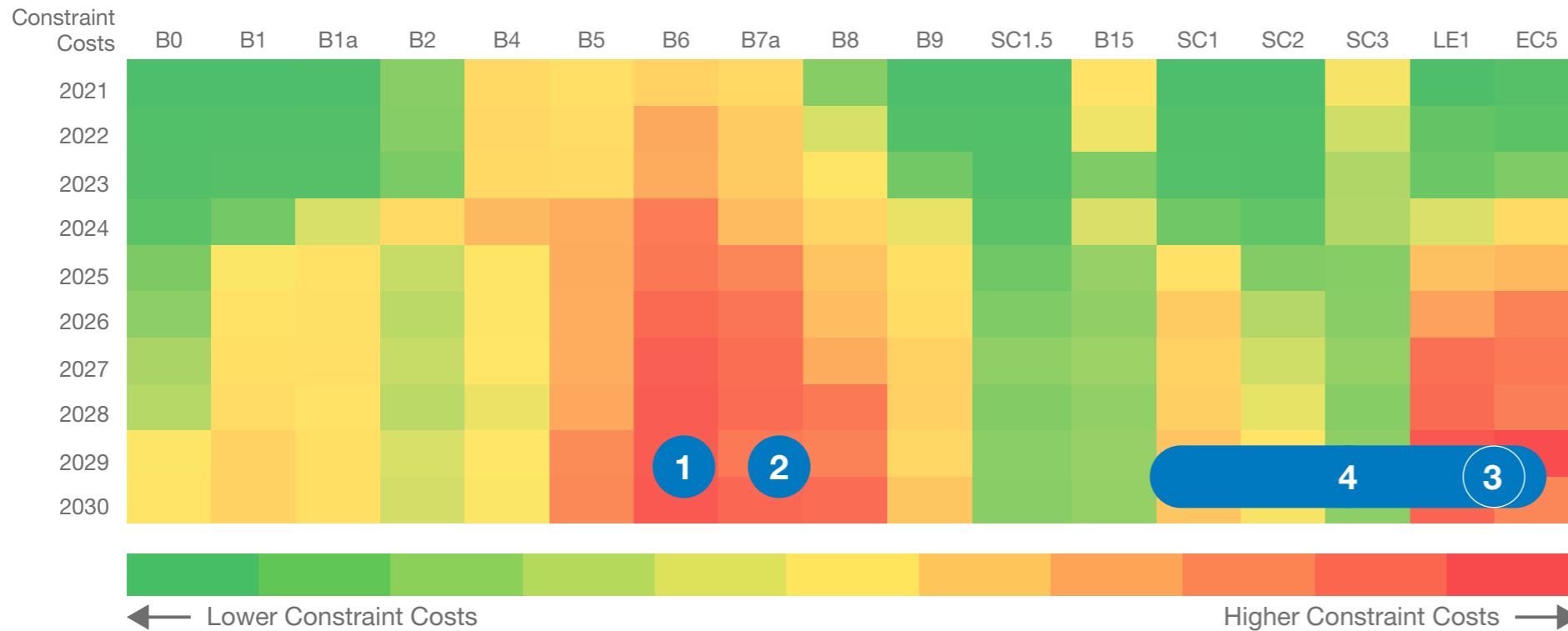
17% increase in expected generation between Two Degrees (FES 2019) and Leading the Way (FES 2020).

New interconnectors with Europe will place increased requirements on the transmission network.

London and Southern England need more reinforcement to enable future interconnection.

# Key message 3

**Constraint costs are expected to increase due to high flows across the transmission boundaries if no action is taken over the next ten years.**



The ETYS describes the network capability by looking at the maximum secured power transfer between two regions or the power transfer across a boundary.

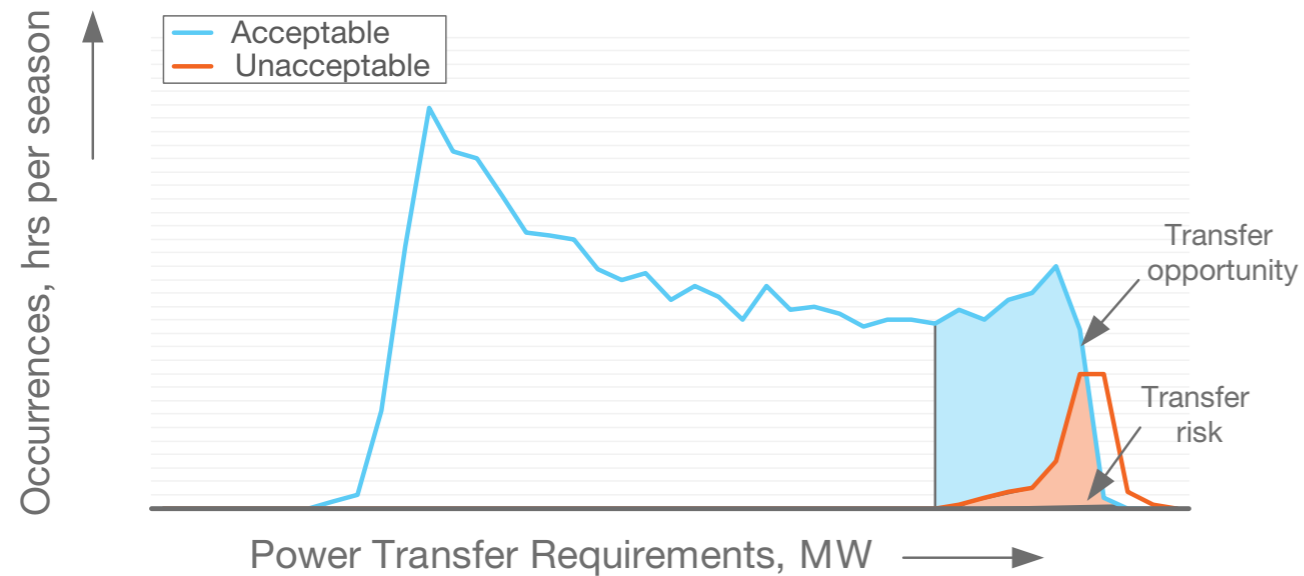
To operate the system safely, we must make sure that the power flow across the boundary does not exceed the capability of the system between the two regions. To prevent this, we have to take actions to constrain generation - which can incur significant costs.

The heatmap shows that if no reinforcements are made to the system (i.e. the system is the same as it is today, over the next 10 years), the network boundaries defined in the ETYS would lead to incurring significant network constraint costs due to the high flows from the increased generation capacity.

# Improving our analysis

## Our new analysis techniques enable us to look at more detailed year-round thermal requirements.

The power transfer capability across the network throughout the year is constantly changing and we are always trying to maximize the capability of the transmission network. As the ESO, we securely operate the transmission network.



The graph shows the number of scenarios throughout the year for a particular power transfer level across the boundary showing how many scenarios had no overloads, so acceptable (blue), and how many scenarios had at least 1 asset overloading which is unacceptable (orange).

Defining the network capability is complex. The overlap in the graph shows that a particular level of power transfer across a boundary could be either “acceptable” or “unacceptable” which is dependent on the generation and demand scenario. Our new analysis techniques allow us to model this complexity and calculate the likelihood and impact of different network conditions throughout the course of a year.

We can also assess solutions across year-round conditions to help identify an optimal solution which extends our traditional analysis and opens the opportunity for wider range of network and non-network solutions.

We will be learning from these techniques and investigating how to integrate the analysis within the ETYS and NOA processes and how it could evolve to capture both thermal and voltage issues.



about the Probabilistic Approach in Chapter 4 of the ETYS

# Future developments

The future development of the ETYS and NOA processes will be shaped by the NOA pathfinder projects which aim to resolve additional challenges related to thermal, high voltage and stability constraints.

We have been learning from our pathfinders and are investigating expanding the range of system needs beyond bulk power transfer and facilitating competition in our planning process. There are currently three pathfinders:

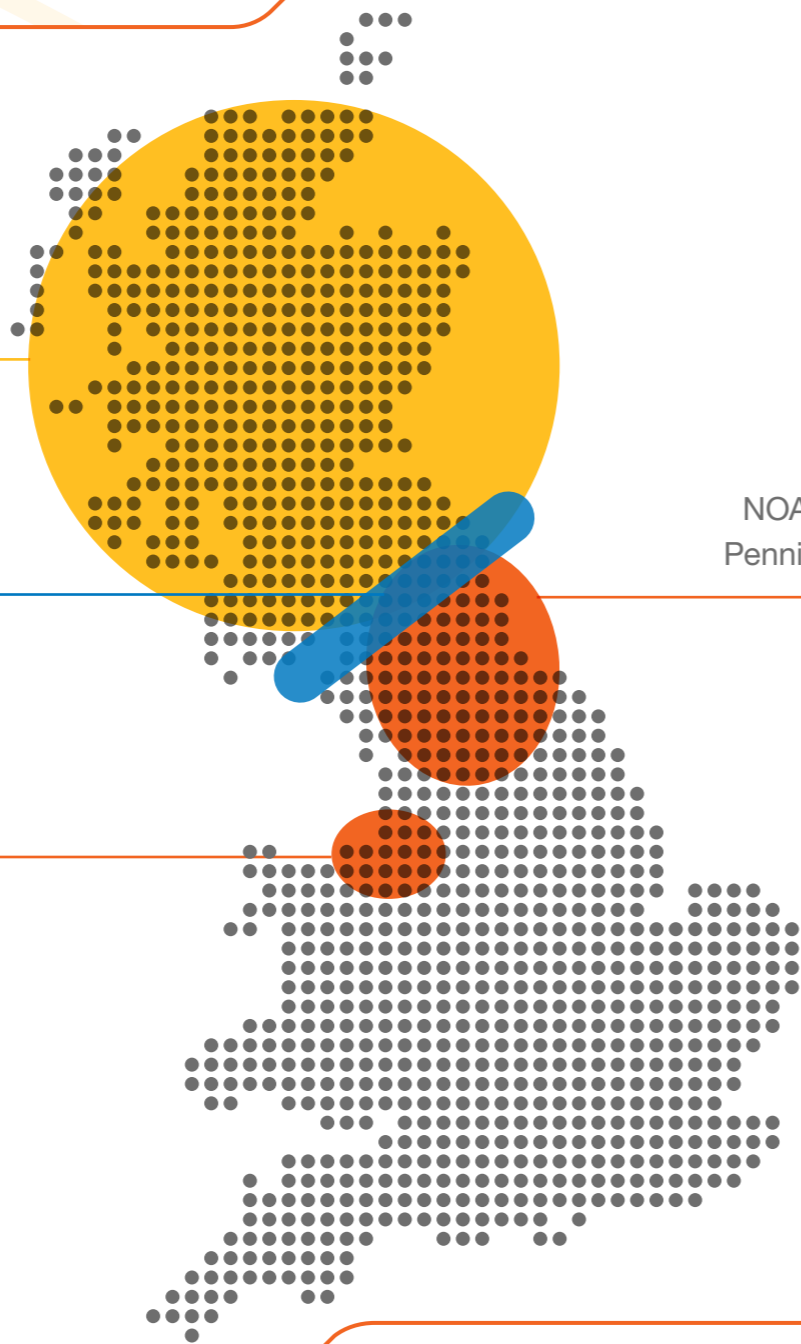
Voltage Pathfinder	Stability Pathfinder	Constraint Management Pathfinder
Aims to find solutions to resolve regional high voltage issues.	Aims to address our immediate needs of national inertia and deliver local short circuit level needs in Scotland.	Aims to resolve network constraint issues and lower balancing costs.

NOA Stability Pathfinder  
Phase 2 (Scotland)

NOA Constraint  
Management

NOA Mersey Voltage  
Pathfinder

NOA Stability Pathfinder  
Phase 1 GB wide



NOA North of England and  
Pennines Voltage Pathfinder

## You can get involved in shaping the pathfinders by:

- Engaging with us on the direction of the pathfinders. You can do this by emailing [box.networkdevelopment.roadmap@nationalgrideso.com](mailto:box.networkdevelopment.roadmap@nationalgrideso.com)
- Joining in any potential Request for Information (RFI), expression of Interests (EOI) and tenders with your solutions to the problems being considered.
- You can find out about the progress of the pathfinders by signing up to the mailing list [here](#).



about the Pathfinders in  
Chapter 5 of the ETYS

# Stakeholder feedback

**We would like to thank everyone who participated in the stakeholder survey in April 2020.**

We've used your views to make improvements to the ETYS so that it is easier for all our stakeholders to understand future electricity network challenges.

Other improvements we're investigating include;

<b>Improvements to schematic and geographic maps of the transmission system</b>	<b>Enhancing the probabilistic analysis</b>	<b>More detail added to our Technical Appendices</b>
<b>We're investigating an interactive map</b>	<b>We have added the ability to consider post fault actions to our analysis</b>	<b>We are working with the TOs and investigating making additional information available</b>

If you would like to receive updates about the ETYS and the NOA, please sign-up to our mailing list here. What do you think about the ETYS 2020? Let us know!

Please email: [etys@nationalgrideso.com](mailto:etys@nationalgrideso.com)

# How can I get involved?

## You can get involved by:

- Supporting the **NOA Pathfinders** and helping solve network issues
- **Sign up** to the Network Development newsletter to stay up to date and find out about how you can get more involved

If you would like to learn more or get involved, please email: [etys@nationalgrideso.com](mailto:etys@nationalgrideso.com)

Or you can read the full version of the **ETYS** to find out more.



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