Facilitating connections in the North East, Yorkshire and northern Lincolnshire.

9 March 2023

ESO nationalgrid NORTHERN POWERGRID

Welcome

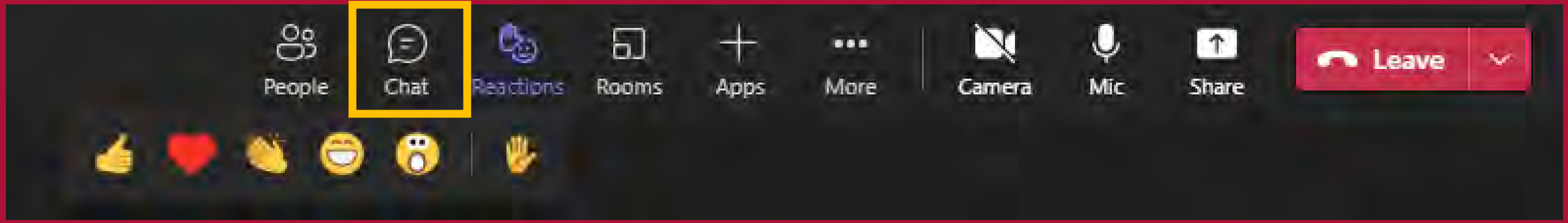
Our objectives

- A clear understanding of:
  - the difficulties of connecting electricity projects in our region and
  - the solutions
- An opportunity to ask questions of all parties (Transmission and Distribution) about the regional situation and outlook.

What	When
Welcome	12.00
ESO Update	12.05
NGET Update	12.25
NPg Update	12.35
Q&A	12.45
Close	13.15

Housekeeping

- Today's session will be recorded.
- Use the chat button to submit your questions but please don't post anything commercially sensitive as all attendees can see your comments.
- We will try to answer as many questions as possible during the Q&A, including those that were submitted in advance of today's webinar.
- Please avoid scheme specific questions.



Who's on the call today?

- Presenters and panel

nationalgridESO

Susana Nevesebrooks
Head of Network Connections

Andrew Wainwright
Head of Whole Electricity System

Stephanie Wootton
Connections Contract Manager

Djaved Rostom
Connections Operability Assessment Manager

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John Twomey
Head of Customer Management

NORTHERN POWERGRID

Jim Cardwell
Head of DSO Policy

Paul Glendinning
Director of Policy and Markets

Northern Powergrid Team

ESO INITIATIVES:
RESPONSE TO GB CONNECTIONS CHALLENGES

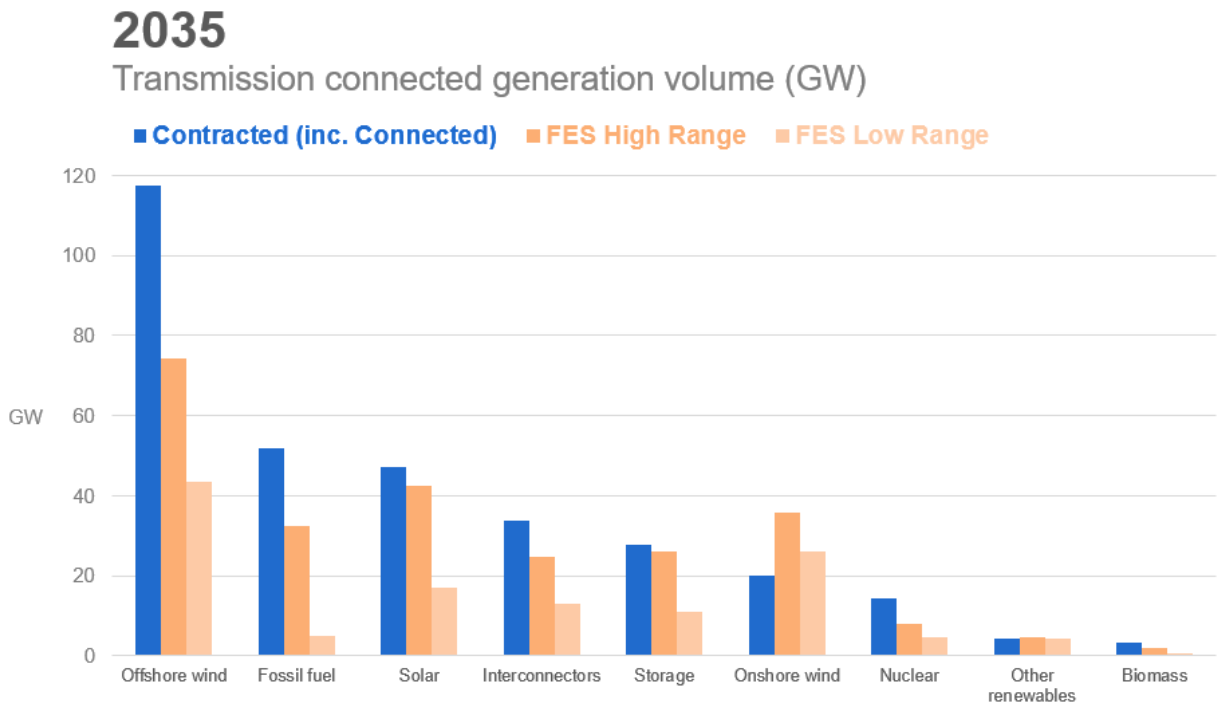
Connections: The Challenge

GB needs **123-147GW** of low carbon generation by 2030 to achieve net zero, we already have **83GW** connected.

As of February 23, our connections queue had **257GW** of projects waiting to connect.

Only **30-40%** of projects in the queue materialise, but the queue operates on a first-come-first-served basis.

Projects further up the queue not ready to connect can delay those that are more readily able to supply energy.



2035 TOTALS
320 GW contracted volume
250 GW FES high range
125 GW FES low range

Our **Five Point Plan** to speed up the connections queue:

1. Operating a Transmission Entry Capacity Amnesty until April 23, allowing developers to **leave the queue** with **no penalty**.

2. Updating our modelling assumptions to reflect current connection rates of **30-40%.**

3. Changing treatment of network **storage**, allowing them to connect **faster** and free up capacity for other projects.

4. Developing new **contractual terms** for connection contracts so projects that are **progressing can connect** and those that are not can **leave the queue**.

5. Developing an **interim option initially** for storage projects to connect to the network **sooner**, but they may be required to **turn off** more frequently when needed to without initially being paid.

TEC Amnesty

TEC amnesty

- **September 2022** - TEC Amnesty Expression of Interest letter released to industry
- **1 October - 30 April 2023** - TEC Amnesty expression of interest window is open
- **1 May 2023 - 30 June 2023** - Review of submissions
- **31 July 2023** - ESO will issue communications confirming next steps and communicate with customers

Changing the way we assess and model connections

Construction Planning Assumptions Review

Why are we doing this?

- Oversubscribed generation background with substantial volume of speculative projects
- Only 30%-40% of projects will make it to fruition
- Studies indicating that the network will be constrained, driving the need for substantial enabling works and delaying connections dates
- Common goal is to achieve net zero together
- New CPA principles have been developed to better reflect actual attrition rates.
- ESO is taking on more risk whilst ensuring network remains operable, economic and efficient

Local Region

- 50% Attrition rate applied to MW capacity
- Applied to projects without consents
- Applied by fuel type
- Applied to projects in the queue and projects with a connection offer

Wider Region

- 66% Attrition rate applied to MW capacity
- Attrition by fuel type
- Opportunity to align wider background with FES
- Wider boundary capability limits applied

Distributed Energy Resources

- 66% attrition applied to local and wider regions
- Mixture of appendix G data and FES
- DER output from POUYA
- DNO ANM Schemes- Future improvement

New CPA Principles

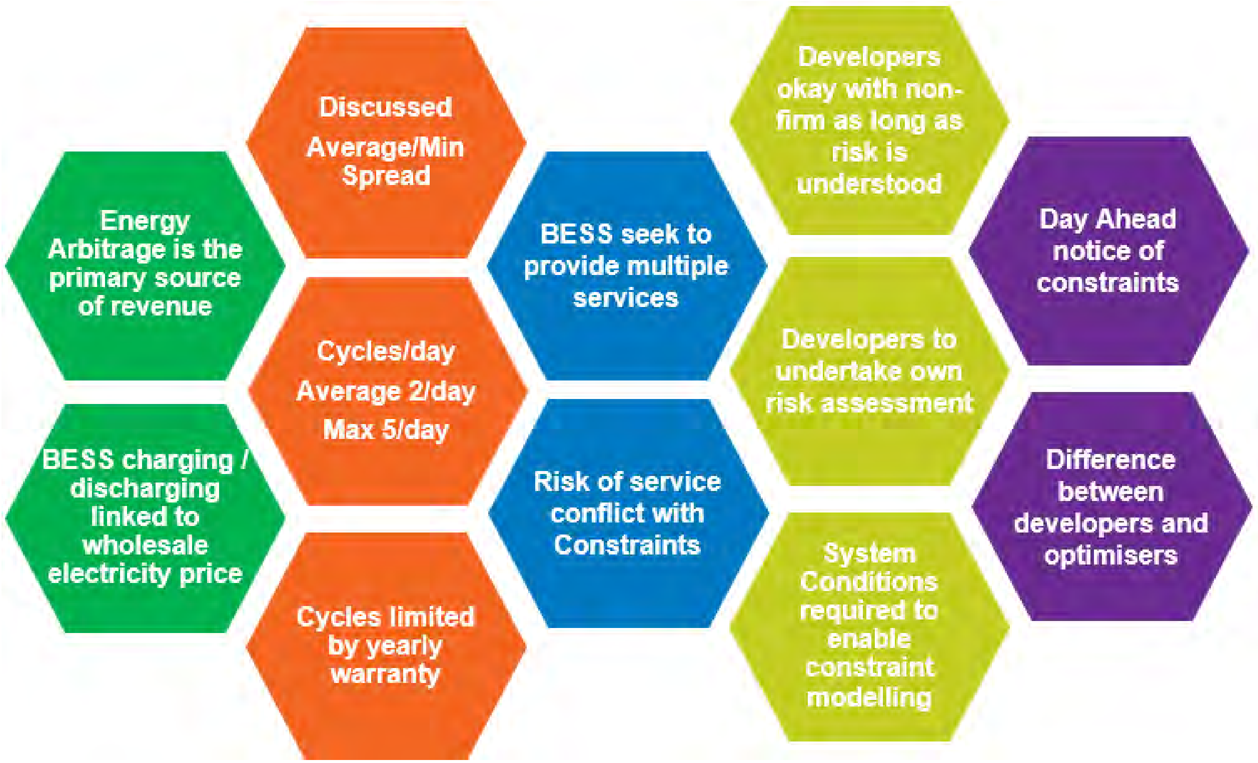
Treatment of BESS

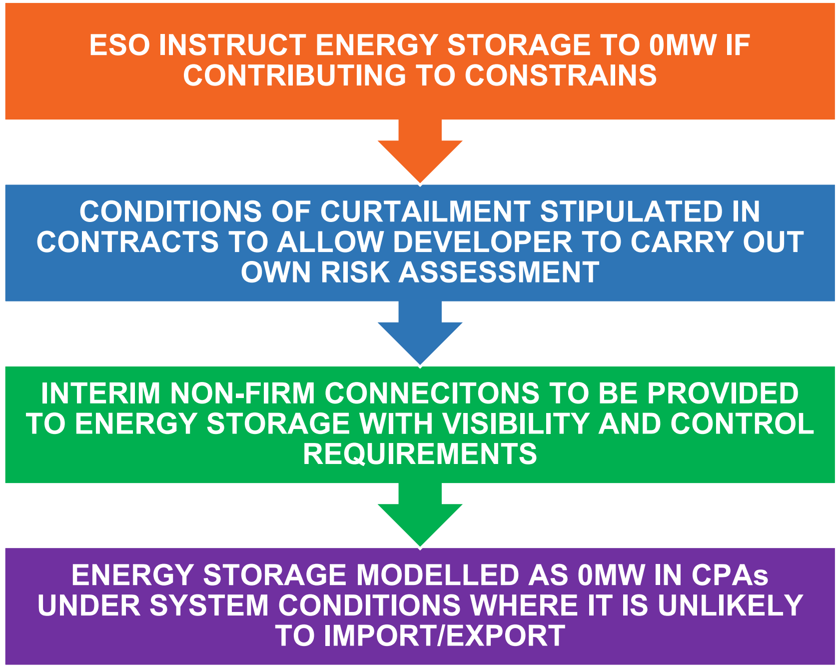
Why are we doing this?

Energy storage can play an important role as enable of renewable energy penetration and facilitate the transition to net zero

In some cases their operation can have a negative correlation with system constrains

We have engaged with a group of energy storage developers to understand the business model for their assets which helped us shape our proposal





Non-firm offer development for Energy Storage

Network Owners/ ESO Connections

- Improved modelling of energy storage
- Understand implications of curtailment on service provision.
- Define contractual terms for non-firm connections and associated network restrictions.
- Establish data to be provided to energy storage to enable calculation of curtailment risk
- Undertake assessments to determine works for firm connections.

ESO- Electricity Network Control

- Processes established to ascertain when and how energy storage can be curtailed.
- Establish optimum time (Day Ahead/ within day) for providing curtailment signals
- Development of IT systems to issue instructions to energy storage at both T&D
- Systems to establish when curtailments are compensated v/s not compensated.

Storage Developers

- Carry out assessment of risk of curtailment frequency and duration of curtailment.
- Understand implications of curtailment on service provision.
- Work with Network owners/ ESO to sign up to appropriate systems to receive curtailment instructions.
- Enact upon instructions in appropriate timescales.

We aim to address the above ESO development activities on non-firm connections by end of March 2023.
In parallel we are also be exploring opportunities for non-firm connections for other types of generation

Queue Management

TEC / Queue Management

Original Timeline	Current Status	Risks
Final modification report issued to Ofgem on 12th April Implementation of QM to all new applications, Modification Applications and Agreements to Vary (ATVs) for parties with a CUSC Construction Agreement (except BEGAs, DNOs associated with Distributed Generation (DG) or demand customer connections; and shared works for non-radial offshore connections and any Offshore Transmission System User Development Works (OTSDUW) - 10 working days ESO alternative – QM applies to all existing agreements with a contracted Completion Date of 2 years or more, or projects with a Completion Date of less than 2 years which aren't progressing , from CMP376 implementation - up to 24 months	11 WACMs [new proposals or variations to the original proposal] voted in on the 8th of February Workgroup vote to take place on the 7th March for all alternatives, review of Legal text and Terms of reference to be have met before draft modification report is presented to panel on the 23rd March Original deadline no longer achievable - New deadline, 7th June CUSC Panel	TEC Amnesty was extended to align with QM delivery to enable more projects to come forwards to terminate Enable more parties to Mod App to move completion dates back and associated securities without consequences, such as we would see if QM clauses where in the contract Delay opportunity to start to manage speculative projects out of the queue Prevent the opportunity to add QM clauses and relevant appendices as part of contract updates following TWR review

Two step offer

Step One - Initial Offer

Customers are provided with an offer in standard terms, which identifies a connection site reflecting the requested connection point in the application and a completion date, which may change in step two.

This is based on the existing TEC queue and current Transmission Reinforcement Works (TRW) reflecting the general scale of works to enable connection for projects applying now against the current contracted background.

It will not however include the detailed works, programme or indicative costs and charges that would usually populate the appendices.

No transmission works will be identified in or undertaken for the purposes of the connection at this stage.

Securities will be set at £0 for new offers. Modifications will be reviewed as part of the process

Step Two – Follow up Offer

Where the step one offer is accepted, this offer will then be issued a maximum of nine months after counter signature of the step one offer.

A meeting with each customer who has accepted the step one offer will be held to give an update on the wider results following the completion of the TRW review.

The meeting will also discuss when the customer can expect the follow up offer to be issued, and the likely results.

The follow up offer will be updated based on the TRW review study results and contracted background, and identify the transmission works needed for each project.

This offer will include the complete populated suite of appendices for the agreement, including securities and programme of work, based on the identified TRW.

Two Step Process – Next Steps

Two Step Process started on the 1st March 2023

Two Step Process will apply to England and Wales offers only

Scottish TO's will implement new CPA's using current process

Two step webpages have are live with information and FAQ on ESO website

Two Step Process will run for 12 months

OFGEM letter of support has also been published for Two Step

CPA to be sent from NGESO to all 3 TO's to start the TRW review

Further webinars for March and rest of the year tbc

Governance process implementation to monitor change

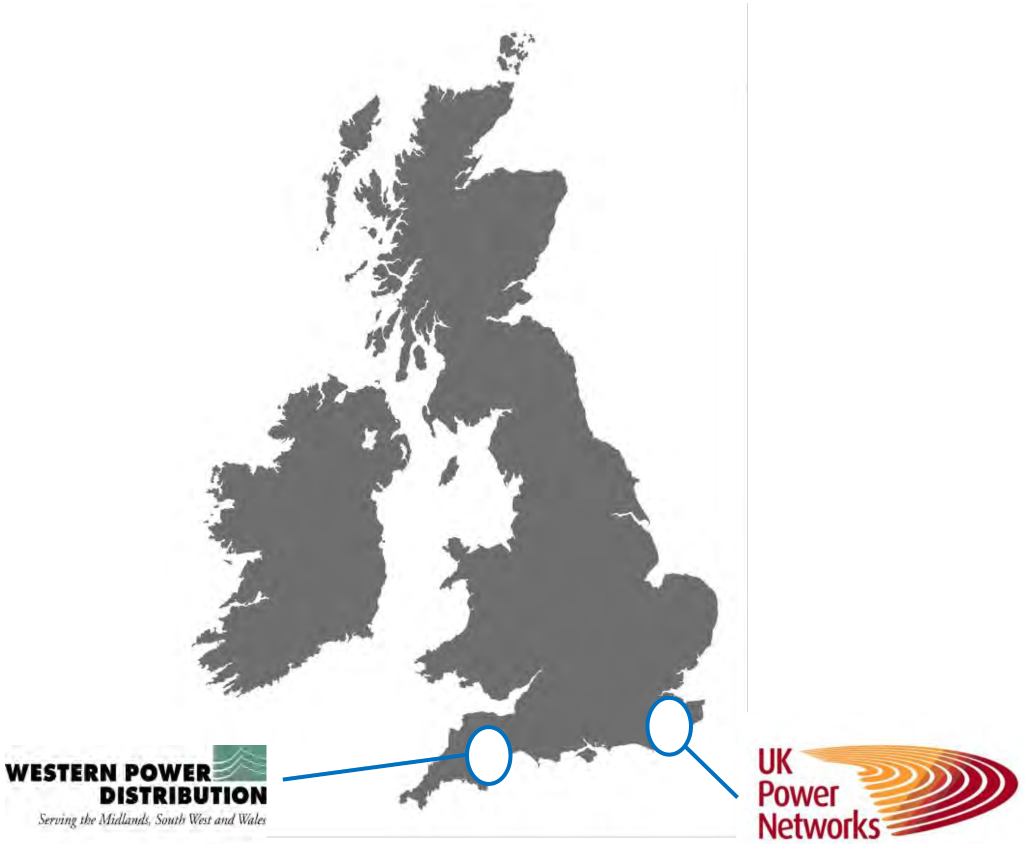
Delivering regional solutions

ESO

Introduction

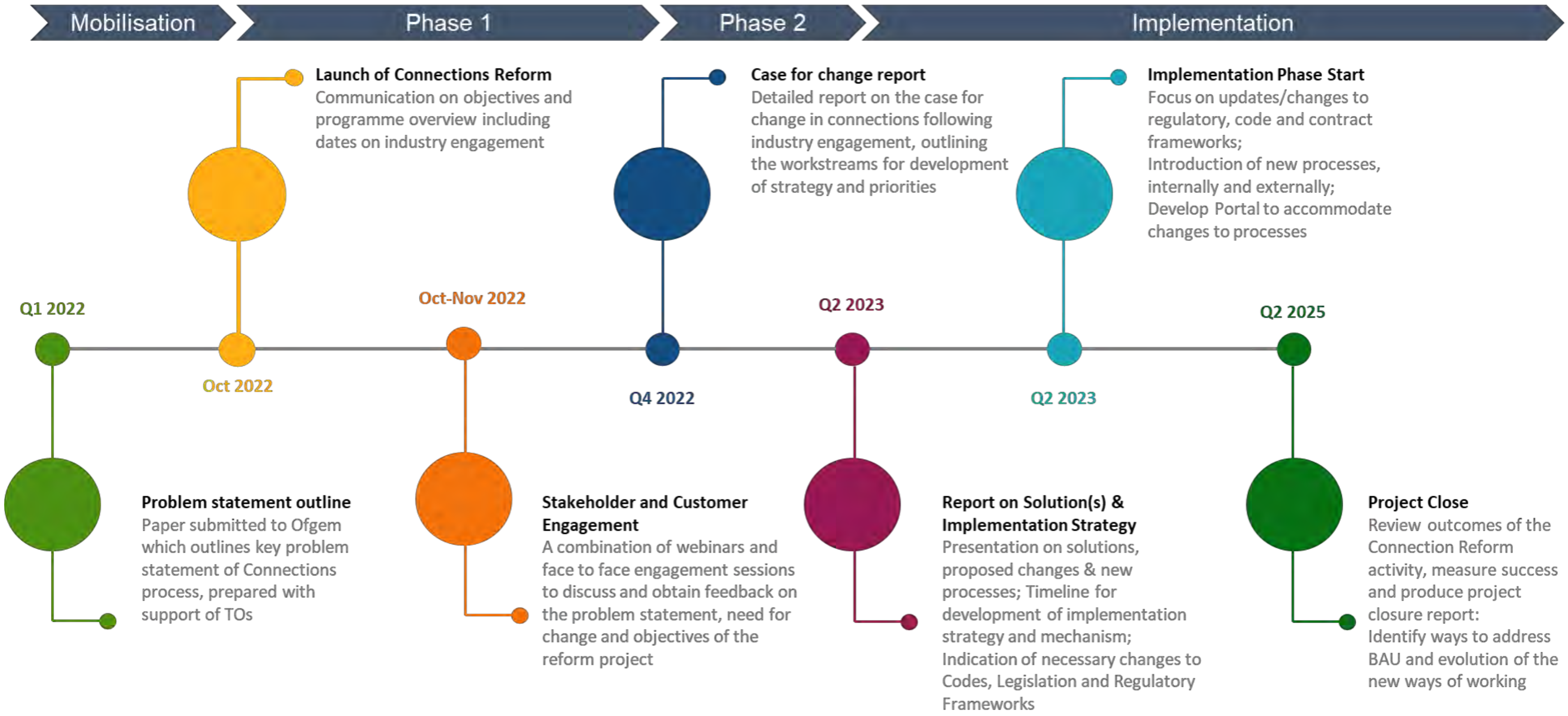
- Releasing local capacity across the T-D interface
    - GSP limits and when we use them

- Managing constraints on broader transmission system
    - Regional Development Programmes and MW Dispatch
        - Importance of visibility and control for DER
    - Next steps – whole system solutions that facilitate interim non-firm connections



Connections Reform Project

Connections Reform - Timeline



The Case for Change and Design Objectives

Phase 1: The Case for Change for Connection Reform

Before Application → **During Application and Signing** → **Post Contract Signing**

"1- Options are collaboratively developed throughout the connections lifecycle"

A. Limited opportunity for customers to understand optionality and shape their applications around grid capability

"2- Rapid connections progressed on their merits"

A. Process may inhibit efficient capacity allocation and management

B. Limited ability to prioritise and progress applications/projects that are more ready to connect

"3- A simple, transparent & coordinated approach to connections"

A. The connections process is being inconsistently applied and roles and responsibilities are not always clear

B. The connections process is unnecessarily complex in some areas

Consistent themes across the process

Easy access to self-service tools, consistent data and quality insight

Consistent, skilled & well-resourced engagement

The full Case for Change for Connection Reform (produced in Phase 1) is available on our website - https://www.nationalgrideso.com/document/273021/download

Phase 2: Design Objectives

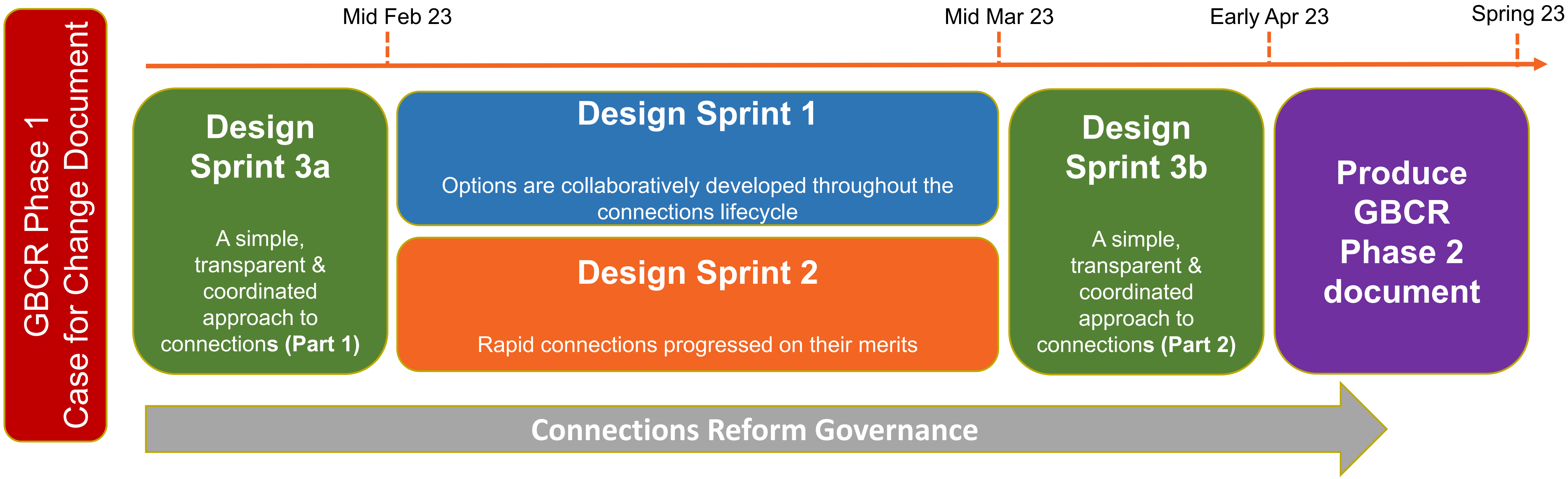
Design Objectives

- Options collaboratively developed throughout the connections lifecycle
- Rapid connections progressed on their merits
- A simple, transparent and coordinated approach to connections
- Easy access to self-service tools, consistent data and quality insight
- Consistent, skilled and well-resourced engagement
- Future proof process which supports efficient delivery of Net Zero
- Better system operability and cost outcomes for the end consumer

Phase 2 Structure and Timeline

We are now in the process of progressing GB Connections Reform Phase 2

Phase 2 of the GB Connections Reform project builds upon the Case for Change (created in Phase 1) to develop a range of possible options for reforming the connections process. This will be done in an agile manner via a number of ‘sprints’ which, when combined, will consider the full breadth of possible options.



All sprints will consider all customer segments and personas, data and technology and people and skills.

The Design Principles will guide the sprints with options assessed against the Design Objectives and Design Criteria.

Connections Portal

ESO

Connections Portal - Update

The Connections Portal is being designed **transform the Connections Journey** and account management for all Customers.

The Portal will provide a single point of contact for all ESO customers looking to connect and manage their projects.

The March 2023 release will enable the digitisation of the e2e application process and include the following high-level functionality:

2nd December 2022
Connections Technical Release

- **Technical Release:**
  - Internal release of new Salesforce backend objects and automation associated to portal.
  - Focus on ensuring internal processes are working and embedded ahead of further external releases.

COMPLETE

30th January 2023
Connections Portal Phase 1a release

- **Controlled released approach:**
  - Release access to portal for the Early Adopters [approx. 50 customers]
  - Focus on staged release of the portal to assess performance and prevent platform to be overwhelmed from high number of users following release (+800 users)
  - Registration issues addressed (Feb 23)

COMPLETE

13th March 2023
Connections Portal Phase 1b release

- **Open access to Registration and Portal to all ESO Customers**
  - Focus on addressing any defects or issues identified from Early Adopters user experience ahead of wider release
  - Ensure wider release is successful and delivers on the improvement to connection application process

ON TRACK

1st May 2023
Connections Portal Phase 2 – Focus

- **Focus Groups**
  - Run a series of webinars and workshops where NGESO will invite Customer to participate to enable further development of existing functionality to enable further improvements to the customer journey
  - Review requirement for development of further functionality and automation

ON TRACK

Next Steps

TEC AMNESTY

- CLOSE WINDOW FOR APPLICATIONS BY END OF APRIL 2023
- CONTINUE TO ENGAGE WITH OFGEM AND CUSTOMERS
- MAY 2023 REPORT INDUSTRY ON OUTCOME

QUEUE MANAGEMENT

- SUBMISSION OF PROPOSAL FOR CUSC MOD TO OFGEM BY EARLY JUNE
- OFGEM TO DELIBERATE [NO DEADLINE OR ESTIMATION OF TIME REQUIRED TO DELIBERATE KNOWN]
- FOLLOWING DECISION:
  - NEW OFFERS: IMPLEMENT WITHIN 10 WORKING DAYS
  - EXISTING CONTRACTS: IMPLEMENT WITHIN 24MONTHS

CPA AND BESS MODEL REVIEW & TWO STEP OFFER

- COMMUNICATE TO INDUSTRY IN LATE MARCH/EARLY APRIL ON GOVERNANCE PROCESS AND PROPOSED REPORTING CADENCE
- FOR ENGLAND AND WALES COMPLETE TWR BY LATE SUMMER/EARLY AUTUMN

INTERIM NON-FIRM SOLUTIONS

- COMPLETE INTERNAL GOVERNANCE PROCESS BY END OF MARCH 2023
- PROVIDE INDUSTRY UPDATE ON PROCESS FOR INTRODUCTION OF INTERIM NON-FIRM OFFERS AND HOW TO TAKE PART BY END OF MARCH / EARLY APRIL
- PUBLISH BLUEPRINT PAPER FOR DER VISIBILITY AND CONTROL REQUIREMENTS

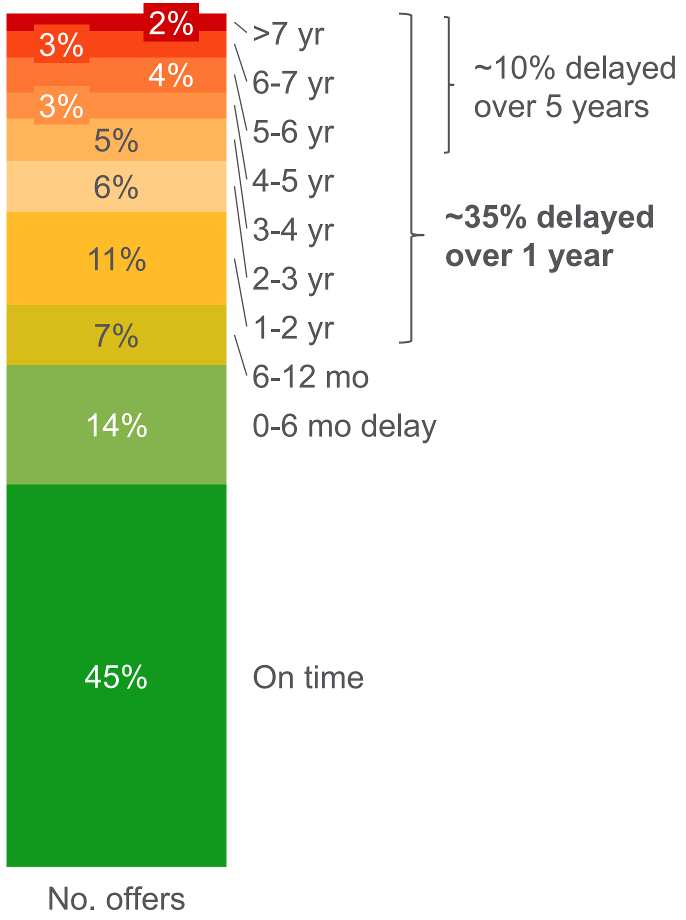
ESO

NGET update on work to support further capacity in the north of England

nationalgrid

We need to reduce the delta between connection dates offered and customers' requested dates; 35% of customers are facing a delay >1year

Delta between connection date offered and requested date (April 20 - Sep 22)[1] - Includes generation and demand contracts



- Currently **35% of our customers' projects are facing a delay of more than a year** driven by connection dates; 10% of these are delayed by more than 5 years.
- To meet customer needs, we need to focus on reducing the **difference between offered and requested dates**, typical lead time per technology;
  - Offshore wind - 6-9 years
  - Solar >100MW - 4-9 years, Solar <100MW - 3-4 years
  - Data centres - 1-5 years
  - Batteries - 2-4 years
  - DNOs / housing estates -1-4 years
- This issue **also impacts DNOs ability to meet their customers' needs**;
- Lead-times are driven by the increase in **scale and, crucially, complexity of the queue,** which is only set to increase
- Without fundamental reform we expect the queue to continue to rise rapidly, due to; BESS, possible relaxation of onshore planning restrictions and an increase in EV / Heat pump adoption
- **The challenge is not unique to NGET**, similar challenges are occurring across other countries

Key Capacity projects (1/2)

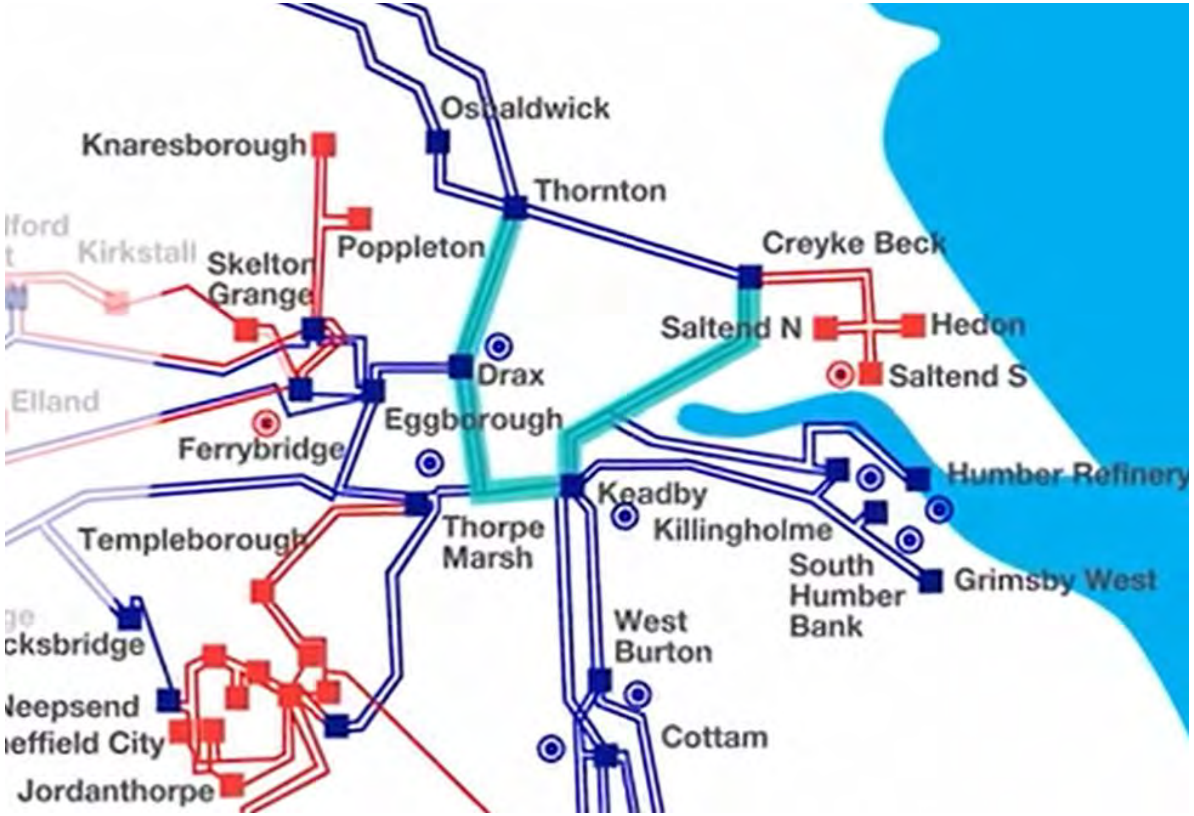
- High volume of connections continue to contract in this region. Currently we have over 30GWs of contracted generation. Current connection timescales in this area are now beyond 2030 due to the level of volume contracted.
- The region continues to see a diverse set of technologies looking to connect from offshore wind, interconnectors, batteries and solar farms.

- Predominant North to south flows in this area, as generation makes it way down to the big demand zones in England.
- Focus of work required in this area centres around both the reconductoring of existing circuits and the need for additional overhead line capacity in the area

Key Projects which we are actively focused on developing and delivering include :-

- Reinforcement of a number of substations to accommodate new super grid transformers and delivery of new substations in the area.
- Uprating solution for Norton – Lackenby – Thornton to provide additional capacity out of the group.

Key Capacity Projects (2/2)



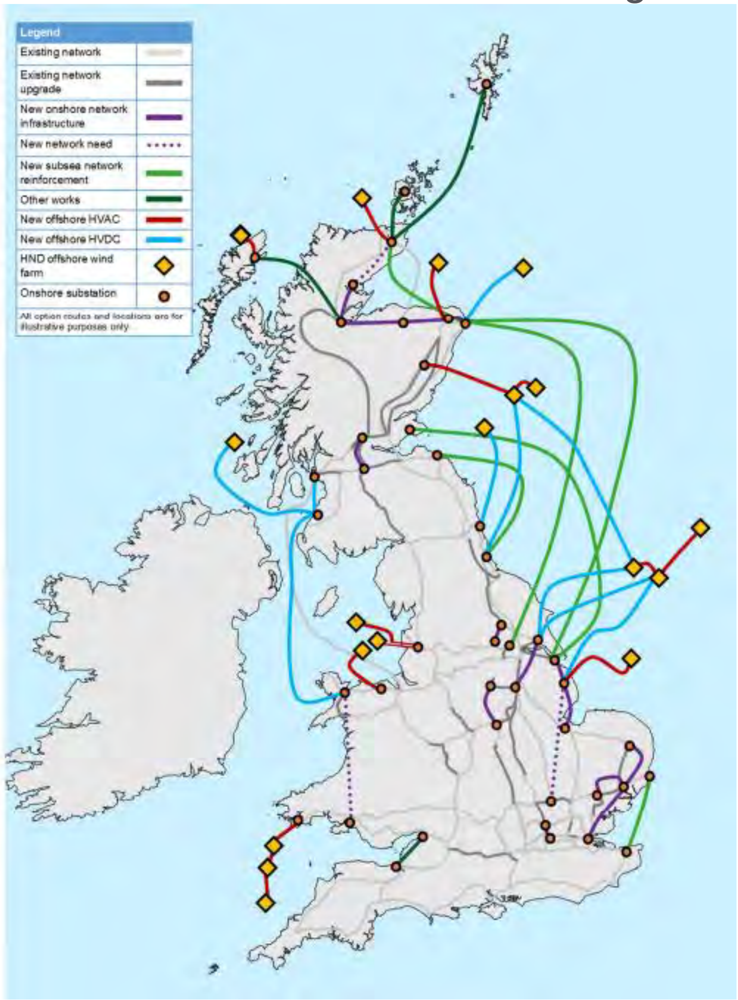
There are a number of reinforcement schemes required across this region, all of which are required to mitigate thermal constraints on the system. Key schemes that are required include :-

- Reconductoring of thee Thornton – Drax – Keadby circuit
- Reconductoring of the Creyke Beck – Keadby circuit
- New Overhead line out of the group from Creyke-Beck to high Marnham
- New Overhead line from South Humber to South Lincolnshire
- New coastal substation in the Lincolnshire area

There will need to be careful planning of system access windows in this area to successfully sequence the works to optimise customers connection dates.

Firm plans are in place for the delivery of new infrastructure to support the decarbonisation agenda

The ESO's Holistic Network Design



	Code	Project Name		Optimal delivery date[1]
17 projects to deliver				
Offshore Mature schemes	E2DC	Eastern Link 1 (Torness to Hawthorn Pit)	JV (SPT)	*2027*
	E4D3	Eastern Link 2 (Peterhead to Drax)	JV (SSEN)	*2029*
Offshore Mid-stage schemes	E4L5	Eastern Link 3 (Peterhead to South Humber)	JV (SSEN)	*2030*
	TGDC	Eastern Link 4 (Westfield/Fife to South Humber)	JV (SPT)	*2030*
	SCD1	SEA Link, South & East Anglia Link		*2030*
Onshore Mature schemes	OPN2	Yorkshire GREEN		*2027*
	BTNO	Bramford to Twinstead		*2028*
Onshore Mid-stage schemes	AENC	North East Anglia GREEN		*2030*
	ATNC	South East Anglia GREEN		*2030*
	CGNC	Humber Trent GREEN		*2030*
	GWNC	Lincolnshire GREEN		*2030*
	EDN2	Chesterfield to Ratcliffe-on-Soar		*2030*
Upgrades to existing NGET assets	EDEU	Brinsworth to Chesterfield		*2028*
	HWUP	Hackney, Tottenham & Waltham		*2027*
	TKRE	Tilbury to Grain & Tilbury Kingsnorth		*2028*
	PTC1	Pentir to Trawsfynydd		*2028*
	PTNO	North Wales		*2029*
6 further early stage projects we're developing				
Onshore New schemes	*LRN4*	*Lincolnshire to Hertfordshire (or similar)*		*TBC*
	PSNC	*Pentir to Swansea North*		*TBC*
Truly offshore	*AC6*	*T-Ponit to Pentir (HVDC)*	JV (SPT)	*TBC*
	AC4	*SW_E1a – R4_1 (HVDC)*	JV (SSEN)	*TBC*
	AC2	*R4_1 – R4_2 (Offshore AC)*		*TBC*
	AC1	*R4_2 – Lincolnshire Connection Node (HVDC)*		*TBC*

[1] "Optimal date" as set out in Ofgem's Accelerated Strategic Transmission Infrastructure (ASTI) decision of December 2022

The delivery challenge

To meet the government's target, our industry must deliver more than 5 times the amount of electricity transmission infrastructure in the next 7 years, than has been built in the past 30 years.

We can't deliver this without supporting major supply chain investment

So, how do we make it happen?

We are acting on this framework to deliver in new ways

Working differently with our supply chain

Certainty to invest in capacity

Partner, rather than commission

Seeking to understand where this can create local skills and jobs

Innovative ways to deliver better and quicker …

…including looking at how we improve our impact on communities and the environment

We've started consulting our supply chain on our plans to do this and are looking to go to tender later this year

Northern Powergrid Update

Impact on connections in our region

Jim Cardwell
Head of DSO Policy

9 March 2023

What does it mean for Northern Powergrid customers?

- 60% of Grid Supply Points impacted.
- 122 customers currently have long lead times.
- We expect that another *c*.+50 customers will join this list when responses are received for in-flight project progressions.
- In our region this is largely impacting customers seeking to export electricity (generation and storage).
- Electricity demand projects are less impacted.
- We continue to see significant interest in generation and storage.

North East GSPs impacted	Yorkshire GSPs impacted
1. Blyth 66kV	1. Camblesforth
2. Hartmoor	2. Creyke Beck
3. Knaresborough	3. Drax
4. Lackenby	4. Elland
5. Norton	5. Ferrybridge A
6. Osbaldwick	6. Ferrybridge B
7. Poppleton	7. Grimsby West
8. Spennymoor	8. Keadby
9. Stella North 132kV	9. Saltend North
10.Stella South 132kV	10. West Melton/ Thorpe Marsh
11.Tynemouth	11. Pitsmoor
12. West Boldon	
13. Hawthorn Pitt	

What does it mean for Northern Powergrid customers?

Industry collaboration	Our commitments
– **Queue optimisation** exercising contractual rights to remove stalled projects from the queue and free up capacity for projects that can proceed. We are leading a new approach that involves: – Re-phasing – Optimisation – Reform – **Delegated limits** DNOs seeking the ability to refer fewer decisions to the ESO. – **Smarter connections** sharing more information between customers and networks to get people connected - if accepting limitations on operation.	– **Making improvements** to our network availability heat maps to help customers make more informed choices about how and where to connect. – Publishing a **project progression summary**. – Continuing to provide opportunities for customers and stakeholders to **engage with us** on this important subject. – Facilitating **surgeries** for those customers who want to work through issues post-acceptance.

What does it mean for Northern Powergrid customers?

- Connections quotations continue – now involving a **two-stage transmission offer**.
- **Flexible connections** will be used where possible – we will seek to offer non-firm principles if it enables an earlier connection.
- ESO initiatives should improve the position – **modified offers** will start to be issued in 2023.
- Further improvements sought – we are **collaborating** with other network companies to improve the situation further and will keep you informed.
- Socialisation of connection costs – the Ofgem Access SCR decision means that from 1 April 2023 some connection offers will have more of the **costs socialised**.

Seeking improvements for our customers in terms of timescales and offers

Panel Q&A

- Please use the chat function to ask questions.
- We will try to answer as many questions as possible during the session, starting with those that were submitted in advance of today's webinar.
- If we run out of time or can't answer your question, we'll follow up with you individually.

Thank you for your participation.

Contact:
transmission.enquiries@northernpowergrid.com