Electricity
Transmission

# North East: Future Network Blueprint

nationalgrid

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# Executive summary
## Purpose

### Our whole system vision
To collaborate with our stakeholders to optimally plan, develop, and operate the transmission network, protect vulnerable customers, and deliver whole system benefits while ensuring the delivery of the energy transition by 2050.

**In alignment with our national Business Plan, these Future Network Blueprints (FNB) serve to deliver a strategy centred on our whole system vision*, while addressing the unique needs and opportunities within each area. By focusing on national and regional differences and leveraging local opportunities, whilst minimising local impact, we aim to succeed in delivering the grid that is needed by all in the future.**

**The circumstances in which we build and operate our network are changing rapidly, driven by:**

- greater reliance on electricity across various sectors to achieve a decarbonised society and economy
- rising numbers and diversity of customers requiring connections at specific locations
- need for expansive network development to address the requirements of multiple sites and circuits within a region, rather than isolated solutions
- increasing complexity of the network with more variable power flows.

We recognise our FNB 'regions' do not fully reflect the geographic or administrative borders that one might expect to see. This is because in defining these regions we have also had to consider electrical factors such as power transfers and access for planned outages. However we have aligned to Distribution Network Operator (DNO) and local authority boundaries where feasible to do so.

**'Whole system' – A collaborative and integrated approach with networks and other stakeholders.**

More information can be found in our short video.

* https://www.nationalgrid.com/electricity-transmission/our-future-network/our-whole-system-approach

**These changes require a new approach to network development, which is where our Future Network Blueprints play a crucial role. The strategy outlined in these documents detail our process and projected outcomes, ensuring readiness for future requirements.**

**"Our Future Network Blueprints embed a forward-thinking approach, offering a pathway to enhance efficiency, boost collaboration, and improve visibility for whole system working at the local level."**

Ben Haggerty
Head of Whole Systems,
National Grid Electricity Transmission

# Executive summary
# Our future network blueprint strategy

In developing our Future Network Blueprints, we used the following process:

## Step 1
Information gathering

### Regional context
Review the region as a whole, understanding broader interactions beyond the network to ensure alignment and identify interdependencies.

### Current network view
Collect key data on the current NGET network in each region to understand the baseline for future development.

### Design the right network
We place stakeholders at the heart of our network planning process. This approach helps us navigate uncertainties and ensures we have a comprehensive regional understanding of network needs.

## Step 2
Insights and analysis

### Stakeholder engagement
Enhance our understanding along the way through ongoing engagement and partnerships, enabling us to better foresee forecasts, identify risks and explore opportunities.

### Connections
Provide perspective on customer demand and generation trends, helping us forecast future service requirements and growth areas.

### Safe and reliable network
Provide critical asset health, maintenance, and operational performance data to ensure the blueprint delivers a dependable network throughout the journey to Net Zero.

### Strategic infrastructure
Align with government initiatives and the National Energy System Operator (NESO) to provide input on large-scale projects, shaping long-term infrastructure investments.

## Step 3
Develop strategic options

### 2050 backwards
Step back assessment to ensure we are being ambitious enough to meet our 2050 commitments.

### Network design principles
Check we are applying the three NGET Design Principles: are we enabling investments; do it once, do it right; and whole system network planning.

### Network compliance
Ensure all projects meet with network security and quality of supply standards [National Electricity Transmission System (NETS) Security and Quality of Supply Standard (SQSS)] to maintain secure and reliable supplies.

# Executive summary
## Key regional highlights

**18**

substation investments; 15 new and 3 major interventions

**£8.6bn**

**of investment**

to maintain, upgrade and develop our network in T3

**13 GW**

**demand**

contracted to connect*; **1.6 GVA** of additional capacity expected to be installed in T3

**114 GW**

**generation**

contracted to connect*; **9.9 GW** estimated to connect in T3

**831 km**

**of overhead line**

reconductoring planned within T3, equating to 25% of the region

**24**

strategic infrastructure projects within the region

*Including T3 and beyond

# Information gathering

## In this section

# North East
# Regional context

The North East transmission network region, encompasses Northumberland, Tyne and Wear, County Durham, Cleveland, North Yorkshire, West Yorkshire, South Yorkshire, Humberside and parts of Lincolnshire. The North East and Yorkshire region has a strong industrial heritage, with areas like Teesside, South Yorkshire, and West Yorkshire historically known for steel production, chemical industries and manufacturing. These industries have high energy demands, necessitating a robust transmission network.

The transition from heavy industry to more diversified economies has influenced the energy landscape, with a shift towards service industries, advanced manufacturing, and tech sectors, which have different energy needs. Heavy industries in these regions are expected to undergo significant decarbonisation by 2040, using technologies like carbon capture and storage (CCS), electrification, and hydrogen fuel switching. This aligns with the UK's target to reduce greenhouse gas emissions by 81% by 2035 compared to 1990 levels, as part of its broader goal to achieve net zero emissions by 2050.

The North Sea, adjacent to the North East, Yorkshire and Humberside, is a key location for offshore wind energy. Major wind farms like Hornsea, Dogger Bank, and Teesside are either operational or under development. These wind farms feed directly into the North East region's transmission network. Upgrading current infrastructure and building new, allow this renewable power to be transported to where it is required.

The Humber and Teesside are pivotal in the UK's hydrogen strategy, aiming to produce 10 GW of low-carbon hydrogen by 2030, with large-scale projects like the Humber Zero initiative. These areas are set to be major centres for both green (from renewable energy) and blue (from natural gas with CCS) hydrogen production.

Carbon capture and storage (CCS) technology is essential for decarbonising the heavy industries in the Humber and Teesside areas. The UK government aims to capture and store 20-30 million tonnes of $CO_2$ per year by 2030, with these regions hosting key infrastructure like the East Coast Cluster, which will transport and store $CO_2$ under the North Sea.

Major cities in this region, including Leeds, Sheffield, Newcastle, Hull, and York, are significant population and economic centres, driving substantial electricity demand. Urban growth and modernisation efforts, such as the development of smart cities, further impact the electricity distribution and transmission network. Working alongside the electricity distribution networks we know things like the transport network in these urban areas is also becoming more electrified, with increasing use of electric vehicles (EVs), necessitating additional infrastructure to support EV charging.

## Offshore wind

The North East and Yorkshire, is a key location for offshore wind energy

# North East
# Current network view

## Network overview

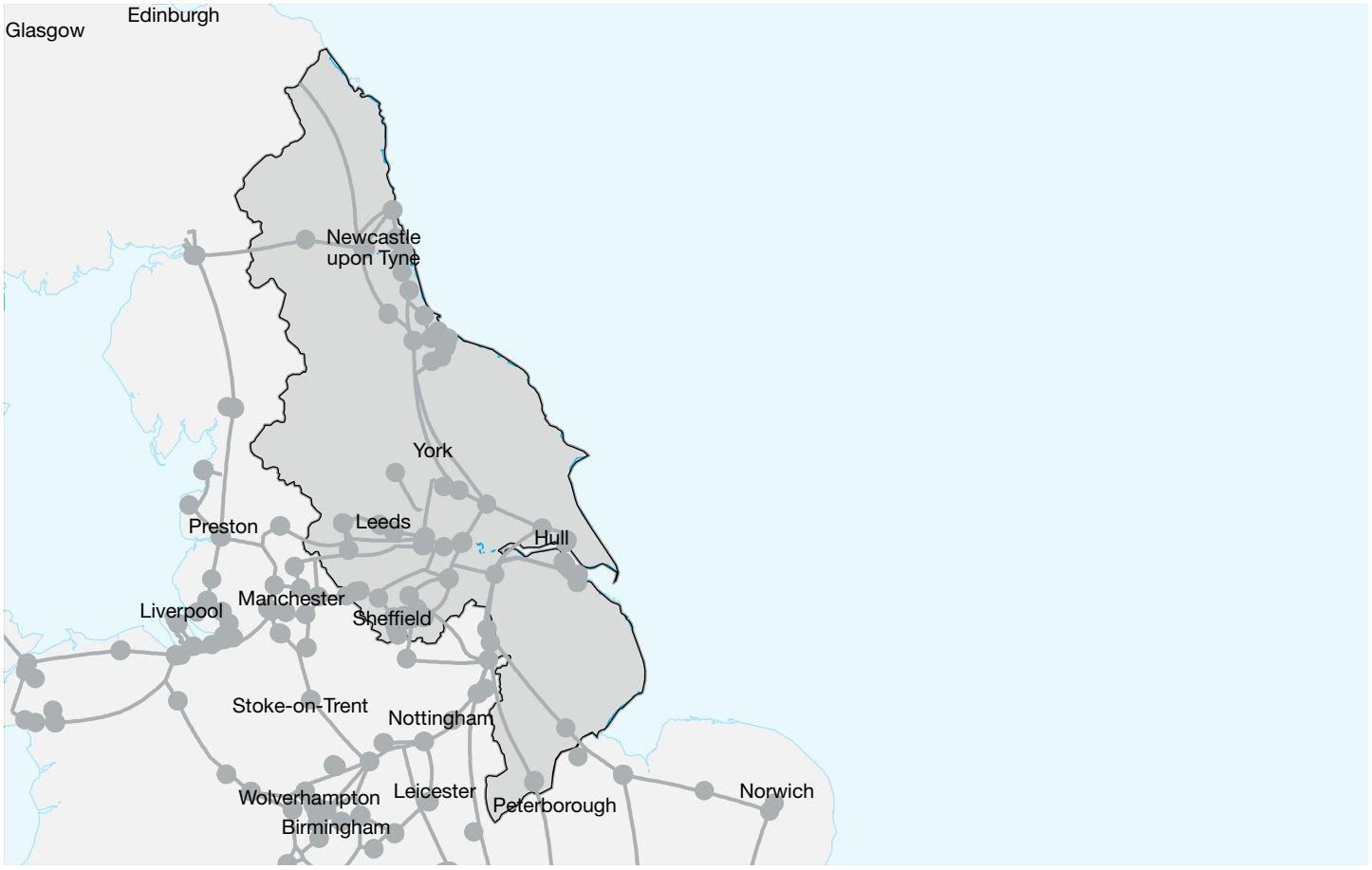
The North East 400 kV and 275 kV transmission network is principally designed for transfer of North-to-South power flows.

At present, the network supports the transfer of renewable energy from Scotland while integrating the historically high levels of fossil-fuel-based generation from power stations such as Teesside,  Drax and Ferrybridge as it channels electricity south.

This part of the network now has significant wind generation connected, and during periods of high wind, excess power naturally flows through the Midlands and towards the South East, potentially exporting via the sub-sea interconnectors. Interconnectors are high voltage cables that are used to connect the electricity systems of neighbouring countries. They allow excess power to be traded between different countries providing valuable export capability for excess renewables.

The North East is home to key UK industries, including manufacturing, steel production, automotive, and historically, shipbuilding—all of which consume large amounts of power.

The increasing volume of intermittent generation and additional interconnectors in the region will create dynamic network challenges. Electricity demand is expected to grow over the next 20 years as the North East continues its decarbonisation journey. Balancing demand growth with increasing embedded generation from things like solar power will be a key focus for both the transmission and distribution networks. It will provide opportunity to optimise how we utilise existing infrastructure.



# Design the right network
# Stakeholders

## Context

As we embark on our RIIO T3 journey, we recognise that the landscape has evolved significantly since our last price control period. The UK Government's ambitious targets for a decarbonised power system, coupled with the devolved Government powers now enabling regional energy decarbonisation planning, necessitate a fresh, collaborative, and holistic approach.

We made a commitment to place stakeholders at the centre of our network planning and listened to over 12,000 stakeholders representing all regions and stakeholder types.

This helped us in getting a balance of needs and priorities across all our stakeholder groups – from those impacted by the upgrade, those dependent on it (across each region) and those funding it (all consumers).

This insight formed our overarching ambition and created stakeholder design principles to initially assess the approach we took to each network blueprint, ensuring we had a fair and consistent approach to planning from the start.

This is our starting position, but we have also been forming partnerships with those representing the region to help inform and shape what we design and build locally.

This includes the new Regional Energy Strategic Planner (RESP) role set up by the NESO in which we have already started aligning and working with.

Local priorities and needs are crucial to our planning process, which is ongoing and continuously evolving.

**>12,000**

We have received feedback from >12,000 stakeholders as part of the listening phase of our price control engagement programme

# Design the right network
# Our ambitions

## Ambition A

**Deliver the grid of tomorrow, today**

**Deliver with urgency the Transmission Network needed for Great Britain's future growth and decarbonisation**

**A1:** Maintain world class levels of network performance and resilience, ensuring that the new network we build is designed to reflect future security and climate challenges

**A2:** Deliver the capacity our customers need now, looking holistically across multiple investment drivers to deliver at the pace and scale required to support the Government's ambition on growth and decarbonisation

**A3:** Future-proof our network with strategic capacity and flexibility for the longer term, using the network modeling capabilities we developed in RIIO-T2 to surface insights and inform strategic decisions

**A4:** Invest in the next generation of innovative technologies to make sure that we are planning and building a network that is ready for tomorrow

## Ambition B

**Do the right thing for consumers, communities and the environment**

**How we deliver is as important as what we deliver**

**B1:** Maximise the value we create by controlling our costs as our network grows, seek opportunities to create additional value for consumers

**B2:** Play a leading role in accelerating a net zero, nature positive future, including by reducing our own emissions and environmental impact

**B3:** Support vulnerable consumers and have a positive impact in our communities through our operations and construction, leaving a lasting legacy

**B4:** Represent the diverse communities we serve by maintaining our sector-leading record on workforce diversity and inclusion

## Ambition C

**Transform the way we work**

**Transform our capabilities to deliver for consumers**

**C1:** Transform our asset management, network development, and network operation capabilities to ensure we can deliver the step-up in work required during this period, and manage a larger, more complex, decarbonised network

**C2:** Grow our workforce capability by positioning National Grid as the best place to work in the electricity sector

**C3:** Put into practice new supply chain strategies to secure the long-term capacity we need

**C4:** Leverage digital and data capabilities to transform how we work with our stakeholders to maintain and operate our network

# Insight and analysis


## In this section

# Insight and analysis
## Our approach

To develop a comprehensive and informed strategic plan, we engaged in a process of data collection and analysis, leveraging insights from both internal departments and external stakeholders. This involved a combination of analysing technical data as well as incorporating feedback from engagement workshops, which ensured a balanced and holistic approach.

The combination of external feedback and internal insights, allowed us to create a blueprint that is responsive to both operational realities and future national and regional transmission needs.

| Stakeholder engagement | Safe and reliable network | Connections | Strategic infrastructure |
|---|---|---|---|
| Local regional stakeholder input from bodies such as the Distribution Network Operators, local authorities, and community representatives gathered understandings on market dynamics and future expectations at a local level. | Provided critical data on asset health, maintenance, and operational performance, ensuring the blueprint aligns with current capabilities and future needs. | Offered insights on customer demand and generation trends, helping us forecast future service requirements and growth areas. | Delivered input on large-scale projects and alignment with government initiatives, plus network compliance which are pivotal in shaping long-term infrastructure investments. |

# Stakeholder engagement
# North East

## Distribution networks

nationalgrid Electricity Distribution

NORTHERN POWERGRID


Within your region, what do you see bringing the greatest demand for connections to the electricity network over the next 10 years?


The engagement sessions found that Parts of the North East have the opportunity to upgrade existing 275 kV and 66 kV networks. This will also give opportunity to make the network more resilient addressing some of the older technology types at the same time co-optimising the solution alongside the Distribution Networks.

## What did stakeholders in the North East tell us?

‘Being able to share data and accessing information is key. Open and accurate data are key to facilitating the path towards net zero and to getting stakeholders more involved in this.’ – (Electricity & Gas)

‘There are people nationally and internationally who want to bring money into the electricity system… but we’re not able to offer the reassurances.’ – (Electricity & Gas)

‘Safe and reliable network and ease of connection are the priorities for me.’ – (University Estate manager)

‘Standardisation would help ease up the manufacturing pipeline.’ – (Construction)

We are working with local distribution networks (DNOs) to understand the impacts and requirements in that region. Working with the DNOs, we collaboratively and continually make certain that a whole system approach is always considered in our planning. We have been engaging with DNOs to strengthen our regional strategic partnerships and develop robust whole system capabilities.

**39**

**The above number indicates the amount of whole system opportunities we have identified in the North East.**

A ‘**whole system opportunity**’ refers to areas where we can collaborate to find more integrated solutions. This could involve infrastructure planning, enhancing the quality and depth of data, or improving network design.

# Safe and reliable network

**There are over 500 substations, 7,200 km of overhead line (OHL) and 1,400 km of high voltage (HV) cable on the NGET network.**

**Our Asset Management Strategy provides direction to the management of these.**

**For RIIO T3 we are required to submit a portfolio view of our assets with supporting narrative providing justification on the level and type of investment.**

**Typically, the default position in asset operations is to incrementally upgrade and replace assets as and when required.**

In developing our strategic plan, our Asset Operations colleagues conducted a thorough review of the asset health data across the region relating to:

- **Reliability:** Network growth will be at its highest in T3, we will proactively identify, manage, and address asset failure risk ensuring reliability across our network is maintained at the current industry leading level.
- **Risk:** Our plan delivers value to consumers by achieving a significant reduction in risk
- **Environment:** We will seek to maximise environmental benefits by identifying and replacing assets which contribute to environmental harm

## Key metrics across North East

We continuously monitor and maintain our assets on a regular basis, undertaking replacements or refurbishments of assets when determined necessary to ensure the reliability of the network.

We have identified eight high voltage substations in the region with enhanced asset health requirements. Apart from requiring asset replacements due to condition, these sites also have other site-level structural and equipment issues. These will be addressed via a combination of portfolio asset interventions and major projects.

A total of 637 km of overhead line in North East require replacement in the next 10 years. Some of this will also be uprated alongside other work.

**Natural hazard resilience**
By the end of 2025, all relevant North East sites will be fully compliant with Energy Networks Association standard 138 on flood protection.

**Physical security resilience**
With increasing generation and demand we are investing in enhanced physical security at sites within the region.

**8**
**High voltage substations identified in region that require enhanced asset health intervention**

**637 km**
**Overhead line in region that requires replacement in the next 10 years**

### Asset health intervention regional metrics

**4**
**Super grid transformer**

**204**
**Circuit breakers**

**176**
**Voltage management assets**

**698**
**Bay equipment replacements**

# Customer connections
## Regional overview

We leverage National Energy System Operator (NESO)'s future energy scenarios and market intelligence to chart the pathway that defines the required energy mix and informs our investment plans. Beyond this, we continuously analyse various scenarios and their underlying network drivers to understand how the energy mix might evolve, incorporating these insights into our regional assumptions.

The investments to achieve the energy mix required will drive how we think about these at site and regional level. For example:

### Standalone connection

Typically there is a specific customer need at a site. The connection usually requires less investment and is relatively straightforward in terms of complexity.

### Site strategy

Where ageing infrastructure, fault level restrictions or physical space is unavailable at an existing site we may not be able to connect customers, therefore a more holistic site strategy is required such as building a new substation.

### Circuit strategy

When we review circuit health, we will assess the long-term growth and capacity needs in a region. This will help us determine whether to maximise the line ratings or consider increasing the voltage and upgrading the associated substations.

### Regional demand and generation

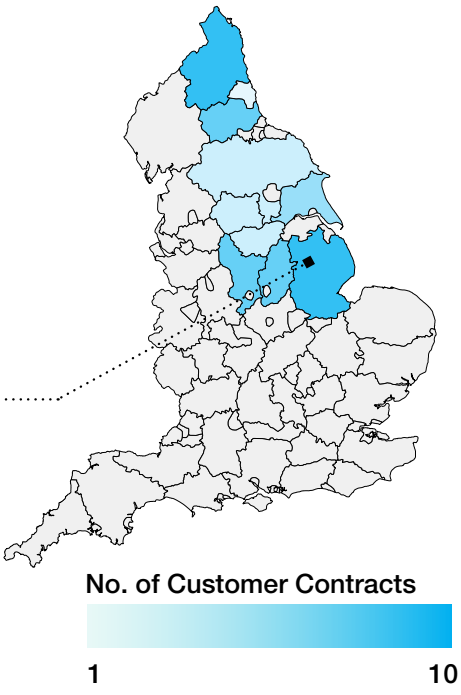
**Demand connections – where power is taken from the grid**

**Generation connections – where power is added to the grid**

Demand:
**13 GW**

Generation:
**114 GW**

Shows a heat map for the number of contracted connections within the North East region out to 2034.



# Customer connections
# North East demand and generation breakdown

## New connections in the region: Generation

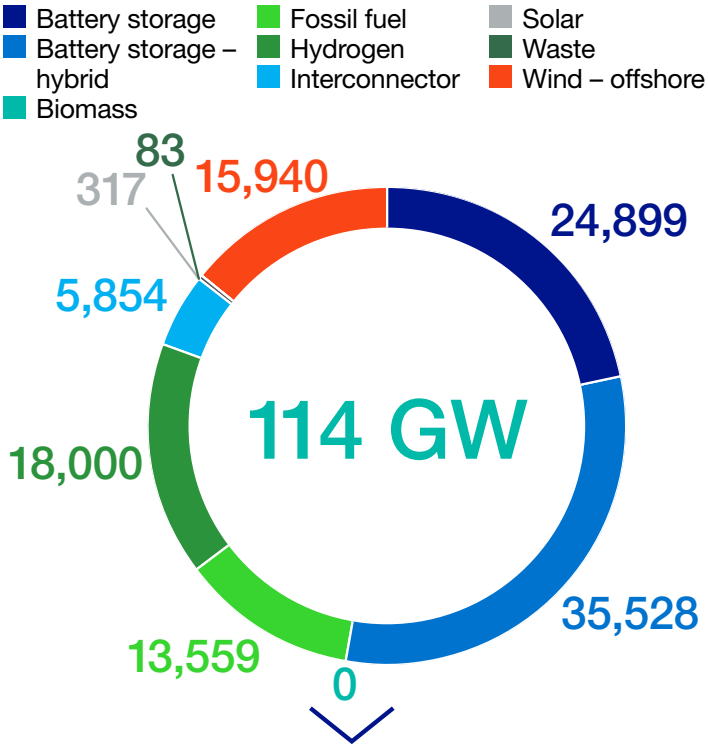
The North East is predominantly a net exporter whereby excess generation and power from the Scottish Transmission Network flows through this region towards demands centres in the Midlands and the South of England during periods of high wind and solar generation in the UK.

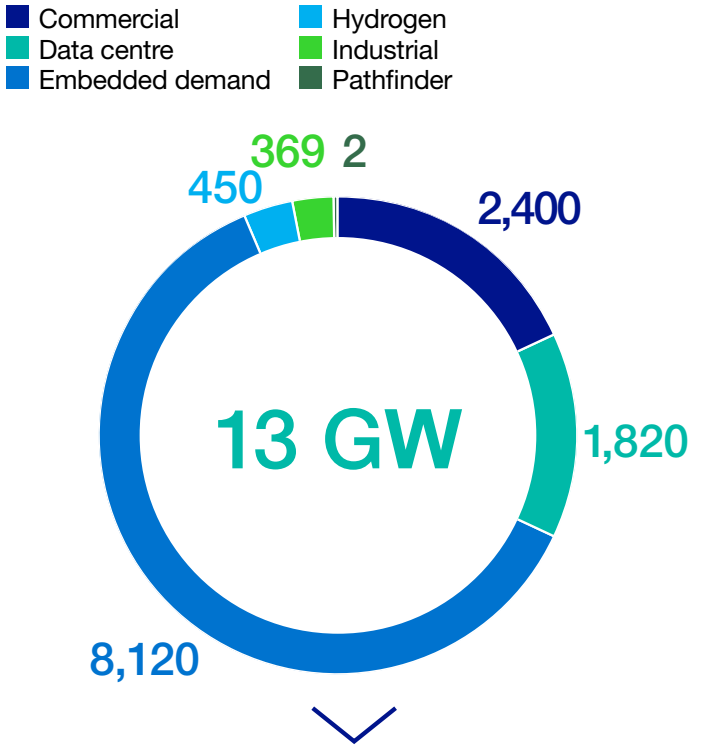
We have contracts for our customers to deliver into the mid 2030s which would connect up to 114 GW of generation. However, not all of this is expected to connect to the network.

## New connections in the region: Demand

There is about **13 GW of demand connections** in the North East. However, not all of this demand is expected to connect.

We expect to add 1.6 GVA of additional capacity in T3.




**9.9 GW of generation expected to connect in T3**

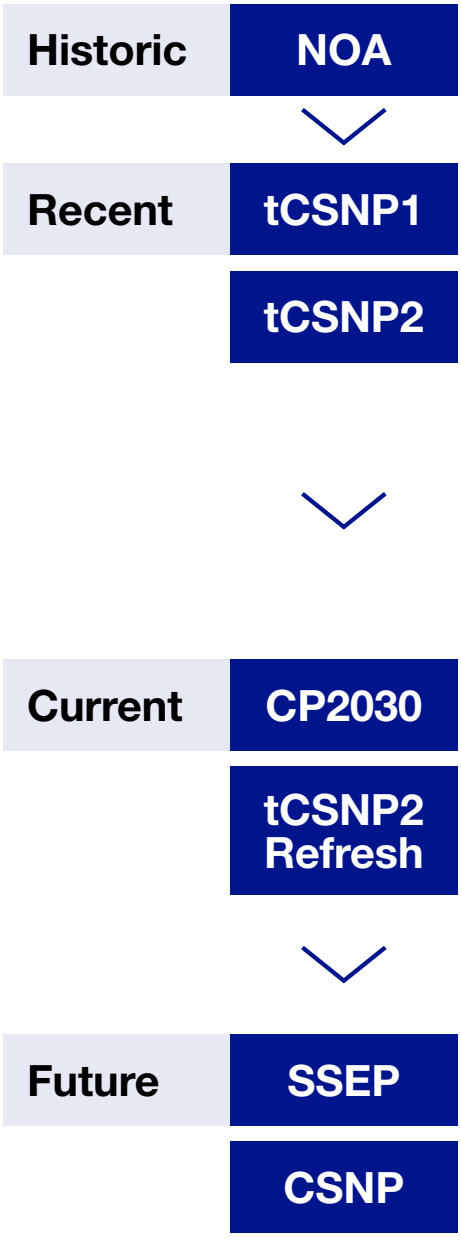
**1.6 GVA of capacity to be added in T3**

**By providing a future ready system through our investments we are also creating options for additional connections.**

# Strategic infrastructure
## Background

The National Energy System Operator (NESO) process for identifying strategic infrastructure on the electricity transmission network has significantly evolved to meet the changing demands of the energy landscape. NESO incorporates scenario analysis, market intelligence, and stakeholder engagement to predict future energy needs.

This includes integrating renewable energy sources, enhancing network resilience, and aligning with government policies on decarbonisation. The evolved process aims to ensure that strategic infrastructure development is proactive, addressing both current and future challenges, and supporting the transition to a sustainable and reliable energy system.




### Network Options Assessment (NOA):

The NOA is the annual process through which the ESO (now NESO) provided its recommendation for which network reinforcement projects should receive investment, and when.

### Transitional Centralised Strategic Network Plans (tCSNP1 and tCSNP2)

In recent years, the planning processes managed by the NESO has started to take a more holistic approach to network reinforcement with the introduction of the Holistic Network Design (HND), which has combined with the NOA to create the 'transitional Centralised Strategic Network Plans'.

- tCSNP1 is the combination of HND1 and the NOA 2021/22 refresh and identified the 'Accelerated Strategic Transmission Investment' (ASTI) projects. The report published by the NESO is also referred to as "Pathway to 2030".
- tCSNP2 is the combination of the HND Follow up Exercise (HND FUE) and the NOA, published in 2024 and facilitates the connection of an additional 21 GW of offshore wind, plus other low carbon generation across Britain. The report published by the NESO is also referred to as "Beyond 2030".

### Clean Power 2030 (CP2030)

In November 2024, the NESO provided advice to government on how to achieve clean power by 2030. The Government published its Clean Power Action Plan in December 2024. This will inform the policies, investments in renewable energy and network, and technological advancements required to achieve clean power by 2030.

### tCSNP2 Refresh

NGET is developing the options recommended in the tCSNP2 to a greater level of maturity and those options will be re-assessed by NESO through the tCSNP2 Refresh.

### Strategic Spatial Energy Plan (SSEP):

The NESO will produce the SSEP with the first plan being published by the end of 2026. It will assess the optimal locations, quantities and types of energy infrastructure required to meet our future energy demand, helping enable the clean, affordable and secure supply, and be a key input into the CSNP.

### Centralised Strategic Network Plan (CSNP):

The CSNP will be produced on a 3-year cycle, allowing a more integrated approach to network planning and more developed recommendations than the NOA. It will provide a more strategic, long-term view of the transmission network's development, using the SSEP as a key input. The first CSNP is due to be published by the end of 2027.

# Strategic infrastructure
# North East projects

In the **North East** we will develop new infrastructure and enhance existing networks to ensure adequate capacity for electricity transmission in and out of the region. This plan includes establishing new circuits whilst upgrading current circuits and infrastructure.

## Specific projects include:

**AC4**
HVDC offshore cable between Scotland and Lincolnshire – Post-T3

**BTR2**
Upgrade existing circuits between Brinsworth and Thorpe Marsh to allow for more capacity – T3 period

**CGNC**
New 400 kV double circuit North Humber to High Marnham – Post-T3

**EDN3**
Replace the conductors with higher capacity conductors on the existing circuits between Brinsworth-Thorpe Marsh, Brinsworth-Chesterfield, Chesterfield – Ratcliffe – Post-T3

**E2DC**
Eastern Green Link 1 (Torness to Hawthorn Pit) – T3 period

**E4D3**
Eastern Green Link 2 (Peterhead to Drax) – T3 period

**E4L5**
Eastern Green Link 3 – Post-T3

**TGDC**
Eastern Green Link 4 – Post-T3

**ETRE**
Upgrade existing circuit between Eggborough and Thorpe Marsh to allow for more capacity – T3 period

**GWNC**
New 400 kV circuit Grimsby to Walpole – Post-T3

**HNRE**
Replace the conductors on the existing circuits between Hawthorn Pit and Norton with higher capacity conductors – T3 period

**JTHW**
Carry out thermal upgrading on the existing circuit between Thurcroft and West Melton – T3 period

**LTRE**
Upgrade the existing circuits between Lackenby and Thornton to allow for more capacity – T3 period

**NOR6**
Replace the conductors on the existing circuit between Norton and Osbaldwick with higher capacity conductors – T3 period

**OPN2**
New 400 kV double circuit – Yorkshire GREEN – T3 period

**OTHW**
Carry out thermal upgrading on the existing circuit between Osbaldwick and Thornton – T3 period

**SHNS**
Substation works at Grimsby West – T3 period

**SNRE**
Replace the conductors on the existing circuit between Spennymoor to Norton with higher capacity conductors – T3 period

**SPRE**
Replace the conductors on the existing circuit between Spennymoor to Stella West with higher capacity conductors – T3 period

**TDP4**
Add power control devices to the existing circuit between Drax and Thornton – T3 period

**ESCF**
Reconfigure the network between Stalybridge and Thorpe Marsh – Post-T3

**TMCF**
Reconfigure Thorpe Marsh substation – Post-T3

**TMC2:** Reconfigure the network between Keadby and Thorpe Marsh – Post-T3

**TMPC**
Add power flow control devices to the existing circuit between Thorpe Marsh and West Melton – Post-T3

# Develop options


## In this section

# Develop options
# Our strategy

**We carry out 3 simple steps to test our thinking around strategic options.**

## '2050' Backwards

**We take step back and look across the network region by region to understand if we are being ambitious enough.**

**Q.** Are we embedding the stakeholder design principles that have been set?

**Q.** Have we provided a long-term focus?

**Q.** Have we addressed possible operability challenges in the future?

**Q.** Have we considered all known and potential drivers for the site/circuit?

## Network compliance

**System analysis is undertaken to plan and develop the network to meet the requirements of the Security and Quality of Supply Standards (SQSS).**

- Ensure the transmission network can withstand equipment faults and failures.
- Determine network solutions that provide the necessary transmission infrastructure to maintain the long-term secure and resilient supply of electricity to consumers.
- Deliver new connections to the transmission network.

## Network design principles

**We then test our view against our Network Design Principles.**

- **Enabling investments** – We will plan and build a network platform today that is ready for future requirements, making sure we are not the blocker to the energy transition.
- **Do it once, do it right for the future –** We will plan the scope and timing of network investments to address multiple drivers at once. We will coordinate delivery to reduce system access requirements, increase efficiency and minimise disruption to communities.
- **Whole system network planning –** We will work with other utilities, across vectors and with stakeholders at all levels to ensure planning and delivery of our future network is coordinated and optimised for the UK.

## Our plan

National Grid's electricity transmission strategy in the North East focuses on upgrading and expanding the network to support substantial renewable energy integration and enhance grid resilience. Several regional projects are part of our Great Grid Upgrade, facilitating the transition to more affordable, secure, and cleaner energy forms, and helping to meet the UK's net zero target.

The North East is a key area for offshore wind generation and will play an increasing role in transporting surplus wind energy from Scotland. We are investing heavily in upgrading existing sites and building new ones to integrate the significant offshore wind power landing in the Humber region as well as new onshore generation connections.

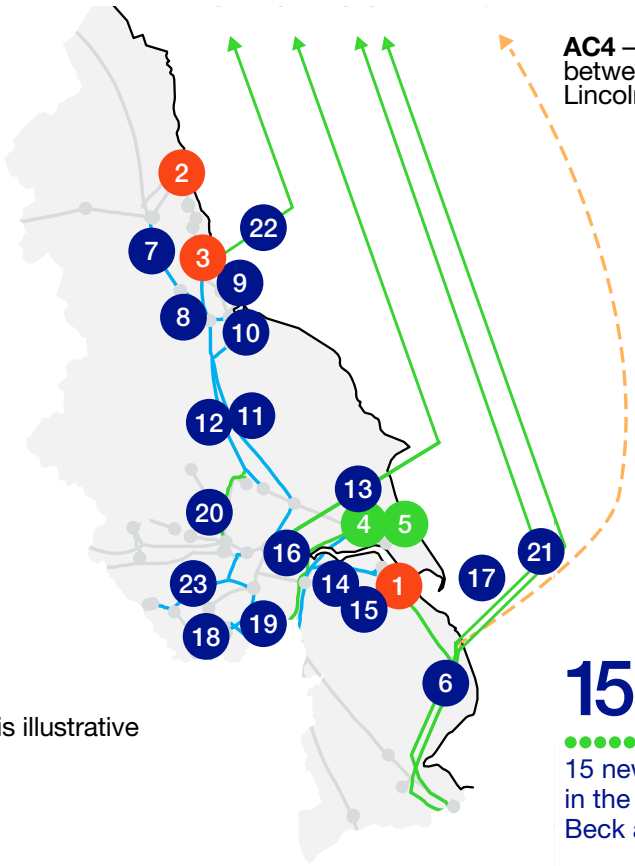
In Lincolnshire we are building critical new infrastructure to enable transmission of clean power whilst at the same time creating capacity for new generation and demand connections within the region.

We are also upgrading and expanding other transmission routes in the region to export the clean energy to the Midlands and further south.

# North East Strategy

## Substations

1. **Grimsby West 400 kV** Rebuild – Beyond T3
2. **Blyth 400 kV** Upgrade – T3 period
3. **Hawthorn Pit 400 kV** Rebuild – T3 period
4. **Wanlass Beck 400 kV** New substation – T3 period
5. **Birkhill Wood 400 kV** New substation – T3 period




**AC4** – HVDC offshore cable between Scotland and Lincolnshire – Beyond T3

- Major site strategy
- New substation
- Coastline
- Existing network
- Upgrade existing
- New build
- Developing only*

Map is illustrative

**15**

15 new substations proposed in the region including Wanlass Beck and Birkhill Wood.

## Circuits

6. **GWNC – Grimsby to Walpole** – New circuit – Beyond T3
7. **SPRE – Spennymoor to Stella West** – Upgrade circuit – T3 period
8. **SNRE – Spennymoor to Norton** – Upgrade circuit – T3 period
9. **HNRE – Hawthorn Pit to Norton** – Upgrade circuit – T3 period
10. **Lackenby-Norton 1** – Reconductor OHL circuit – T3 period
11. **LTRE Lackenby – Thornton 1 and 2** – Reconductor OHL circuit – T3 period
12. **NOR6 – Norton to Osbaldwick** Upgrade circuit – T3 period
13. **E4D3 – Eastern Green Link 2** – New circuit – T3 period
14. **Creyke Beck – Humber Refinery – Keadby** – Reconductor OHL circuit – T3 period
15. **Creyke Beck – Keadby – Killingholme** – Reconductor OHL circuit – T3 period
16. **CGNC – North Humber to High Marnham** – New circuit – Beyond T3
17. **TGDC – Eastern Green Link 4** – New circuit – Beyond T3
18. **Sheffield ring cable replacement** – Beyond T3
19. **BTR2 – Brinsworth to Thorpe Marsh** – Upgrade circuit – T3 period
20. **OPN2 – Yorkshire Green** – New circuit – T3 period
21. **E4L5 – Eastern Green Link 3** – Beyond T3
22. **E2DC – Eastern Green Link 1** – T3 period
23. **ETRE – Upgrade Eggborough – Thorpe Marsh to increase capacity** – T3 period

Map is illustrative. New build and some upgrades are subject to planning permission. The lines shown here should therefore not be regarded as defined or proposed routes but reflective of various required reinforcements published by NESO. Includes baseline and pipeline projects. Major site strategy includes existing substations where we plan a rebuild or significant extension (> £20m). Does not include new tCSNP2 circuits onshore and offshore which are subject to the outcome of NESO's tCSNP2 refresh. This network region reflects the geographical area of East Anglia, but includes some network from parts of neighbouring regions.

*As indicated by NESO; final network solution/route may differ.