Customer Connections Steering Group

Kester Jones
Head of Connections

June 2023

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Customer Connections Steering Group
Agenda

Introduction to the day

01	Business update and connections
02	ESO Interface - Queue Management five-point plan and TEC Amnesty
03	NGED and ENA – Accelerating connections
04	Statement of Works (SoW) and Project progression
05	Innovation in connections

Thank you and close

Director’s Update

Alison Sleightholm
Regulation and Corporate Director

June 2023

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The Energy Landscape

Electricity demand is forecasted to more than double by 2050.

Government target to decarbonise the power system by 2035, while at the same time demand for electricity will increase by 50%

£40 billion of capital investment being spent across National Grid Group over next 5 years.

Various consultations and a combined Ofgem/DESNZ connections action plan due for publication Autumn 2023.

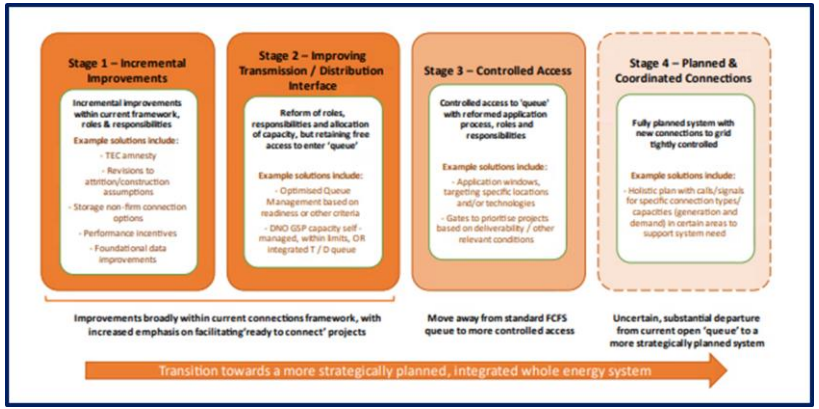
Ofgem open letter/consultation on future reform to the electricity connections process

Ofgem – Open Letter on future reform to the electricity connections process

Objective – electricity connection offers with shorter average connection dates which better meet customers' needs and enable a timely transition to net zero

Ofgem focussed on three key factors: -

- Strategic network investment
- Efficient and flexible network management
- A fit for the future connections process
  - Reduce connection times
  - Open data and data sharing
  - De-prioritise projects not making progress and accelerate well-developed projects.



[Open letter on future reform to electricity connections process (ofgem.gov.uk)]

Ofgem consultation on future systems and network work regulation

Ofgem Consultation: future systems and network work regulation

(Closed 19th May 2023)

Why?

- To move away from the current short-term focus on immediate energy bill impacts and focus instead on delivering longer term benefits to customers.
- Ofgem needs to have strong belief in its own incentives and to recognise and celebrate the fact that any rewards to investors are because the company has delivered for its customers.
- We must make changes to avoid unnecessarily burdensome aspects of the current regime that cause delays to key investments or unnecessary costs to be incurred.

The future regulatory framework needs to:

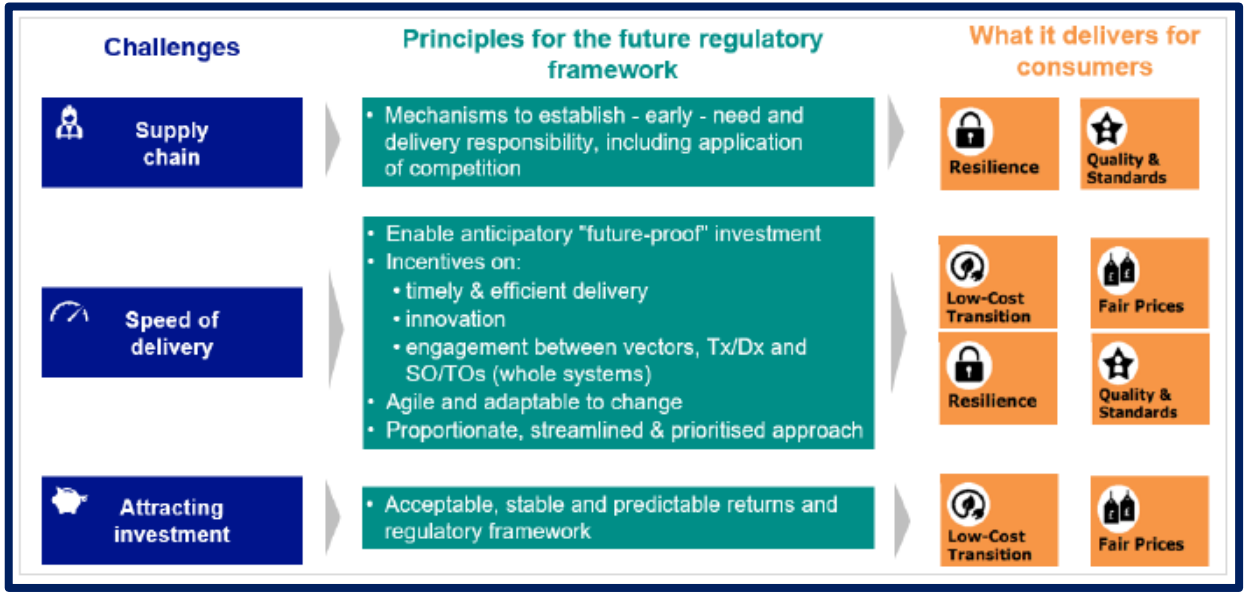
- support whole system thinking
- support long term decision making
- allow networks to deliver for customers at pace
- attract the considerable capital that will be needed
- be able to respond to change flexibly and in a predictable way

Our response

We believe the principles set out could be met through one of two approaches to the regulatory framework:

1. a **'mix and match' based approach,** incorporating elements of all three archetypes; or

2. an **ex-post based approach**, applying a simpler, agile, cost pass-through approach across all investment with a fixed rate of return.



Making the News

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News Update

ESO have launched the Connections Reform Consultation which closes Friday 28th July.

As a quick summary of the ESO preference “TM04”:

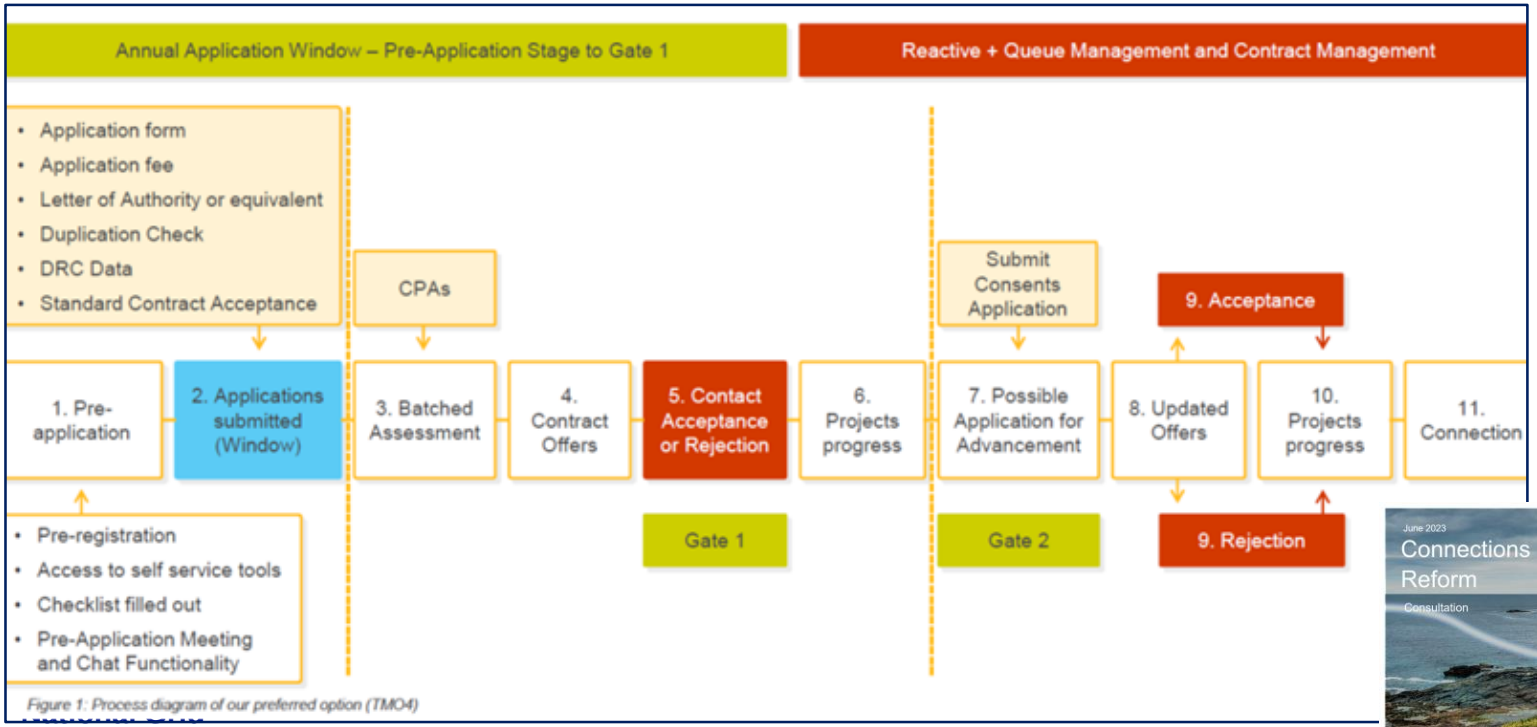

Figure 1: Process diagram of our preferred option (TM04)

Delivering for 2035

National Grid Spring Policy Paper

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download (nationalgrid.com)

National Grid – Delivering for 2035
Upgrading the grid for a secure, clean and affordable energy future.

To achieve the UK's 2035 power section decarbonisation target, significant growth is expected in transmission and distribution.

Offshore wind
4.5 to 6 times
growth in capacity

Solar
2.5 to 5 times
growth in capacity

Interconnectors
2.5 to 3 times
growth in capacity

Battery storage
4.5 to 10 times
growth in capacity

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

Delivery of these changes requires significant upgrades and extensions to National Grid Electricity Transmission's networks. **By 2030,** this is expected to include:[6]

Building over
5 times more
transmission overhead or underground lines than we have built in the last 30 years.

Building around
4 times more
transmission marine cables than our current offshore network.

NGED Footprint
National Grid Electricity Distribution owns and operates electricity distribution networks in the Midlands, the South West and Wales. In these regions by 2035 we expect to see the following growth:[7]

Solar and onshore wind
4 times
growth in capacity

Storage
10 times
growth in capacity

Electric vehicles
23 times
growth in numbers

Heat pumps
13 times
growth in numbers

2035 opportunities and challenges

Five priority areas for action

1 Reform the planning system, centred around a strategic clean energy vision

2 Ensure the regulatory and governance framework is set up for delivery

3 Transform how clean energy connects to the grid, accelerating net zero projects

4 Put communities and consumers at the forefront of the transition

5 Develop supply chain capacity and a skills pipeline across the country

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NGESO TEC Amnesty & Queue Management Update

Matthew Bent –
GB Demand Manager

ESO

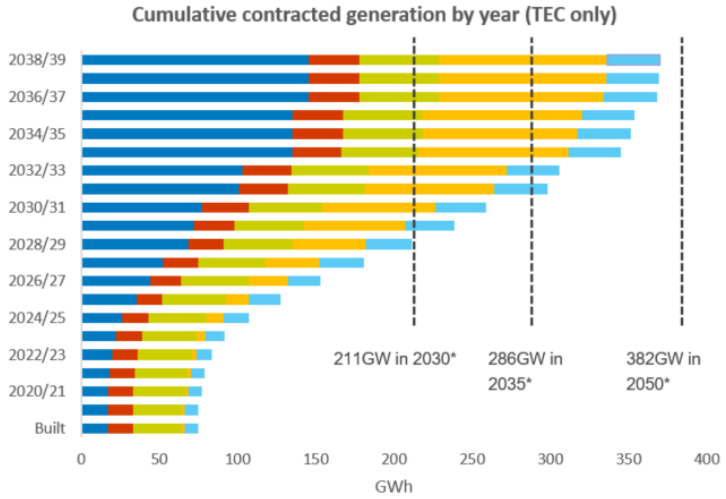
Transmission Entry Capacity (TEC) Amnesty

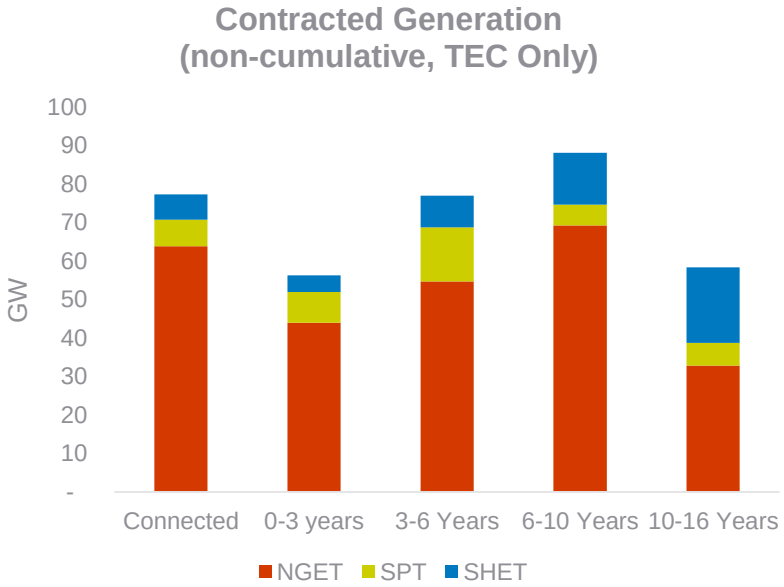
ESO

Connections Queue

The contracted background is still growing, with more applications offsetting a falling acceptance rate to result in a process with more wasted effort.

Over 306 GW of generation projects are currently seeking to connect to the electricity transmission system, yet our data shows that up to 70% of those projects may never be built.





* Highest Total Installed Capacity figures for each date from FES 2022

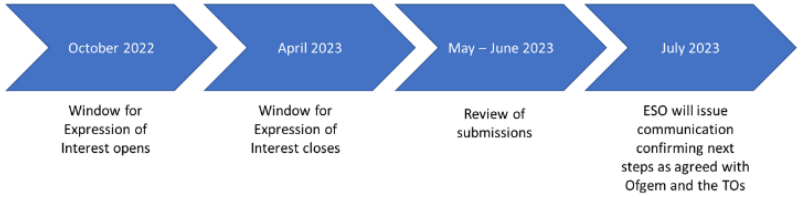
Our 5 Point Plan

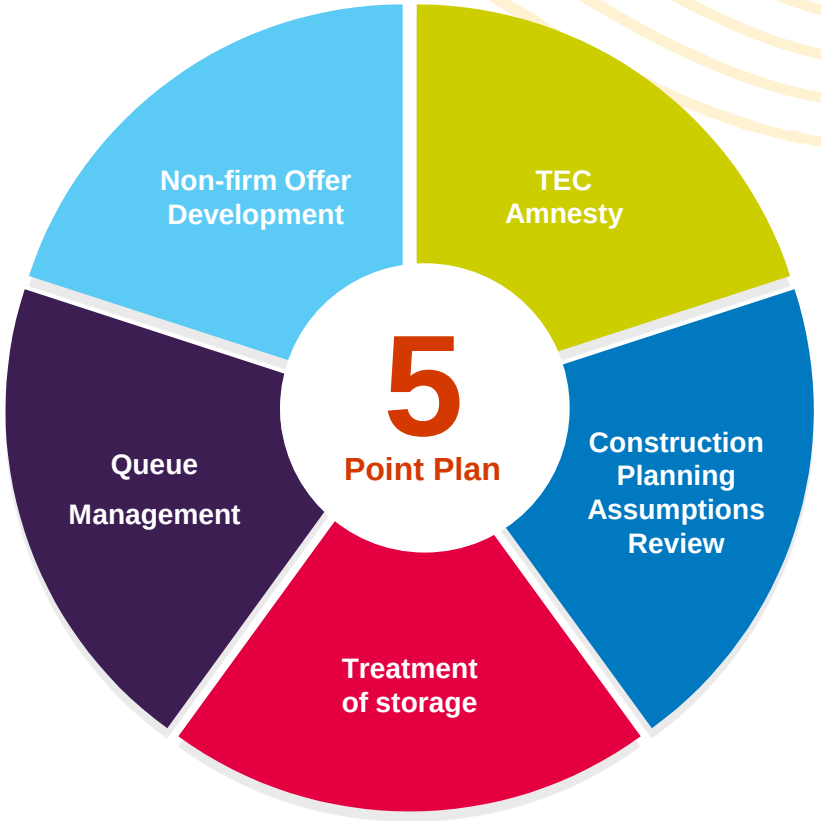
To manage some of these immediate challenges, our 5 point plan is helping.

1. TEC Amnesty

This was the first TEC Amnesty since 2013. We received a total of 8.1GW of applications and are currently working with Ofgem to allow the termination/reduction of TEC process from connection agreements.

Overview of timescales

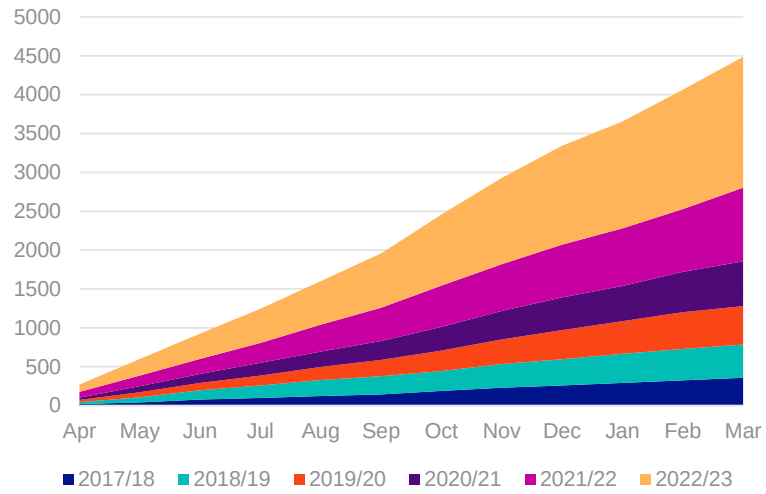




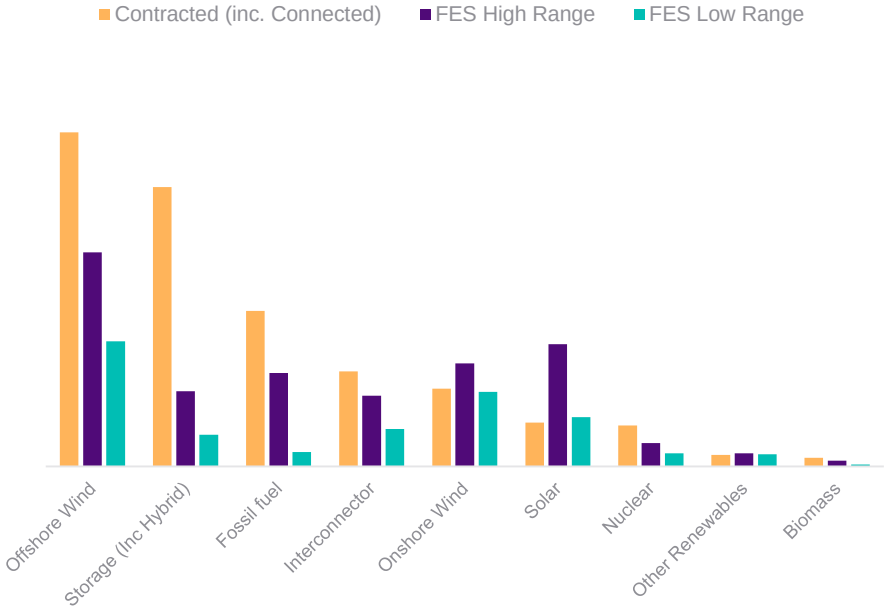
Queue Management

Connection Growth

Licenced Applications Received



Contracted background vs FES 2035



- Continued increase in licenced applications, receiving 1689 in 2022/23
- Majority of new applications are for BESS or BESS Hybrid
- Contracted background now shows 306GW of future contracted generation

Our 5 Point Plan

To manage some of these immediate challenges, our 5 point plan is helping.

All transmission connection contracts are bound by the licensed code, Connection Use of System Code (CUSC)

4. Queue Management – CMP376

There is currently no mechanism in the CUSC to terminate projects that are not progressing. If changes are approved, it would allow the ESO to terminate projects that are not progressing against their contracted milestones and agreed timescales, in order to free up capacity for other projects that can progress.

Update

CMP376 has gone to Ofgem for a decision to introduce QM into the CUSC, and allow NGESO to terminate projects under certain criteria.

Proposer's solution

Scope and Implementation – All new applications, new Modification Applications and new 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)).		
Milestones – Milestones to be included in the Construction Agreement and will date back from contracted Completion Date (Milestone duration time period is determined from a look-up table based on the period from the offer date of the Agreement to the contracted Completion Date).	**Evidence to Demonstrate Compliance –** For each Milestone set out in the CUSC. Note that this is an ongoing compliance requirement for M1, M2 and M3 (i.e. the Conditional Progression Milestones).	**Exceptions** - Exceptional issues that Users cannot control and which may lead to unforeseen project delay and issues with their compliance to Milestones.
Modification Applications – All Milestone dates stay fixed unless Exception provided; in case of 1st Modification Application after CMP376 implementation for pre-existing Construction Agreements, Milestones are set based on the Modification Application offer date and the Completion Date in that offer.	**Terminations** – There is a 60 calendar day remedy period to rectify any missed Milestones ESO will terminate for M1, M2 and M3 (i.e. the Conditional Progression Milestones). ESO has the right to terminate for M5, M6, M7 and M8 (i.e. the Construction Progression Milestones). There will be an internal ESO escalation process before this right is exercised.	**Appeals** – Standard "Other Disputes" process as per CUSC Section 7.4

Thank you for listening, any questions.

NGED and the ENA: Accelerating Connections

Kester Jones
Head of Connections

June 2023

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Current Connections Landscape

Nearly 50GW of renewable electricity projects have been connected since the first commercial wind farm in 1992.

164GW of new connection requests were received in the year to October – more than twice the entire grid's worth of capacity looking to connect.

Network operators are looking to mobilise £22bn of investment into the UK's electricity distribution infrastructure, to help ensure the energy network supports everyone in making their net zero transition.

NGED's Connections Landscape

Although we have limited transmission capacity at 47 of our 58 GSPs, we still connect customers to our network.

In Financial Year 22/23: We made and processed over 250 connections per working day!

We have 9.8GW of Distributed Energy Resource (above 1MW) already connected to our network. A further 10GW in our queue can connect without needing transmission reinforcement.

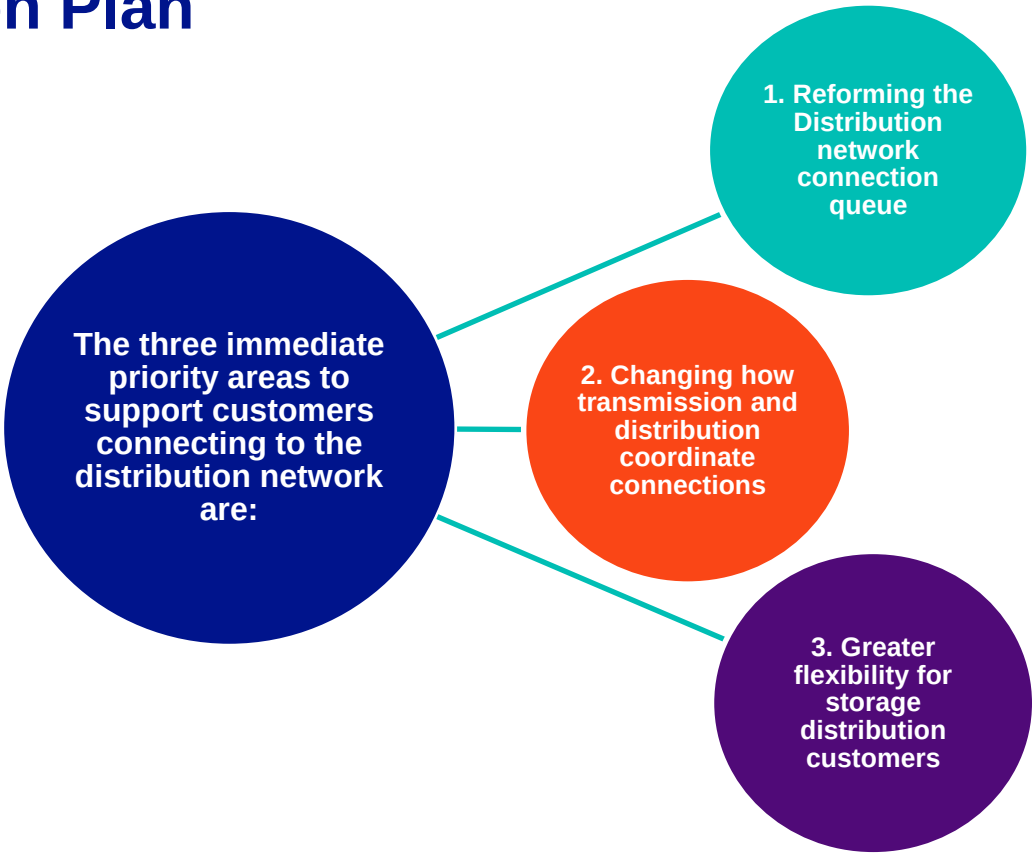
Our total accepted pipeline of connections trying to access the network is currently 37.2GW.

How are we supporting new customers connecting to the distribution network?

The ENA 3-Point Action Plan

The existing connections model was designed for old technology. Using the same model today is not fit for purpose.

As a result, the Energy Networks Association published a three-step plan to speed up connections to the grid.



1. Queue Management and Optimisation

Reforming the distribution network connections queue, promoting mature projects that are closer to delivery above those that may be 'blocking' the queue.

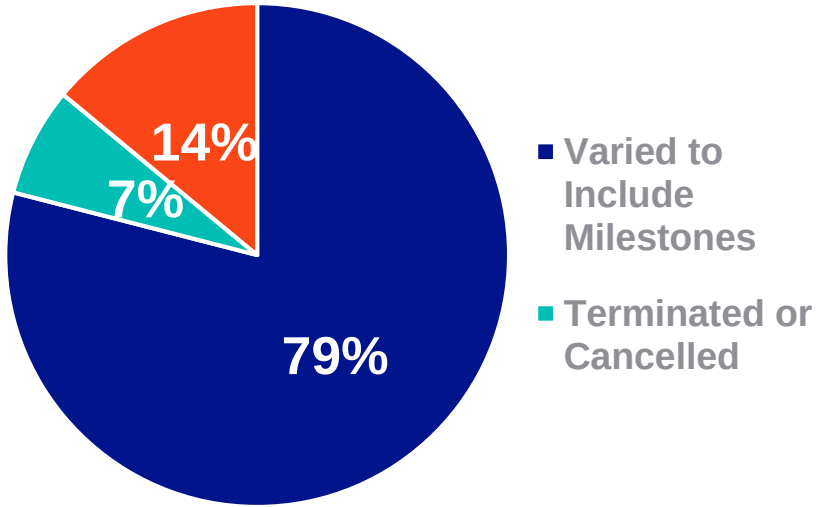
Sub-task 1: Spring Clean

- Removal of non-progressing schemes that accepted a Connection Offer prior to 2017.
- Connection Offers prior to 2017 did not include progression milestones.

Sub-task 2: First Ready, First Connected

- 'Shovel Ready' projects will be invited to connect, ahead of those with earlier application dates, without detrimental impact on those ahead of them.

Progress against Sub-task 1



2. Changing how transmission and distribution coordinate connections

Sub-task 1: Clear and Consistent Boundaries

- Creating clearer, more consistent technical boundaries between Transmission & Distribution.
- Better management of the connection queue and accelerates smaller, more agile projects

Sub-task 2: Co-ordinating the queue

- Coordinated approach implemented for generation/exporting distributed energy resources (small scale generation and battery storage), that are still dependent on both transmission and distribution network capacity.
- Improves clarity of queue management and the ability of distribution network operators to manage connections within boundary limits agreed by the ESO.

David Tuffery, Network Modelling & Whole-System Manager, will cover this in more detail next.

3. Greater flexibility for storage distribution customers

The Challenge

- Battery Storage connection applications is exceeding future energy scenarios expectations.
- More than 56GW of battery storage is now contracted and queuing.

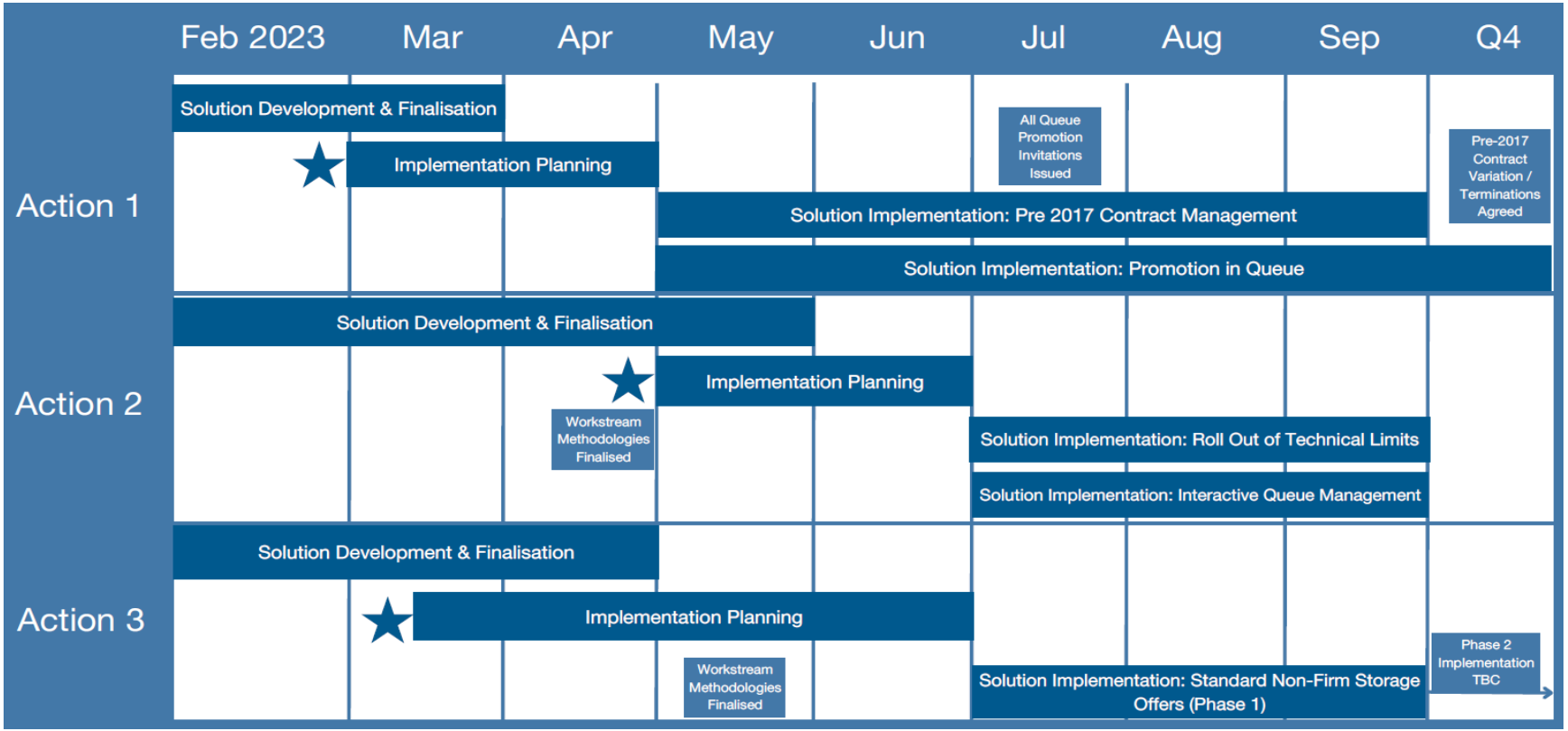
More than 14 Drax Power Stations

Between 200-500% more than the ESO forecast will be needed in 2030!

The Solution - Flex Capacity

- Battery storage operators will be offered standardised ‘non-firm’ connections that allow them to connect more quickly.
- That is, if a 10MW battery is connected to the grid, this non-firm ‘connect and manage’ approach will enable more of that capacity to be offered to other customers.
- Strategic updates to standards and codes required to leverage the benefits of battery energy storage systems for consumers.

Implementation Timetable



What does this mean for customers?

Connected Customers with firm Connections	• No impact
Connected Customers with Flexible Connections	• No impact
Customer with accepted connection offers (non-curtailed)	• Opportunity of earlier connection dates if customer programme can support • Stronger incentive to keep to stated programme • Less curtailment experienced in earlier years with earlier connections
Customer with accepted connection offers (curtailed / flexible)	• Opportunity of earlier connection dates if customer programme can support • Stronger incentive to keep to stated programme

Moving Forward

Connectability forms one of four key focus areas in our Business Plan.

National Grid Electricity Distribution will not be a barrier to connections.

We will continue to update stakeholders on progress against the ENA Action Plan.

Accelerating connections to our network is key to achieving net zero.

Please contact us to discuss any concerns or ideas that you have with the actions outlined today - nged.connpolicysupport@nationalgrid.co.uk

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Electricity Distribution

Statement of Works

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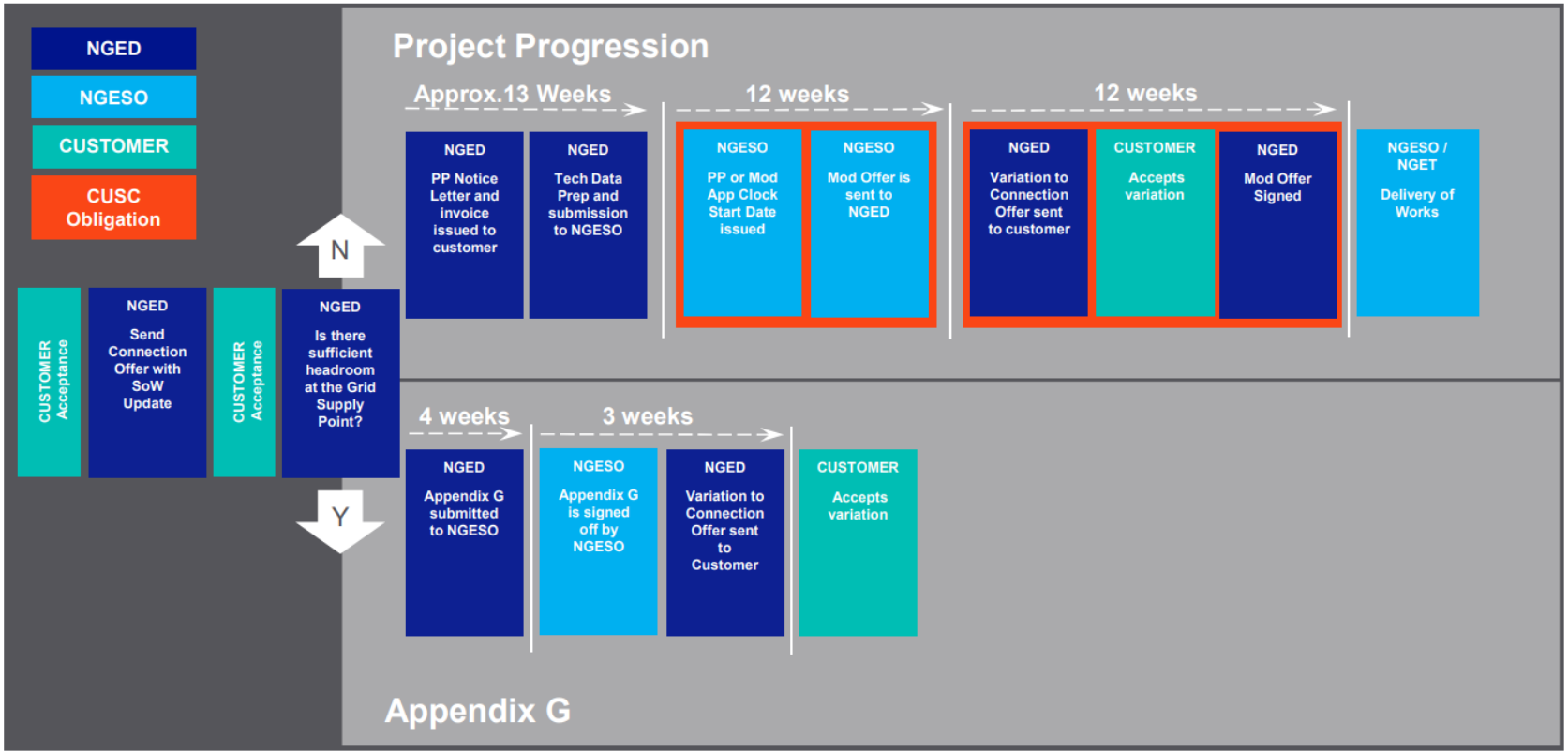
Background

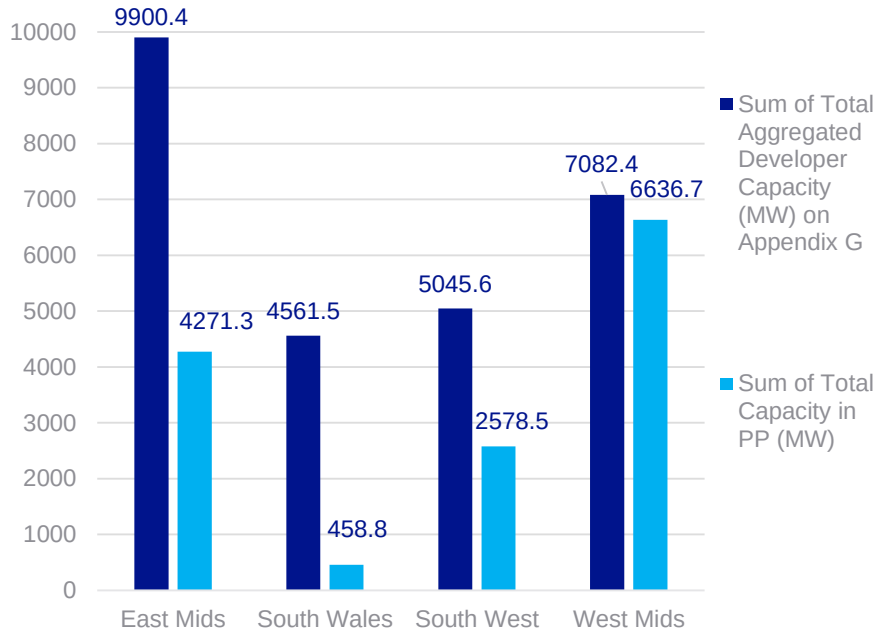
- Statement of Works commonly used as a catch-all term to describe the DNO-ESO interface
- Processes include Statement of Works, Project Progressions, Mod-apps and Appendix G
- Core principle is to inform ESO of generation connecting to the distribution network that may impact the transmission network
- NGED adopted the Appendix G ‘trial’ across all GSPs in 2018
- Appendix G worked effectively for a number of years and allowed us to connect and contract a significant volume of generation

Appendix G and Project Progressions

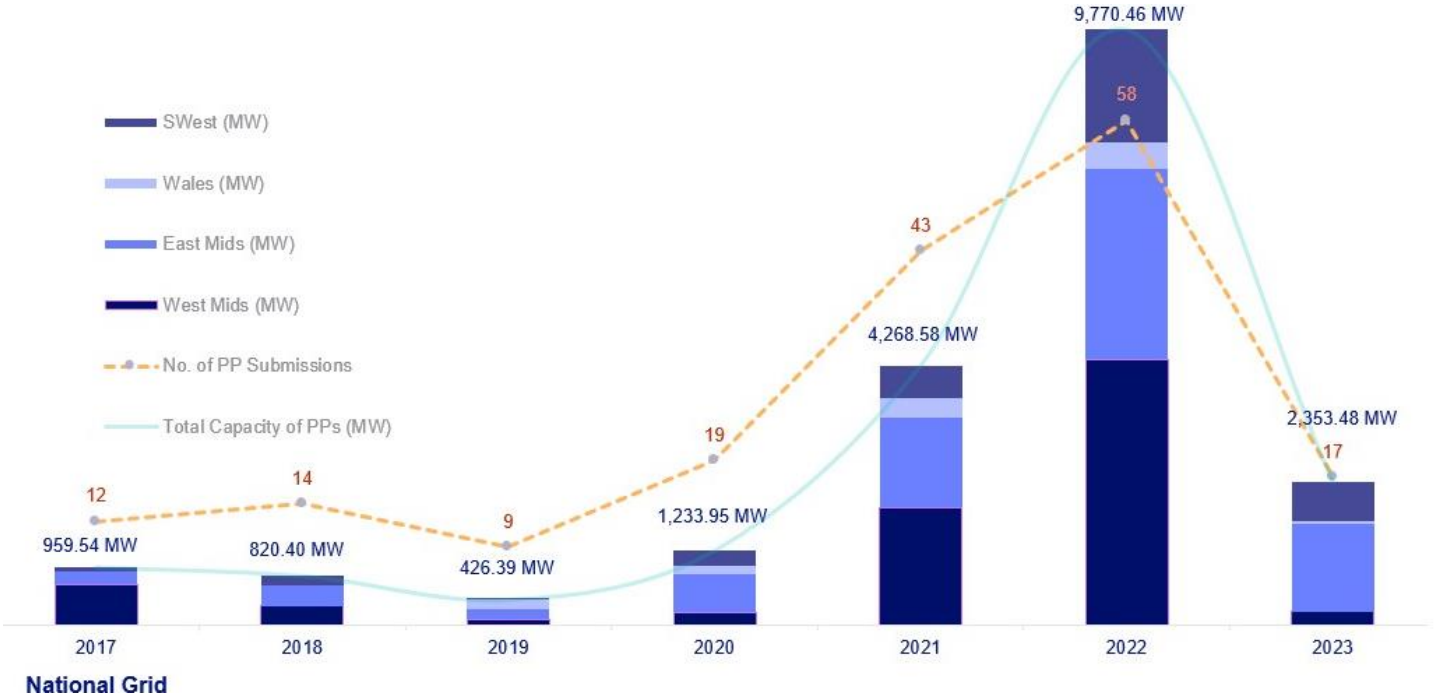


Appendix G Summary

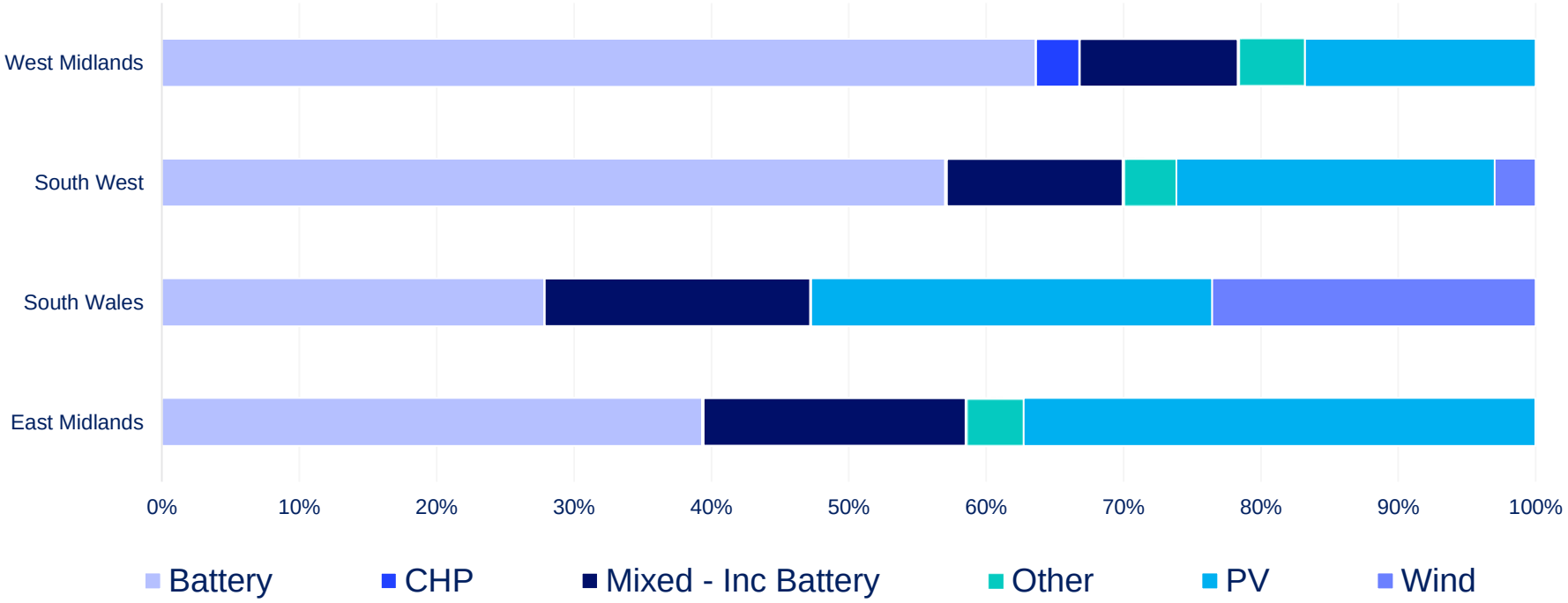
Distribution Licence Area	Total No. of GSPs	Total Aggregated Developer Capacity (MW) on App G	Total Capacity in PP (MW)
East Midlands	15	9,900.4	4,271.3
West Midlands	18	7,082.4	6,636.7
South Wales	10	4,561.5	458.8
South West	11	5,045.6	2,578.5
Total	54	26,589.9	13,945.3



Project Progression Volumes



Project Progression Technology Breakdown



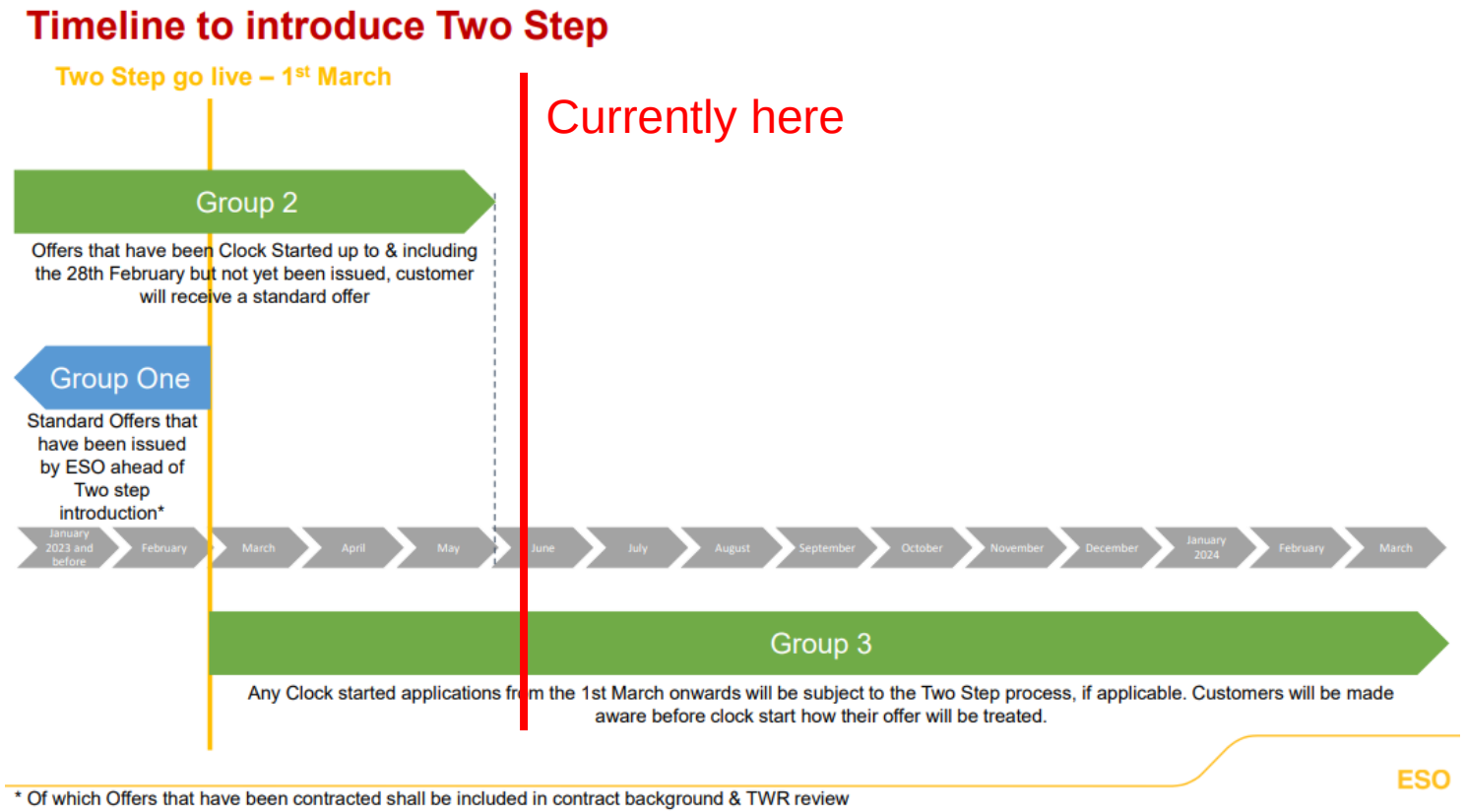
Where we are now

- Since late 2021 major transmission reinforcements identified across all licence areas
- Reduction in available headroom on Appendix G
- Need to submit relevant schemes through a full Project Progression or Mod-app
- Seeing increase in attributable and reinforcement works in mod-offers
- Has triggered the major reform work currently ongoing:
  - ESO 5-point plan, including 2-step offer process
  - ENA Strategic Connection Group T-D Actions

Two-step Offer

- From 1st March 2023, in England and Wales, ESO have implemented a two-step offer process
- This two-step process is an interim measure that will run until the 29th February 2024
- Aiming to improve completion (connection) dates
- This two-step process will allow reassessment of:
  - Construction Planning Assumptions (CPAs)
  - Battery Energy Storage Systems (BESS) modelling
- Targeted at improving connection dates for any scheme with a Connection Date later than 1st January 2026

Two-Step Offer



*Taken from ESO Webinar March 2023

SCG Transmission-Distribution Boundary

- Working with the ESO to decouple transmission and distribution networks to enable simple boundaries to be agreed and considered collaboratively
- By enhancing the way capacity and technical limits are agreed at the transmission/distribution interface
- Benefits:
  - Ability for the DSO to manage the ‘firmness connections within boundary limits agreed by ESO
  - Non-firm access for DER, subject to technical limits
  - Optimises capacity utilisation
- Evolve the existing Appendix G process to facilitate the required data exchanges
- We expect changes in summer 2023 to enable these changes

What we are doing

- Continuing to proactively submit generators via Project Progression and Mod-app process
- Feeding into the ESO Connection Reform work and 5 point plan
- One of the main drivers on the SCG T-D interface
- Utilising the new ESO Connection Portal to manage NGED-ESO interface
- In active discussion with ESO regarding migration to latest Appendix G Mark 2

Innovation in connections

Paul Morris
Innovations Manager
June 2023

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Electricity Distribution

What is Innovation?

Customers have new expectations for how they want to access and use our network.

This means we need new methods and capabilities and to roll them out at Scale.

An innovation function allows us to understand what are the most effective ways to deliver change and how to scale them up.

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Electricity Distribution

Our track record

NGED has long record of innovation and product roll out. We are able to scale some innovations rapidly within price control periods. Some of these connection related examples include:

ELECTRIC NATION
VEHICLE TO GRID

NIA project: Electric Emissions testing

Enablers for in the "plug and play model" for domestic charging.

Now codified into NGED connection policy

LOW CARBON HUB

Conclusions from these lead to our "suite of flexible connections"

LCNF project: Network Templates

The Conclusions allowed us to change voltage control policy.

Resulted in more connection headroom for generation

NIA project: Take Charge

High power density primary substation for Motorway charging clusters

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Electricity Distribution

Track Record & Price Control

Sometimes we need to agree funding with Ofgem before we can roll out innovation. Examples of successful ED2 outcomes are as follows:

LOW CARBON HUB

Active Network Management

NETWORK EQUILIBRIUM

System Voltage Optimisation

Open LV Your local electricity data

Open Access to LV monitoring

The learning from these RIIO ED1 projects enabled Ofgem to agree to roll-out investment in RIIO- ED2

More capacity and faster connections

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Electricity Distribution

How we innovate

We are always open to new methodology and ideas for how to deliver change. We can sometimes test these ideas within innovation projects.

- Innovation projects delivery new capability or obtain insights.

  Needs to meet funding governance.

  Needs to trial a new method and not duplicate previous work.

We are always open to considering new methodology. nged.innovation@nationalgrid.co.uk.

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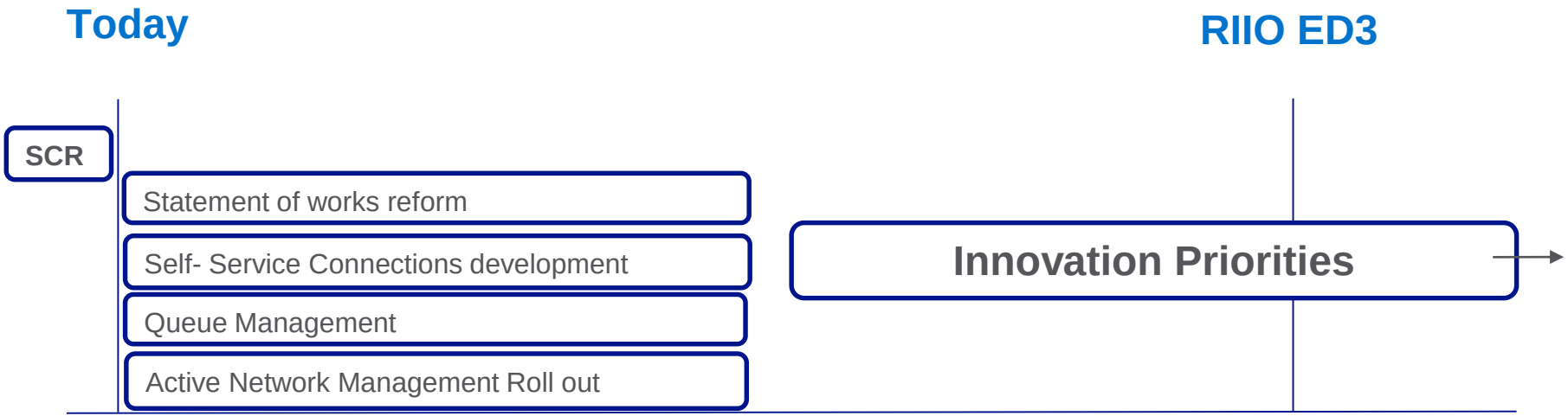
Participation Exercise

We are shaping our innovation priorities. We want to look beyond workflows what we already have in hand.



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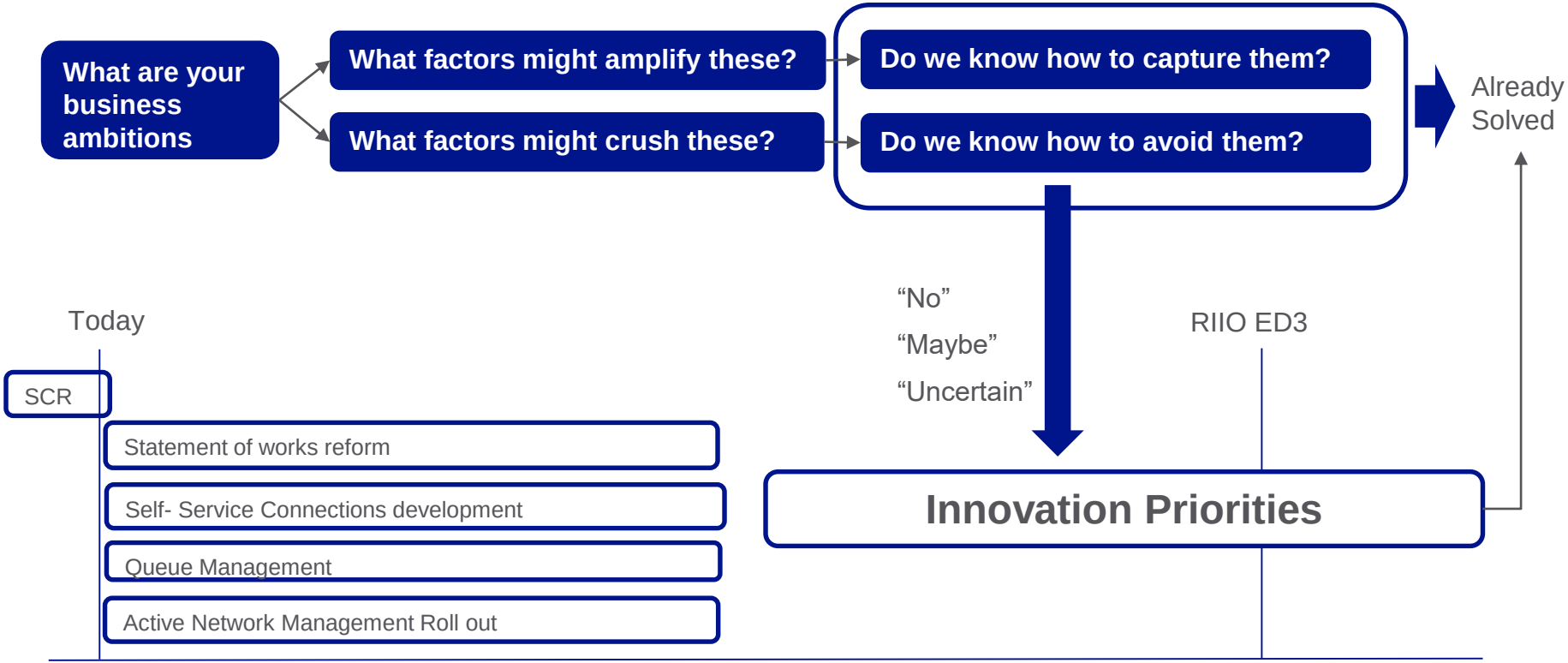
Participation Exercise



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Electricity Distribution

Summing up

Contact
nged.innovation@nationalgrid.co.uk

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Feedback and Summary

Kester Jones
Head of Connections

June 2023

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Close and thank you

Summary

Feedback

- Any further feedback on todays topics

What would you like to see next time?

- Is there a topic you would like to be discussed in our next CCSG?

Other events

Events

- Next CCSG – Wednesday 18th October 2023
- Connections annual hybrid workshop – Wednesday 15th November 2023

Follow National Grid on LinkedIn for updates

https://yourpowerfuture.nationalgrid.co.uk/our-engagement-groups/connection-customer-engagement/connection-customer-steering-group