

Young Planners' Conference

**Connecting Town and Country:
Planning for Urban and Rural Areas**

11 – 12 October 2024 #YPCConf2024





RTPI

Royal Town Planning Institute

BREAKOUT 3

Connectivity and Infrastructure

Charlotte Mitchell - Chief Planning Officer,
National Grid

Kevin Roeton - National Grid

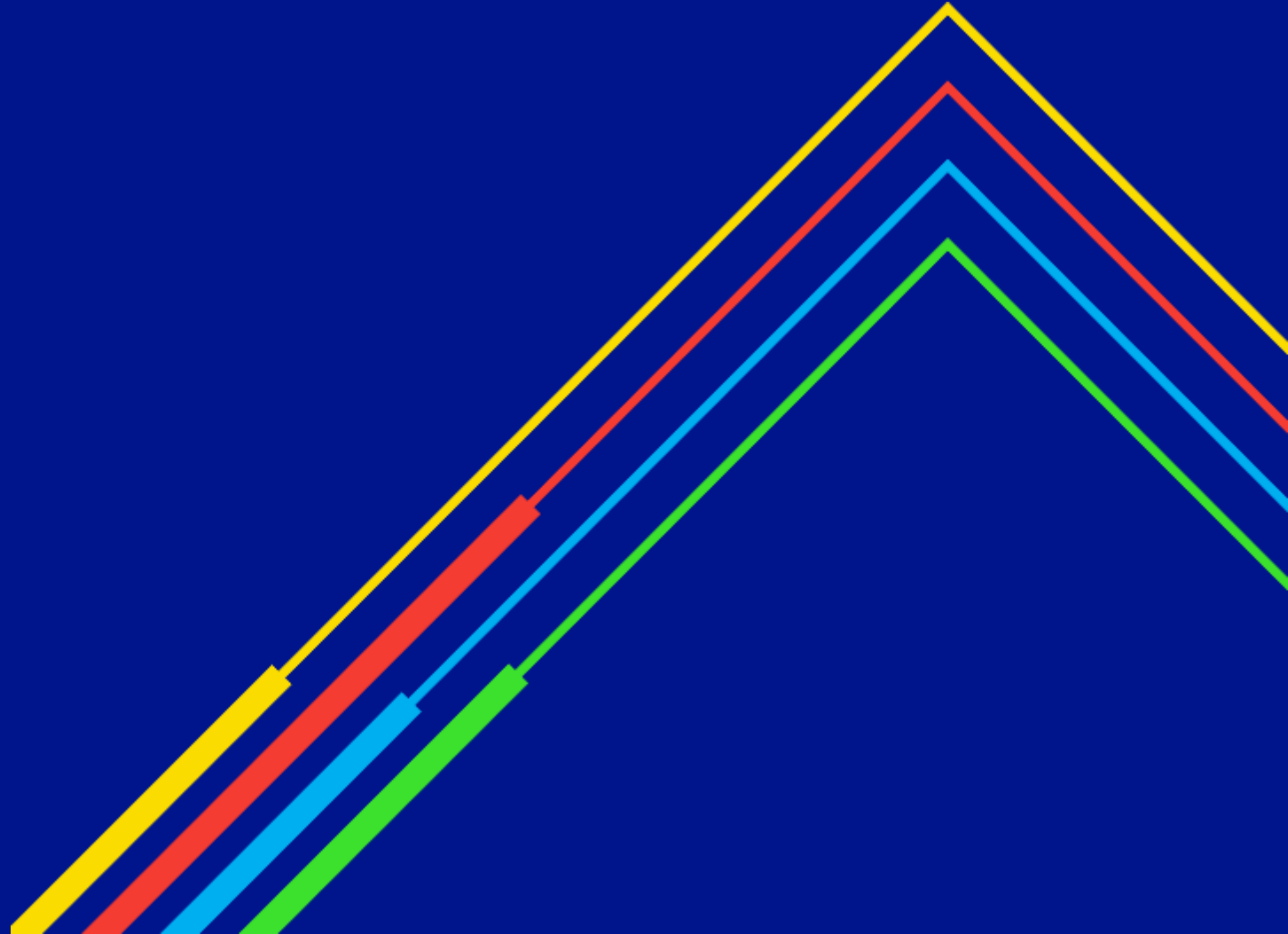
Chair: Errin Marshall - RTPI East of England
Young Planner Chair



National Grid and the Great Grid Upgrade

RTPI Young Planners Conference
October 2024

national**grid**



Introductions



Charlotte Mitchell
Chief Planning Officer



Kevin Roeton
Senior Consents Manager

National Grid and its network

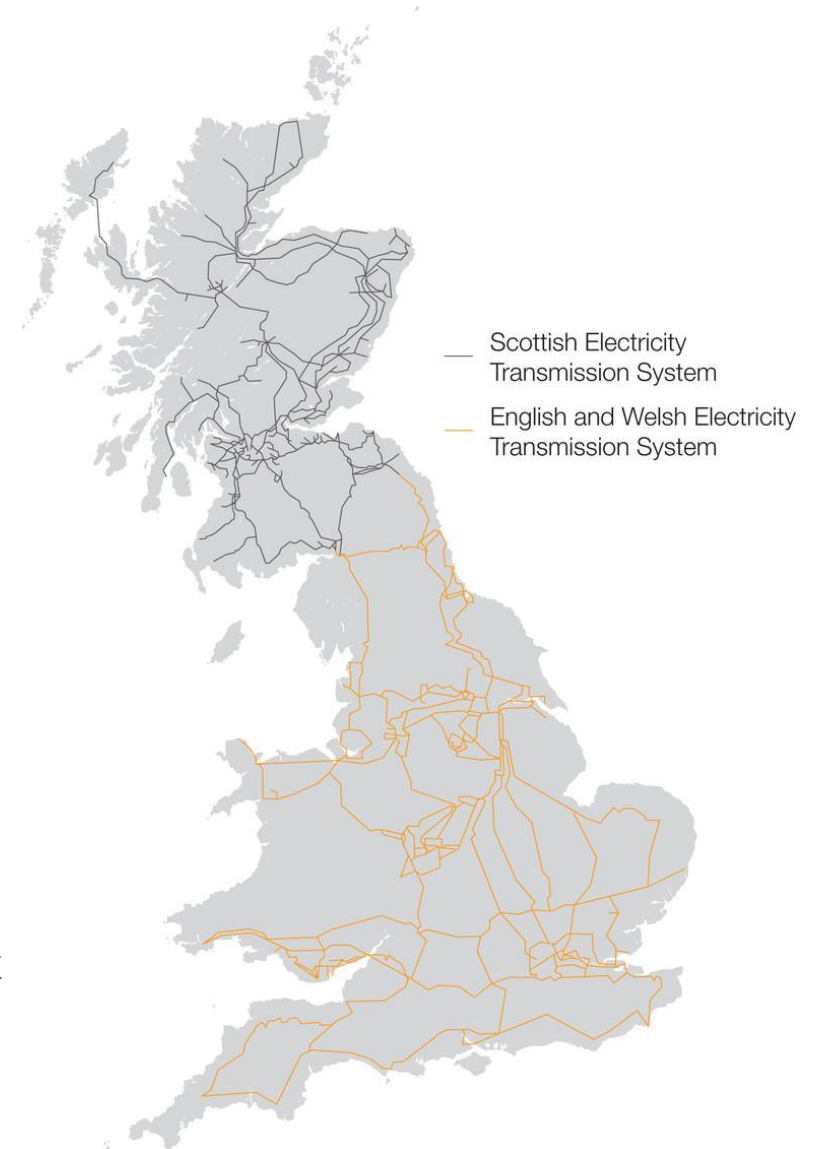
National Grid owns and manages the high voltage electricity transmission system in England & Wales. Comprises 4,500 miles of overhead line, around 900 miles of underground cable and more than 300 substations.

The existing network

- Largely built in 1960s to take energy from coal fired power stations in the north across Britain
- Limited transmission capacity between the North of England and Midlands, Scotland and central England (also other parts of the network)

The future network

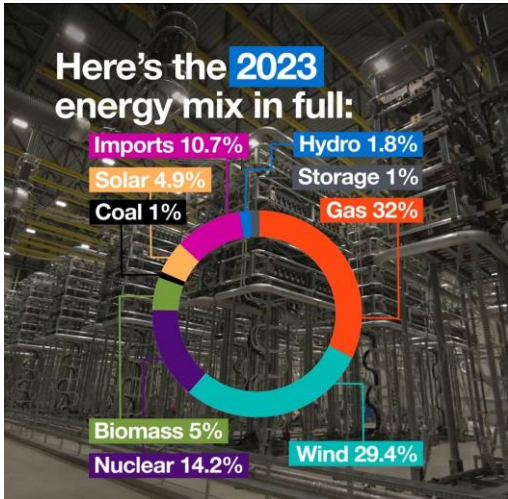
- Connect more offshore renewable energy
- Increased electrification of transport and heat, demand is set to significantly increase
- Requires a combination of upgrades to get the most out of the existing network and new lines



The way we generate electricity is changing rapidly

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2023 was the **greenest** year on record for electricity generation in Britain!



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While renewables like **wind** and **solar** climbed.



We've broken **records** for:



Wind generation
21,813 MW
on 21st December

We've broken **records** for:

>>



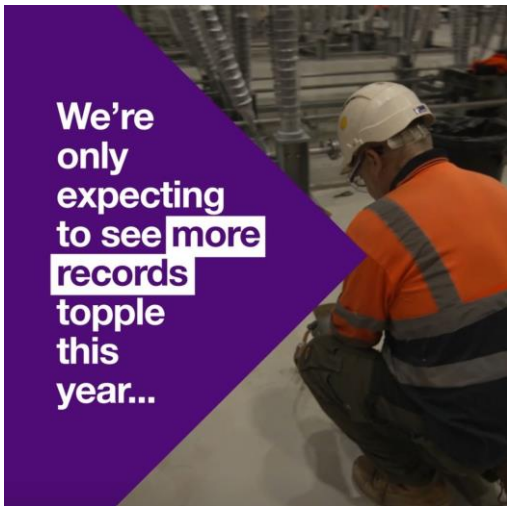
And minimum carbon intensity
27g CO₂/kWh
on 18th September

We've broken **records** for:

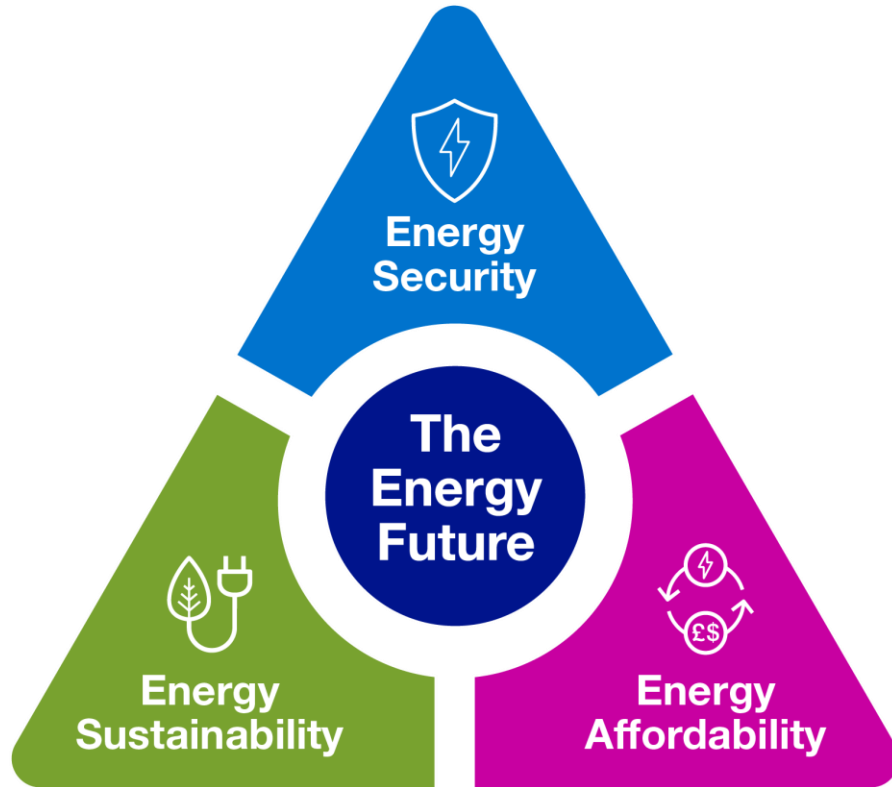


Solar generation
10,971 MW
on 20th April

We're only expecting to see **more records** topple this year...



Journey towards net zero - UK to deliver 50GW of offshore wind by 2030



UK government net zero and energy security strategies are setting the ambition

- **50GW** of offshore wind by 2030
- **70GW** of solar by 2035
- **24GW** of nuclear by 2050
- Net zero power system decarbonisation by 2035
- Increased electrification of transport and heat, demand is set to significantly increase (by around 50%)

Driving an increase in scale, pace, and complexity of transmission infrastructure needed

The Great Grid Upgrade

The Great Grid Upgrade is the largest overhaul of the electricity grid in generations.

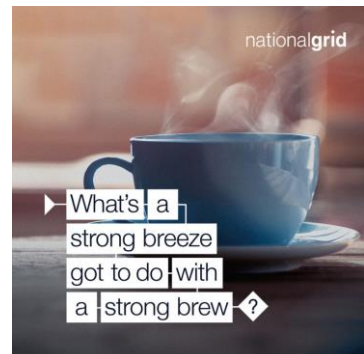
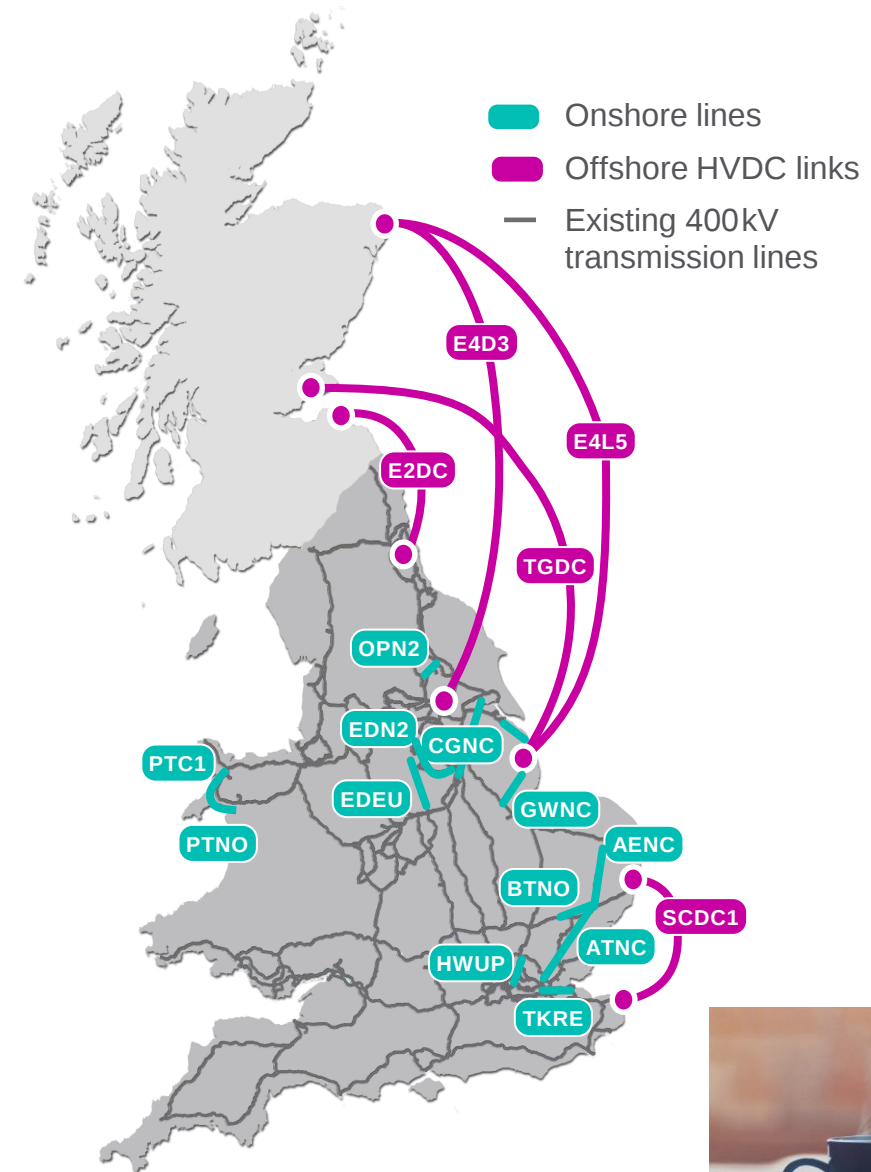
There are 17 network reinforcements identified as 'essential' to meet the Government's net zero targets.

Drivers:

- 50GW of offshore wind by 2030 (also increases in solar + nuclear)
- Net zero power system decarbonisation by 2035
- Increased electrification of transport and heat, demand is set to significantly increase
- Need to connect more offshore renewable energy

Requires a combination of upgrades to get the most out of the existing network and new lines.

Our programme of network reinforcements will support the UK's net zero target by adding capacity to accommodate increasing power flows of energy generated mostly from offshore wind, which is expected to double within the next ten years, to areas of demand.



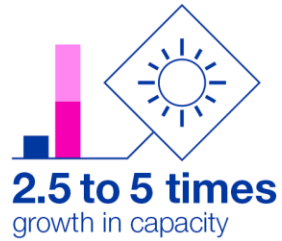
National context – delivering a net zero power system for 2035

We must systematically upgrade the England and Wales transmission network to service future electricity needs

Offshore wind



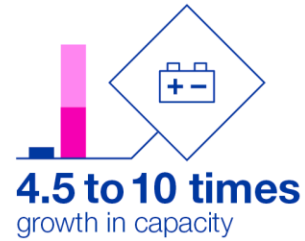
Solar



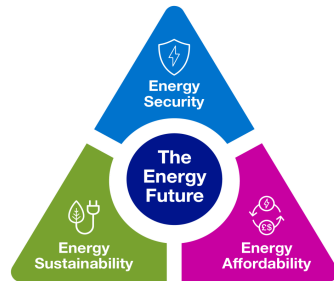
Interconnectors



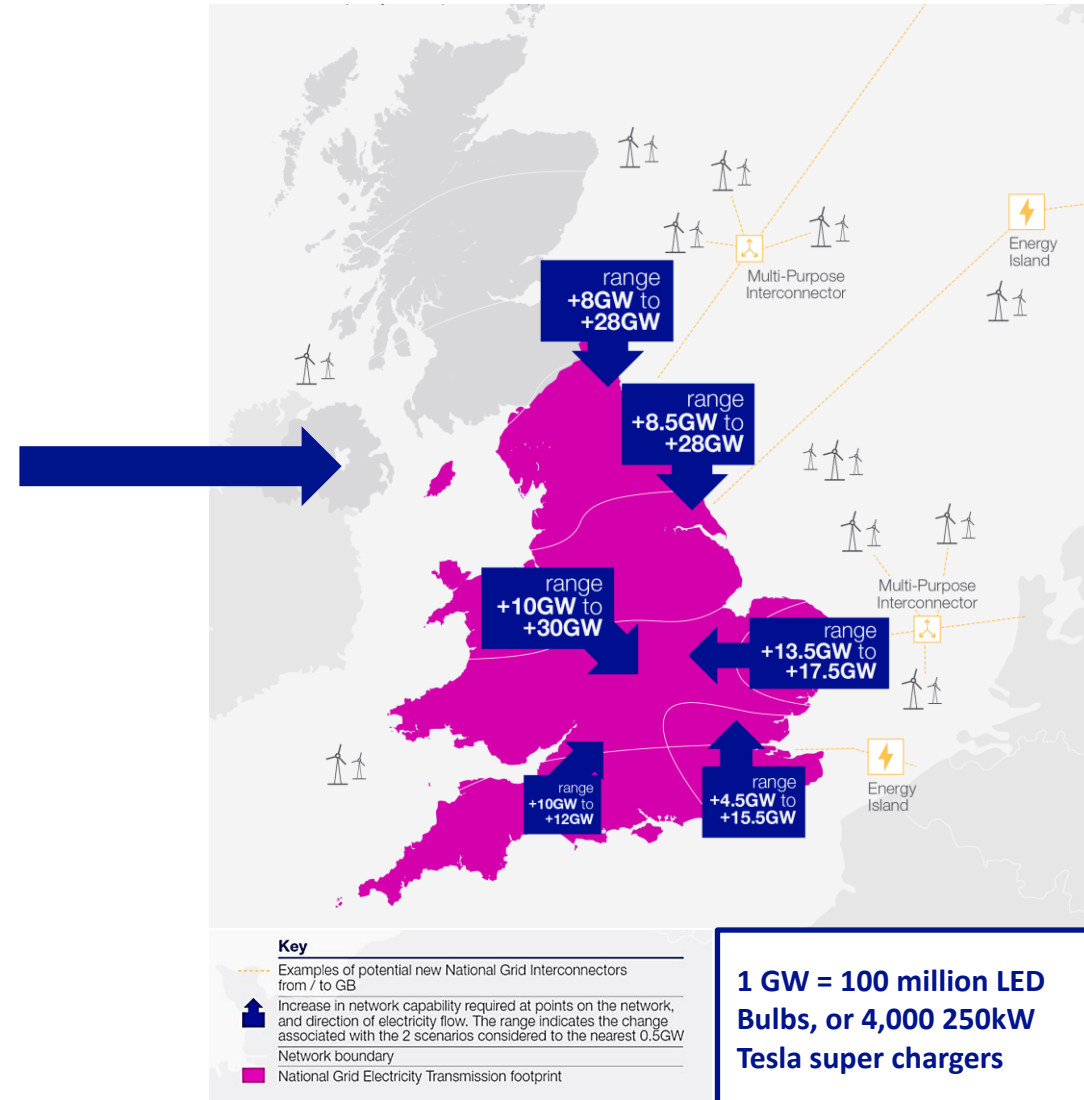
Battery storage



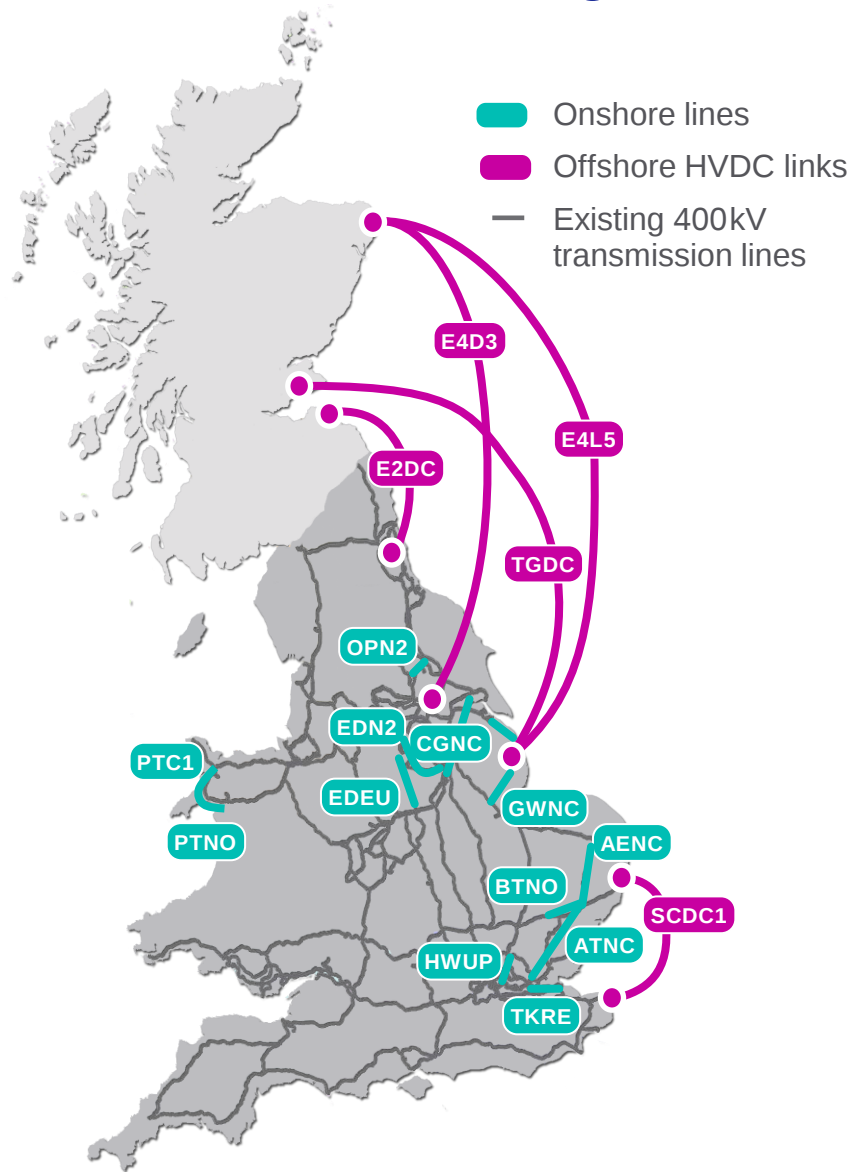
At the same time cross sector electrification is expected to increase total electricity demand by around 50%.⁵



National Grid



Scale of challenge to deliver 50GW of offshore wind by 2030



National Grid

Scale of the challenge is large, both in terms of scale and extent of consenting, and supply chain delivery, all at pace to achieve 50GW by 2030

Optioneering and consenting		
Over 500km of new Overhead Line	1,330 new towers	8,370km of Overhead Line conductor
To be delivered through the various projects	35,000 tonnes of tower steelwork - equivalent to more than 4 Eiffel towers	New and uprated lines totals enough to stretch from London to Los Angeles
~4,000km High Voltage Direct Current (HVDC) conductor		+ Other Electricity System Operator projects + customer connections + Asset health
+ 5 HVDC offshore link projects of c.£9bn - more than the total cable length of BritNed, Western Link, NSL Nemo and IFA 2 built in the last 35 years		(~2,000km of new or works to existing lines)

ASTI project timeline

	Code	Project Name	Region	ASTI licence delivery date
Offshore (primarily)	E2DC	Eastern Green Link 1 (JV with SPT)	Scotland (East) to North East	2028
	E4D3	Eastern Green Link 2 (JV with SSE)	Scotland (NE) to Yorkshire	2030
	E4L5	Eastern Green Link 3 (JV with SSE)	Scotland (NE) to East Midlands (Lincolnshire)	2031
	TGDC	Eastern Green Link 4 (JV with SPT)	Scotland (East) to East of England (Norfolk)	2032
	SCD1	Sea Link	East of England / South East	2031
Onshore	OPN2	Yorkshire Green	Yorkshire	2028
	BTNO	Bramford to Twinstead	East of England	2029
	AENC	Norwich to Tilbury (North)	East of England	2031
	ATNC	Norwich to Tilbury (South)	East of England	2031
	CGNC	North Humber to High Marnham	Yorkshire / East Midlands	2031
	GWNC	Grimsby to Walpole	Yorkshire / East Midlands (Lincolnshire)	2031
	EDN2	Chesterfield to Willington	East Midlands	2031
Upgrades (to existing NGET assets)	EDEU	Brinsworth to High Marnham	Yorkshire / East Midlands	2029
	HWUP	North London Reinforcement	Greater London	2028
	TKRE	Grain to Tilbury	South East / East of England	2029
	PTNO	Pentir to Trawsfydd (second circuit)	Wales	2029
	PTC1	Pentir to Trawsfydd (cable replacement)	Wales	2029

The Great Grid Upgrade in the East of England

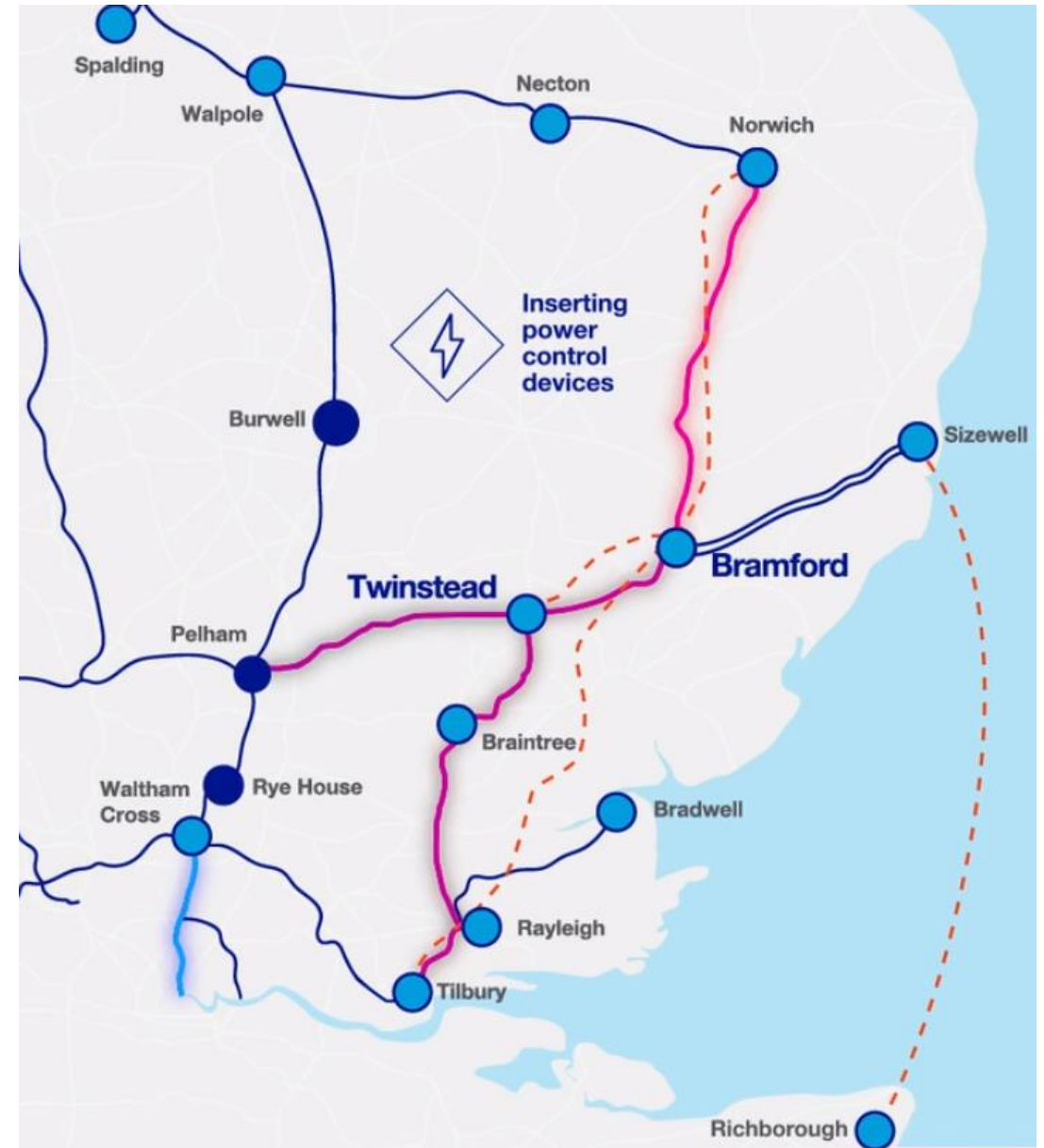
Bramford to Twinstead – Approved network reinforcement between Bramford Substation in Suffolk and Twinstead Tee in Essex.

Norwich to Tilbury – Network reinforcement between the existing substations at Norwich Main in Norfolk, Bramford in Suffolk, and Tilbury in Essex, as well as connect new offshore wind generation.

Grain to Tilbury – Construction of a new cable under the Thames between Kent and Essex to reinforce the local network.

Sealink - Reinforcing the electricity transmission network between Suffolk and Kent through building a new, primarily offshore, 2GW high voltage direct current link.

LionLink: National Grid Ventures - connecting Dutch offshore wind to Dutch and British markets via subsea electricity cables called interconnectors.



Identifying network capability needs

The National Energy System Operator (NESO) looks at how much energy needs to be carried on the network in future and where network capability needs to be improved.

It does so by producing three key documents - Future Energy Scenarios, the Electricity Ten Year Statement and the Network Options Assessment.

- Future Energy Scenarios – this is published each summer and sets out different scenarios about how quickly the UK might make the transition to a greener electricity network.
- This informs the Electricity Ten Year Statement – this assessment, published annually in November, sets out the Electricity System Operator's view about where the capability of the transmission network might need to be addressed over the next decade.
- National Grid, as the operator of the transmission network in England Wales, responds with solutions to address network requirements identified in the Electricity Ten Year Statement.
- The Electricity System Operator then publishes an annual Network Options Assessment provides recommendations for which network reinforcement projects needs to be taken forward and when.

Our role and obligations

When new sources of electricity apply to connect to the network, the National Energy System Operator (NESO) must offer terms to connect them to the system.

Under the Electricity Act 1989, transmission network proposals must be developed in a manner that is **efficient, co-ordinated and economical**, whilst also **having regard to the desirability of preserving amenity**.

We only build electricity lines along new routes or new substations where:

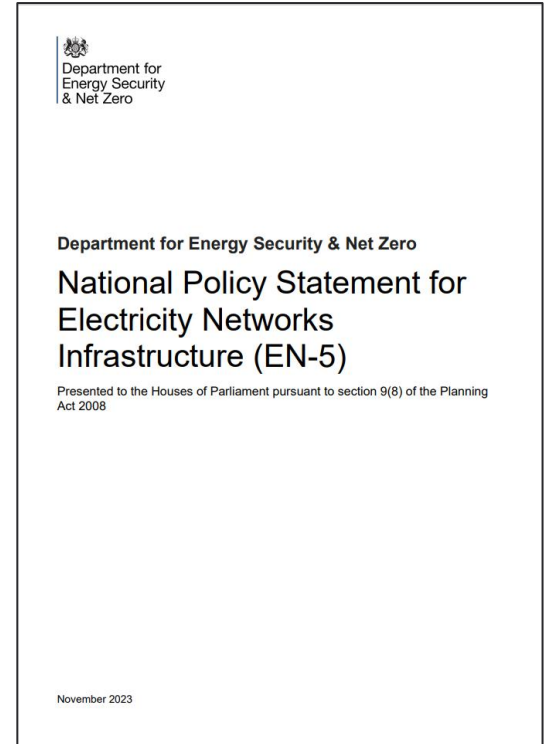
- our existing infrastructure cannot be upgraded (technically or economically) to meet system security standards and regulatory obligations;
- forecast increases in demand will not be satisfied by other means;
- customer connections are needed; or
- where an existing line has been identified for replacement through our Visual Impact Provision project.



The pathway to consent: Development Consent Orders

We use a range of consenting regimes for our project, and delivery of the Great Grid Upgrade will require 11 Development Consent Orders (DCOs)

- Permitted Development, TCPAs, Electricity Act S37 Applications, DCOs
- DCOs are the consenting regime for Nationally Significant Infrastructure Projects (NSIPs) which are defined in the Planning Act 2008
- DCO regime takes decision making for NSIPs out of local planning and hands it to the relevant Secretary of State (for us SoS for Energy) with PINS examining the application and making a recommendation
- Local Authorities become stakeholders in the process rather than decision makers
- It's designed to be a front-loaded process, with onerous requirements for pre-application consultation. Statutory requirements typically lead promoters to do multiple rounds of consultation with communities and stakeholders.
- Consenting timescales are still long – but shorter than the previous system of consenting major infrastructure via TCPA



Planning and Regulatory Context



ofgem



The Planning
Inspectorate

The regulatory parameters

We are bound by Government policy, legislation, regulation and industry rules, which inform the balance we need to strike when developing proposals and ultimately will determine whether individual proposals should proceed:

- Technology
- Environment
- Socioeconomic
- Cost
- System Benefits
- Community Feedback

EN-5 Electricity Networks National Policy Statement

2.11.13

Although it is the government's position that overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Park, Broads, or Area of Outstanding Natural Beauty)

The costs of upgrading the Grid are paid by consumers through our electricity bills. The UK Government and our regulator Ofgem require us to develop proposals which represent the best value for money for electricity bill payers.

Norwich to Tilbury

RTPI Young Planners Conference
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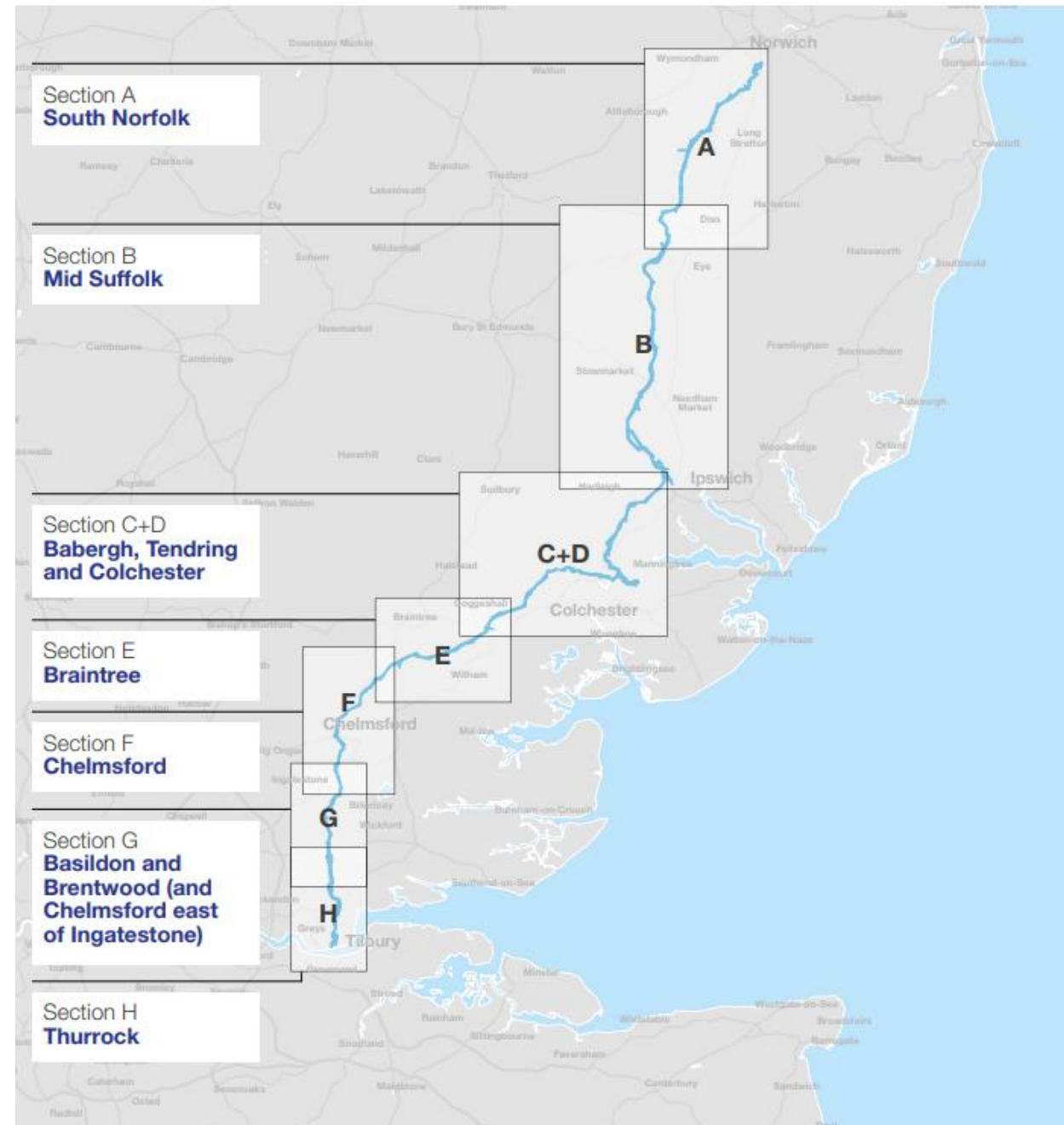
The Great Grid Upgrade

Norwich to Tilbury

nationalgrid

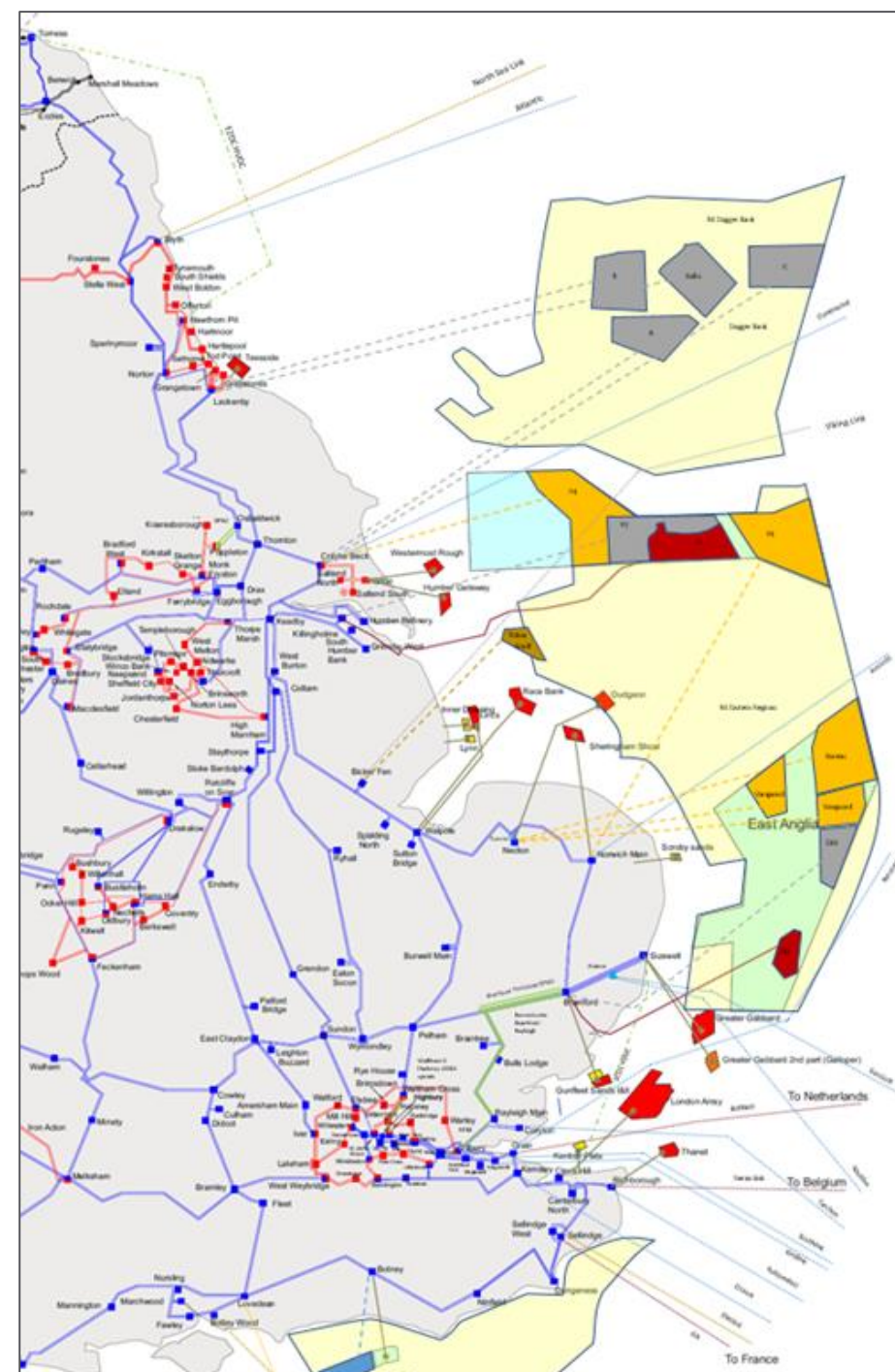
Project Background

- **184 km** of new electricity transmission reinforcement between Norwich and Tilbury (involving 13 local authorities)
- Large linear infrastructure project greater than the 2km threshold to be considered NSIP requiring DCO
- Strategic Infrastructure comprising of overhead line and pylons, along with some underground cables, cable sealing end compounds and a new 400 kV substation
- Electricity transmission connection points at Norwich, Bramford and Tilbury



The Regional Challenge

- Significant amount of energy generation above current capacity connecting in East Anglia
- The Climate Emergency – **net zero by 2050**
- Government's offshore wind ambition - **50 GW by 2030**
- Offshore wind connection points and network reinforcements are required up and down the East Coast.

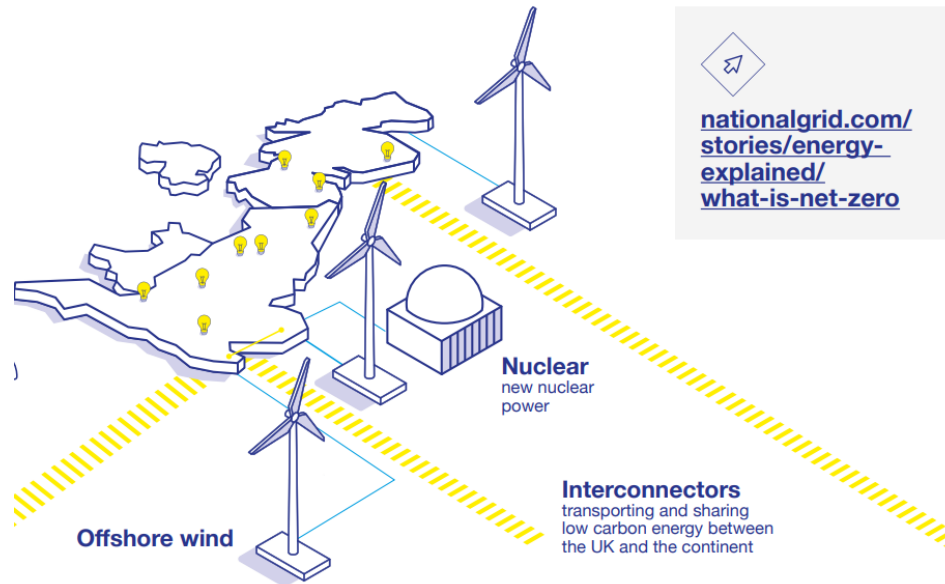


The existing transmission network

- The transmission system in East Anglia was primarily constructed in the 1960s to supply regional demand, centered around Norwich and Ipswich.
- For many years, the only significant power stations generating in the East Anglia region were the Sizewell A and the Sizewell B nuclear power stations, Spalding North and Sutton Bridge gas fired power stations, and some further smaller 132kV connected gas fired power stations.

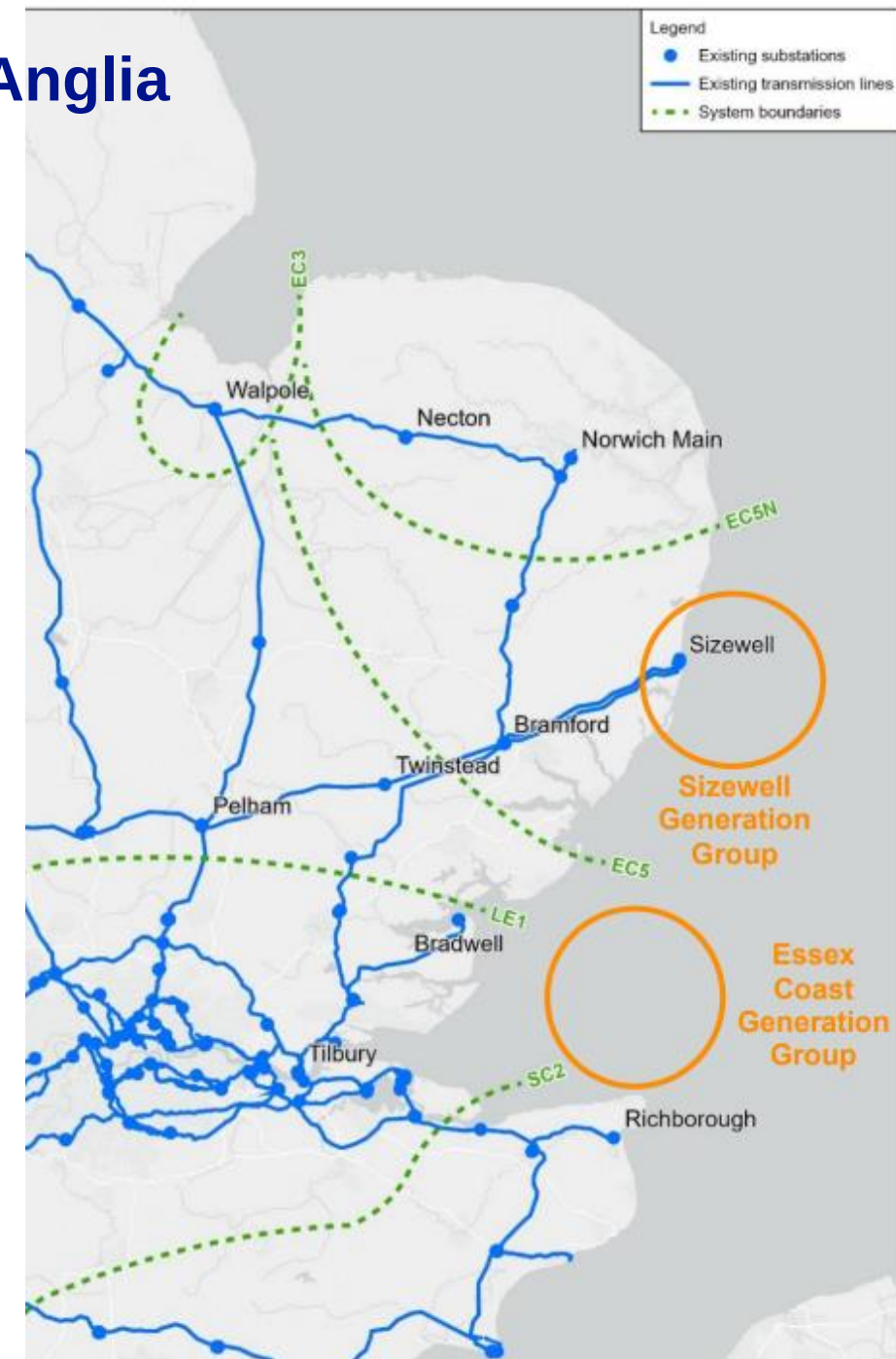


New power generating sources connecting in East Anglia



The relevant Generation Groups are Sizewell and Essex coast. These are illustrated in the network diagram to your right.

Without reinforcement, the capacity of the East Anglia and South East existing network is insufficient to accommodate the connection of the proposed new power sources.



Connecting customers

In addition to windfarms coming into Norwich Main (e.g. Hornsea 3 and Equinor), there are **three signed connection customers driving the need for East Anglia Connection Node substation**:

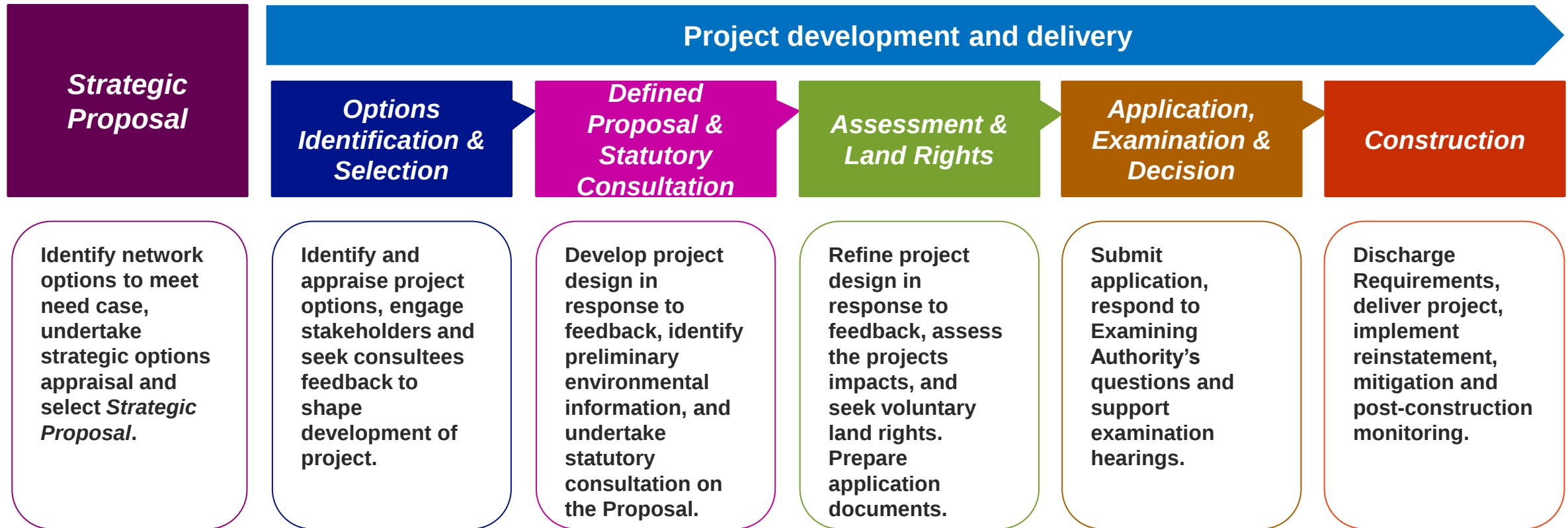
- **North Falls** - Extension to the existing Greater Gabbard Wind Farm off the coast of Essex.
- **Five Estuaries** - Sister project to the existing 353 MW Galloper Wind Farm, 30 km off the coast of Essex.
- **Tarchon Energy** – Developing an interconnector between the UK and Germany



National Grid



National Grid Approach to DCO



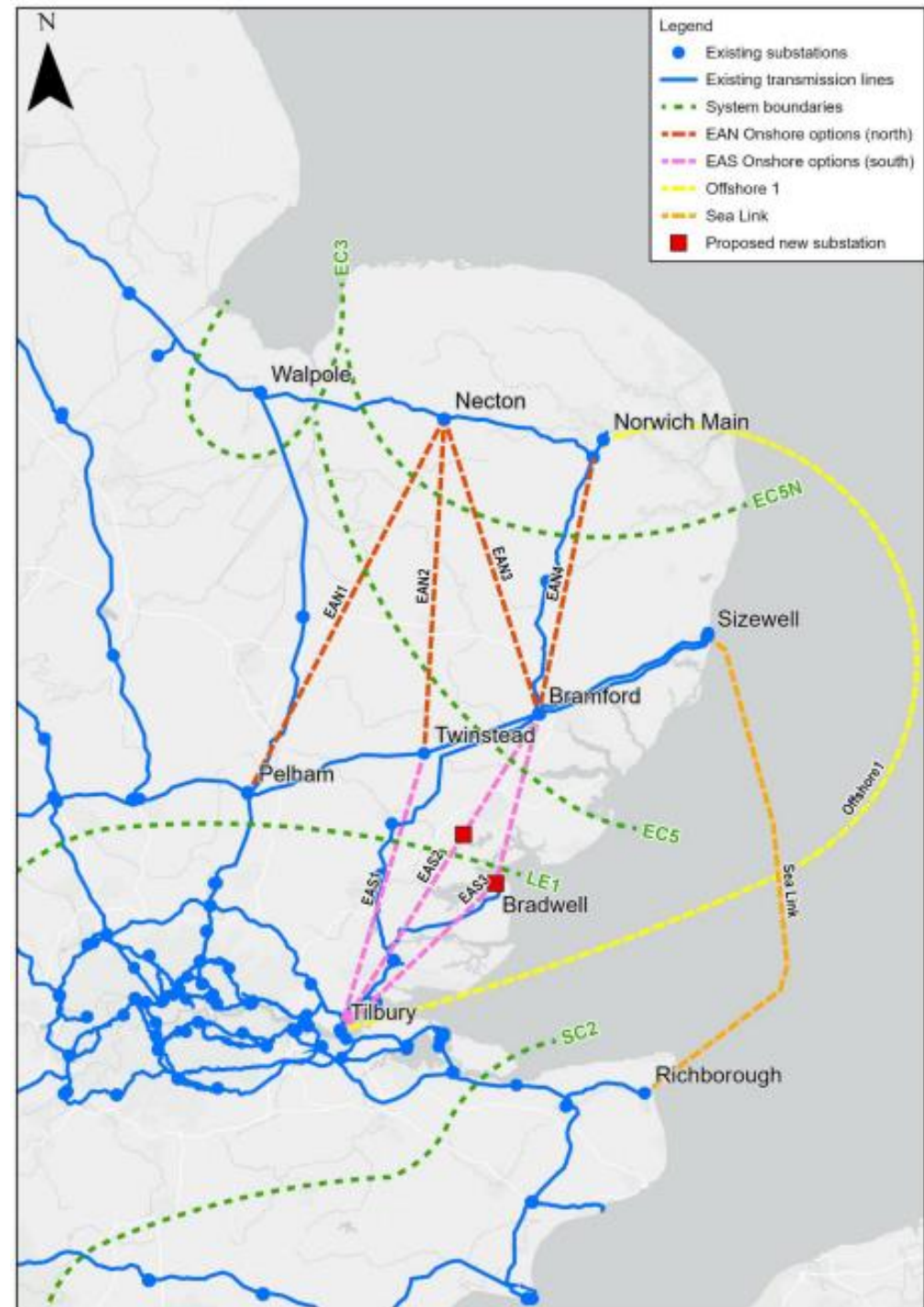
Project development process....

Strategic Proposal (Stage 1)

In looking at how we can transfer increased energy supplies between East Anglia and South East of England we have explored several options across the boundaries.

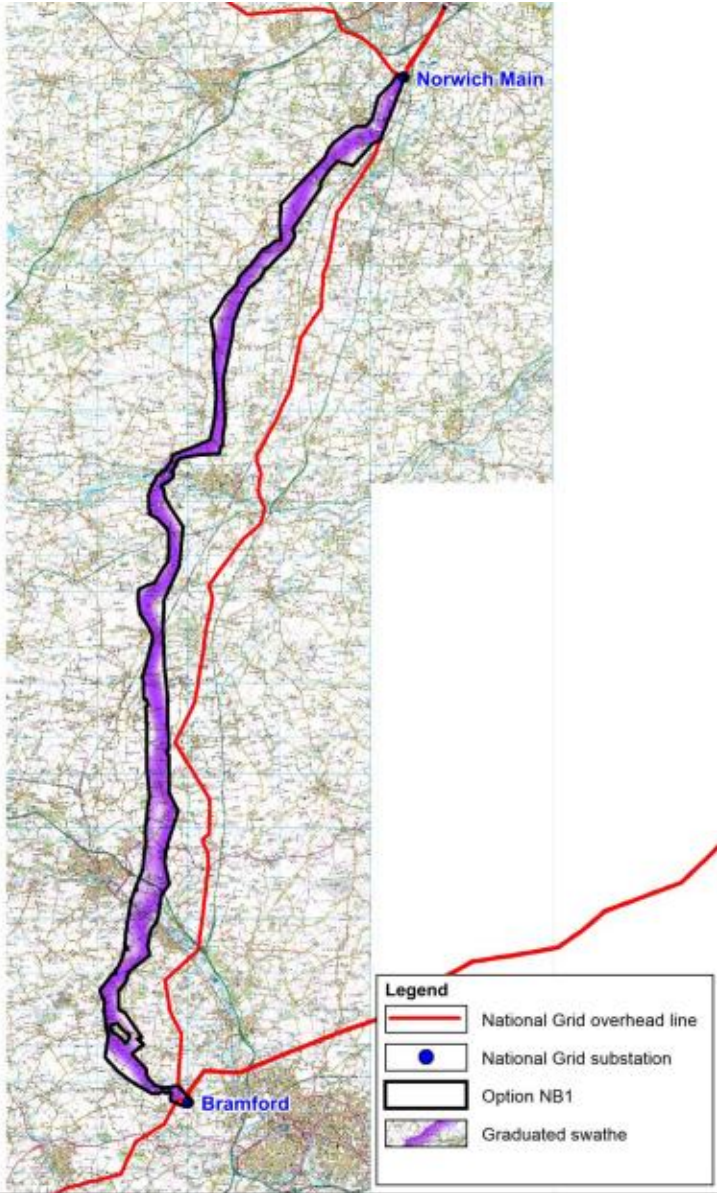
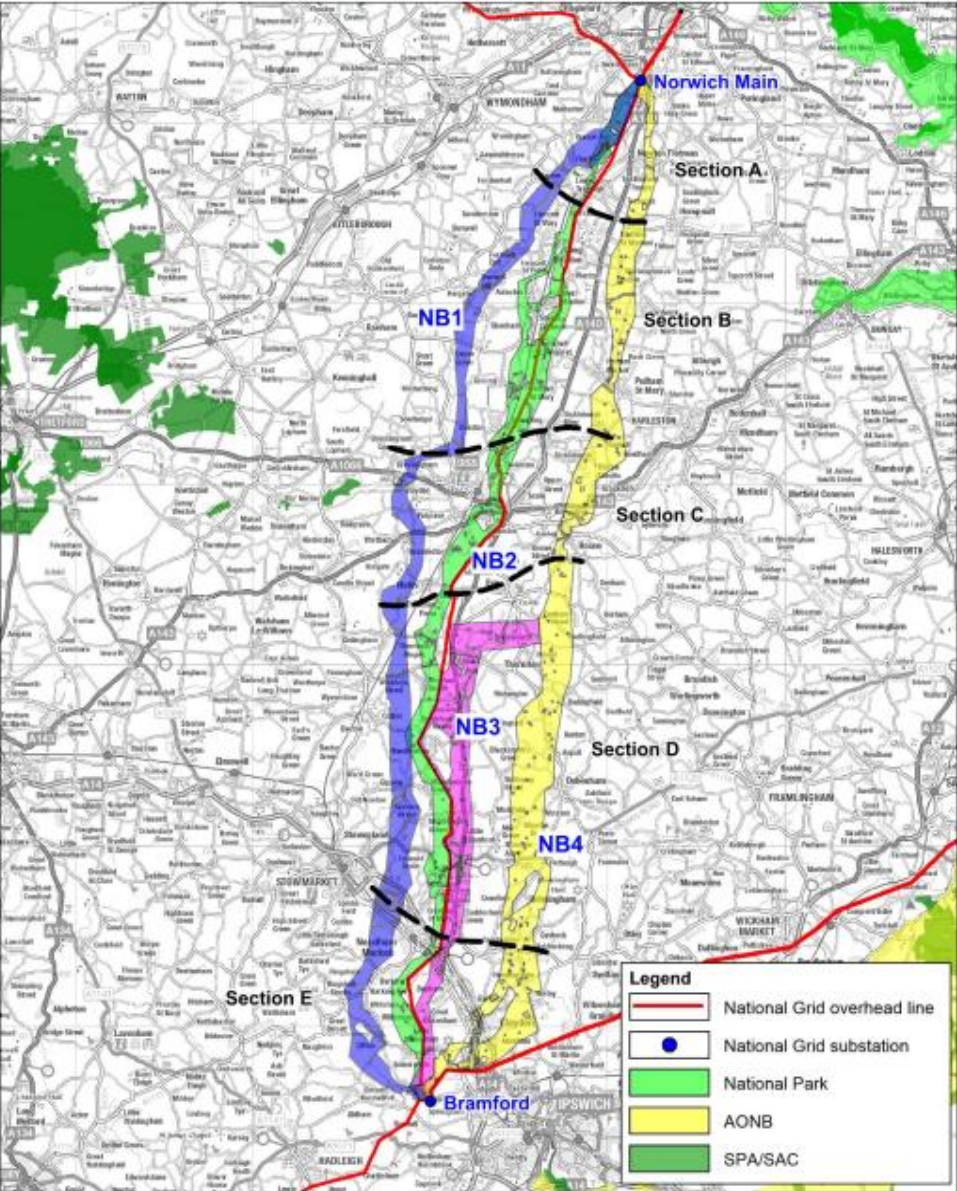
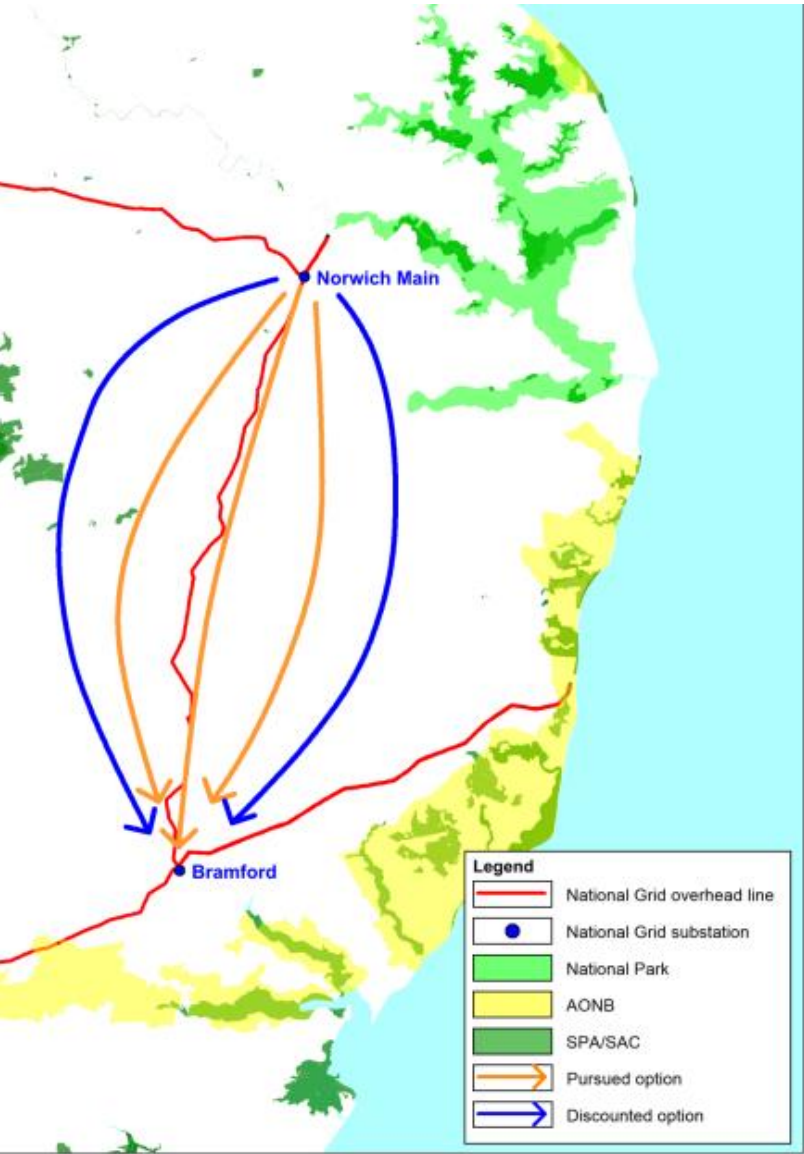
These include **onshore** and **offshore** options that could provide additional transmission capability – to our substation connection points.

Our **Corridor Preliminary Routeing and Siting Study (CPRSS)** and revaluated in the **Strategic Options Backcheck and Review (SOBR)** explain in detail how we have considered a range of technical, environmental, community, programme and cost factors to determine the most suitable strategic connection point options to take forward.



Options Identification and Selection (Stage 2)

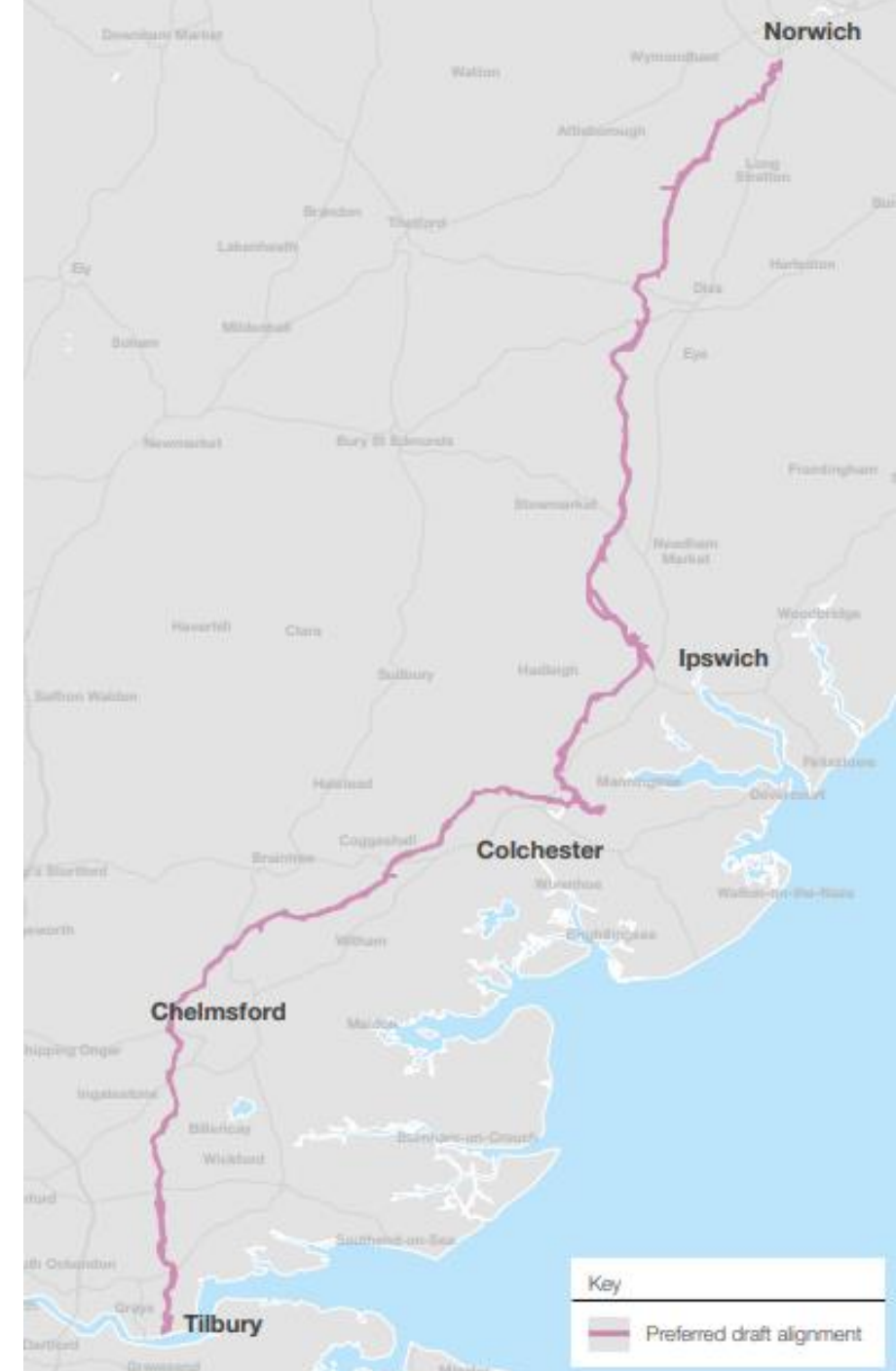
Figure 4.3 – Norwich to Bramford initial options taken to Options Appraisal



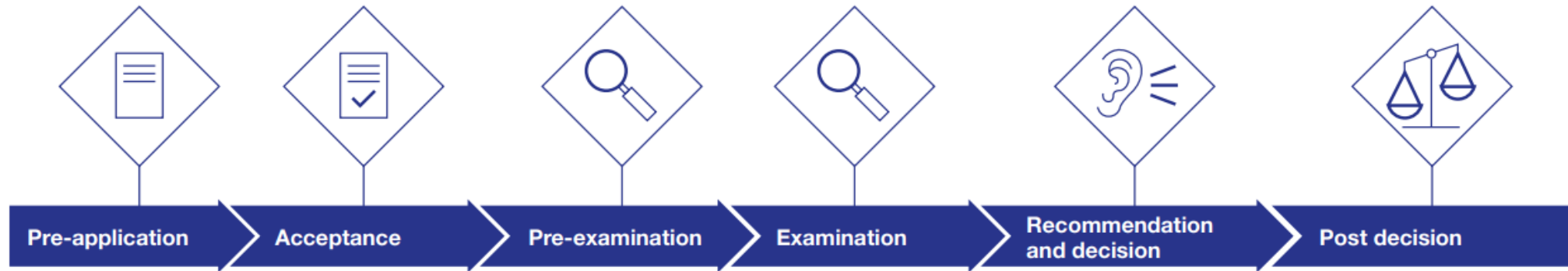
Defined Proposal and Statutory Consultation (Stage 3)

Our defined proposal for reinforcement include:

- New 400kV overhead line between Norwich and Bramford
- New 400kV overhead line between Bramford and Tilbury
- Underground cables through Dedham Vale National Landscape - formerly AONB.
- A new East Anglia Connection Node (EACN) 400 kV substation
- Key supporting infrastructure, including cabling sealing end (CSE) compounds
- **Backcheck and review**



Pathway to consent – the journey so far



First round of non-statutory public consultation (April and June 2022)

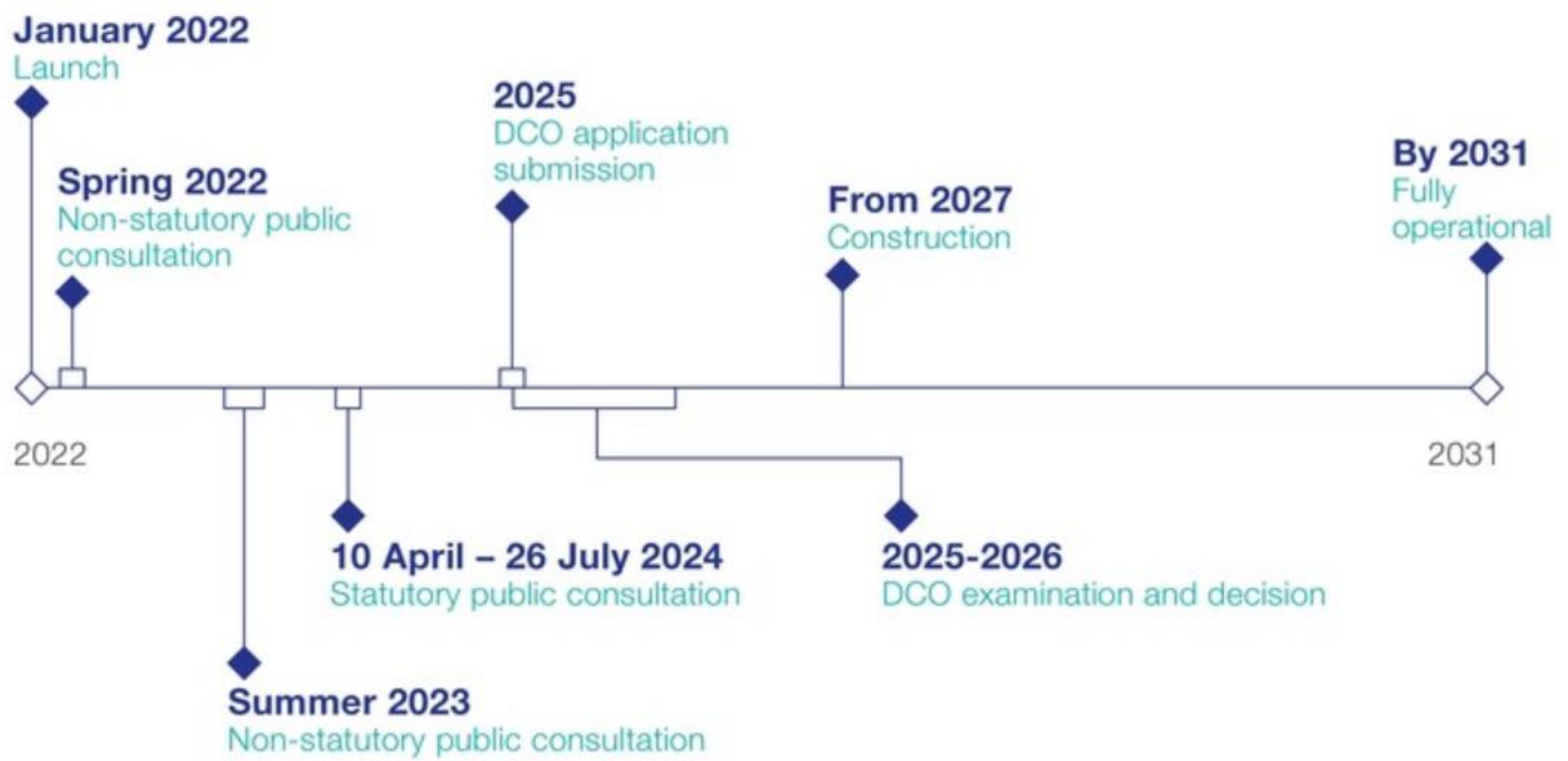
- Processing consultation feedback (June to October 2022)
- Development of Consultation Report (October to May 2023)

Second round of non-statutory public consultation (June and August 2023)

- Processing consultation feedback (July to October 2023)
- Development of Statement of Community Consultation (January to April 2024)

Statutory public consultation (April to July 2024)

Project timeline



Questions and Answers

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Q&A

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Kevin Roeton - National Grid

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