Distributed Generation HV / EHV workshop

July 2022

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Agenda

- **Start & Agenda**
- **Connections Restructure**
- **Flexibility Services**
- **BESS Strategy - P28 Modelling**
- **Significant Code Review Update**
- **Appendix G**
- **Accelerated Loss of Mains Change Programme**
- **ICE Update**
- **Questions & Close**

Meet the Team

Martin Edmundson

Customer Experience Development Manager

Brian Hoy

Head of regulations

Steffan Jones

Head of Connections Quotations

John Carlisle

Head of Connections Operations

Ami Mathieson

Incentive on Connections Engagement Manager

Fiona Tyrell

Connections Stakeholder Engagement Manager

Hannah Sharratt

Connections Change Manager

Simon Taylor

Pre application and Triage Manager

Connections Reorganisation

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Connections Reorganisation

Connections is changing: We need to meet the needs of customers and our stakeholders. Therefore we must ensure our focuses are aligned with their needs and a change in structure will help achieve this.

Increased expectations

This is an expectation from stakeholders and Ofgem, that we provide more upfront support to help customers understand what they need.
With continued customers expectations increasing.

Net zero

The Green Agenda acceleration is leading to increased volumes of connection requests.
The transition to DSO will introduce new processes to connections.

Regulatory changes

The Access and Forward-Looking Charges Significant Code Review will have a significant change on how connections are charged.

Connections ED2 Strategy

- ED2 refers to our next price review period, which runs 2023 to 2028. As part of our business plan we have developed three core principles for connections.

Principle 1: Support connection stakeholders prior to making a connections application by providing accurate, comprehensive and user-friendly information.

Principle 2: Deliver value for customers by ensuring simplicity and transparency through the applications process.

Principle 3: Facilitate the delivery of timely and economical connections that meet customers' needs.

Connections Structure

Stephanie Trubshaw
Customer Directorate

Brian Hoy

Regulation & Compliance

- Role will remain the same focusing on regulations and compliance.

Martin Edmundson

Customer/Stakeholder Engagement & Pre Application

- Stakeholder & Customer Engagement
- GSoP reporting
- Registrations
- Customer communications

Stephen Glasgow

Delivery of all Domestic & LCT

- Domestic & LCT quotations & Delivery
- CSAT measure
- TTC & TTQ
- GSoP

Steffan Jones

Delivery of all Quotations

- All quotations other than domestic
- DSO & strategic planning design and policies
- GSoP

John Carlisle

Delivery of all non domestic construction

- Delivery of all non domestic connections
- Single point of Contractor Management
- GSoP

Principle 1

Principle 1: Support connection stakeholders prior to making a connections application by providing accurate, comprehensive and user-friendly information.

Customer engagement:

Building relationships to make it easier to do business with ENWL

Providing skilled people providing an advice service & support pre-application away from delivering quotes

Enhance welcome information

How to get started, what we can do for you, what you can expect

Martin Edmundson

Fiona Tyrell	Hannah Sharratt	Simon Taylor	Alex Rimmer
Stakeholder Engagement and Customer Experience Manager	**Connections Change Manager**	**Pre-application Support and Triage Manager**	**Registrations and GSOP reporting**
• Stakeholder engagement strategy • Customer improvement roadmap • Voice of the customer	• Development of the changes needed to deliver our stakeholder engagement strategy • Business performance improvements	• A single point of contact for those stakeholders who require assistance in making applications or require some pre-application advice	• Management of the registrations team • GSOP reporting

Principle 2

Principle 2: Deliver value for customers by ensuring simplicity and transparency through the applications process.

Application process:

Focusing on utilising all our resource to deliver customer quotes with clear ownership on customer service, compliance and driving a value for money service

Steffan Jones

Victoria Brown	Matt Savka	Graham Dent	To be appointed	To be appointed
Major connections	General connections	Minor connections	Diversions, Disconnections and Unmetered	Shared Services Team
• Generation and Demand equal to and greater than 1MW/1MVA	• Demand equal to and greater the 300kVA and less than 1,000kVA. All Generation less than 1,000kW	• Demand less than 300kVA	• Diversions, Disconnections and Unmetered	• Admin support, reporting and business analyst

Principle 3

Principle 3: Facilitate the delivery of timely and economical connections that meet customers' needs.

Delivery: Management of construction and build activities across a range of delivery methods enhancing the customer journey to:

- Deliver value for money for all of our stakeholders
- Deliver timely connections
- Deliver against your requirements
- Deliver a consistent approach across the Electricity North West Regional area

John Carlisle

Adette Mason	Dave Green	Craig Jones	Jonathan Cropper
Major Projects	Projects team	Minor works team	Project and contract support team
• 33kV and 132kV and for all projects with a value in excess of £200k	• HV and LV project work, with a value below £200k but in excess of £30k.	• Delivery of all project work connecting at HV and LV, on all projects with a value less than £30k.	• Provide support for all of the three delivery teams. • Contractual and project documentation.

Structure Key Changes

New Customer Engagement team focus on stakeholder engagement

- Ensuring we understand customer's expectations and requirements
- Aim to meet customer's needs

Separate Quotations team delivering consistency for customers

- Increased segmentation /more tailored service by size of the connection i.e. LV, HV, EHV
- Work with DSO to drive efficiencies
- Increase focus on delivery partners

Delivery team increase focus on delivery partners

- Divided by size of the connection i.e. LV, HV, EHV
- Delivering consistency for customers by segmentation /more tailored service

Flexibility Services

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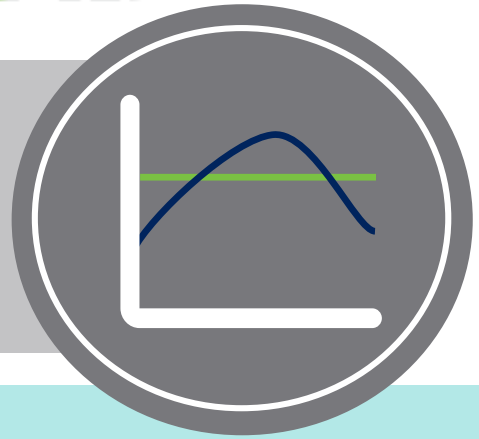
What are Flexibility Services?

When the demand for electricity is greater than the amount that we can provide, flexibility services are procured to alleviate constraints on our network during peak times



These services are provided by companies or individual customers who own assets in our region such as generators, battery storage and EV charge points that can generate more or use less electricity when required

This allows us to balance supply and demand, ensuring a safe and reliable supply of energy for our customers

In return for providing extra capacity to the network, Flexibility providers will receive payment from the network

Our flexibility tenders

Location specific

We procure flexibility services as an alternative to reinforcement in areas where a constraint has been identified on the network

Small entry requirements

50kW

Our minimum capacity requirement is 50kW either from an individual asset or as part of an aggregated portfolio

Assets

- Industrial
- Commercial
- Aggregated domestic and non domestic portfolios

Types of flexibility

- Generation turn up/down
- Demand turn up/down
- Energy efficiency measures

Common products

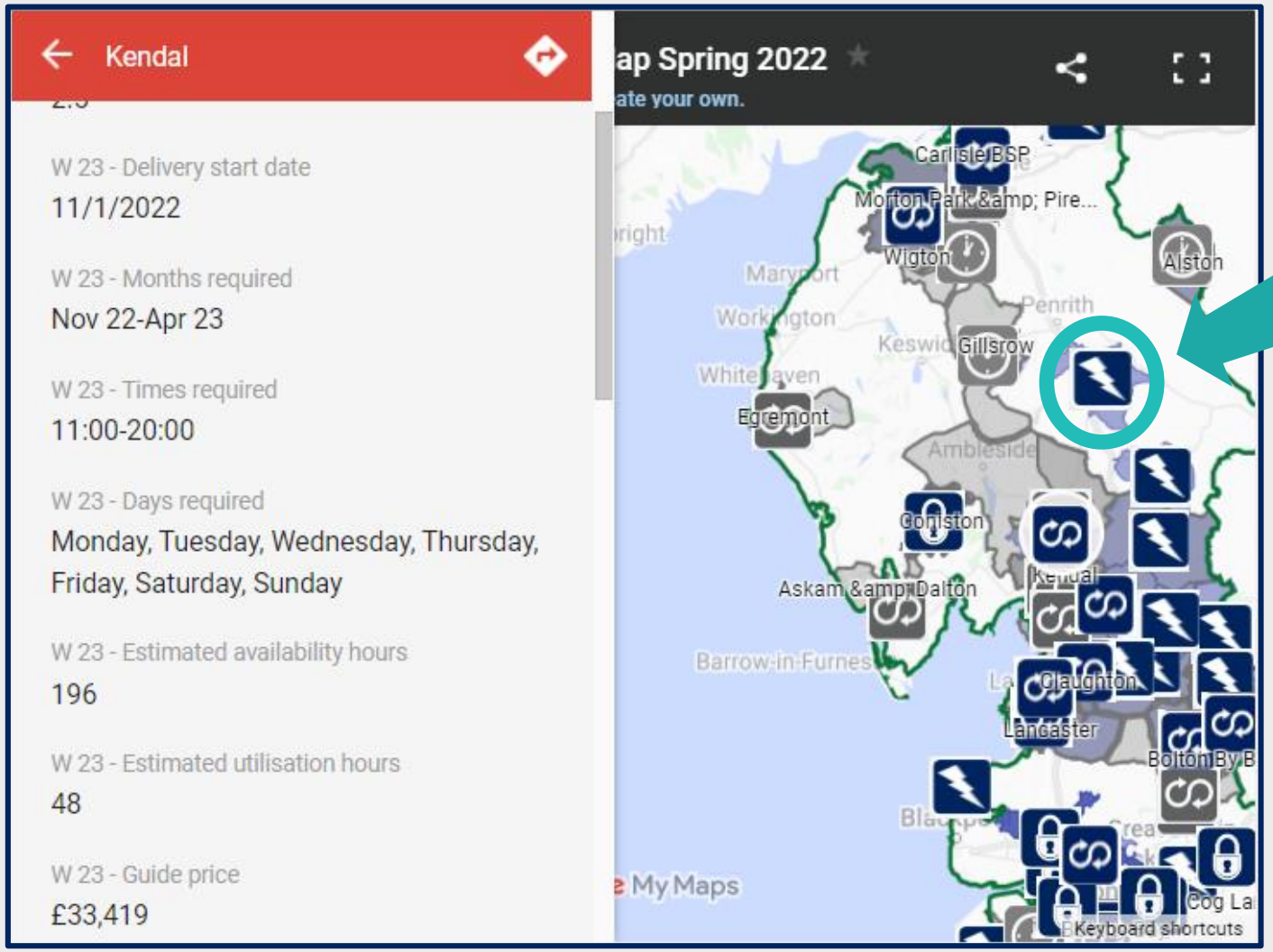
We procure four common products (response types)

- Sustain
- Secure
- Dynamic
- Restore

What we've done so far

Since 2018

Flexibility requirements map



Select an icon to expand the details of each site requirement

You can find this map on our:

- Flexible Services homepage
- Current requirements page

The grey icons correlate to the information in the NDP, showing you whether a site is expected to require flexibility in the next **3-5** or **5-10** years.

Developments and Commitments

We publish tenders twice per year in Spring and Autumn. Our Autumn 2022 tender will include opportunities to participate for the whole ED2 period 2023-2028.

We will be launching a consultation in the next few weeks asking stakeholders for their input into our current flexible services tenders and if/how we can improve them in future.

We will continue to utilise the ENA CEM tool to evaluate requirements for network investment; the value of flexible services; and subsequently any tender offers received. We are currently leading the development of a good practice guide.

We have developed a cost calculator for flexible services to assess their tender offers before submitting them to ensure that they are within the cost cap for the zone.

We will re-tender for the market platform(s) we use for Flexible Services Procurement, Dispatch, and Settlement on a regular basis through the course of ED2 to ensure market competition in this area.

Contact us

QUESTIONS & ANSWERS

flexible.contracts@enwl.co.uk

www.enwl.co.uk/gonetzero

0800 195 4141

facebook.com/ElectricityNorthWest

linkedin.com/company/electricity-north-west

@ElecNW_News

youtube.com/ElectricityNorthWest

Please contact us if you have any questions or would like to arrange a one-to-one meeting

BESS Strategy
Proposed policy change

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Introduction

- Since August 2021 there has been a change to the way BESS are studied – these slides will take you through our proposed solution with the aim to understand if this would deliver on your needs:
  - Connection studies assume BESS sites operate in the same markets – or will operate in the same markets in the future.
  - Potential for simultaneous operation of sites on receipt of signals – coincident power swings
- This has led to a dramatic change in headroom available to BESS from a voltage point of view, as P28 is becoming harder to work within (3% for system intact)

- Note – Engineering Recommendation P28 is a Distribution Code document and therefore must be applied by DNOs to new connections.

Issue – no headroom

S. No.	GSP / Site	Highest V step	Busbar (with highest diff)	Number of Busbar > 3%	Total BESS Real Power at Gen Mode (MW)	Total BESS Reactive Power at Gen Mode (MVAr)	Total BESS Real Power at Load Mode (MW)	Total BESS Reactive Power at Load Mode (MVAr)
1	Bredbury	4.02%	welkin_33	39	102.6	0	-102.6	0
2	Carrington	3.89%	taylor_LV	1	16	0	-16	0
3	Harker/Hutton	4.81%	roosco_11_a	136	179.9	0	-100.5	0
4	Heysham	4.76%	kidds_0.55	49	250	0	-250	0
5	Kearsley & Kearsley Local	5.28%	shoret_11_a	169	121.5	0	-120.5	0
6	Kirkby/Washway Farm	4.14%	steelp_33_a	95	280	0	-280	0
7	Macclesfield	1.19%	hulley_33_a	0	20	0	-20	0
8	Padiham & Rochdale	6.19%	KingBP_33	359	409	0	-409	0
9	Penwortham East	5.66%	petcho_33_a	132	193.4	0	-193.4	0
10	Penwortham West & Stanah	6.31%	poultn_6.6_b	250	317.96	0	-307.96	0
11	South Manchester	2.81%	peakno_132_a	0	258.4	0	-262.5	0
12	Stalybridge	4.87%	tunste_33_b	101	112	0	-112	0
13	Whitegate	2.43%	zetex_6.6_a	0	50	0	-50	0
				1331	2310.76	0	-2224.46	0

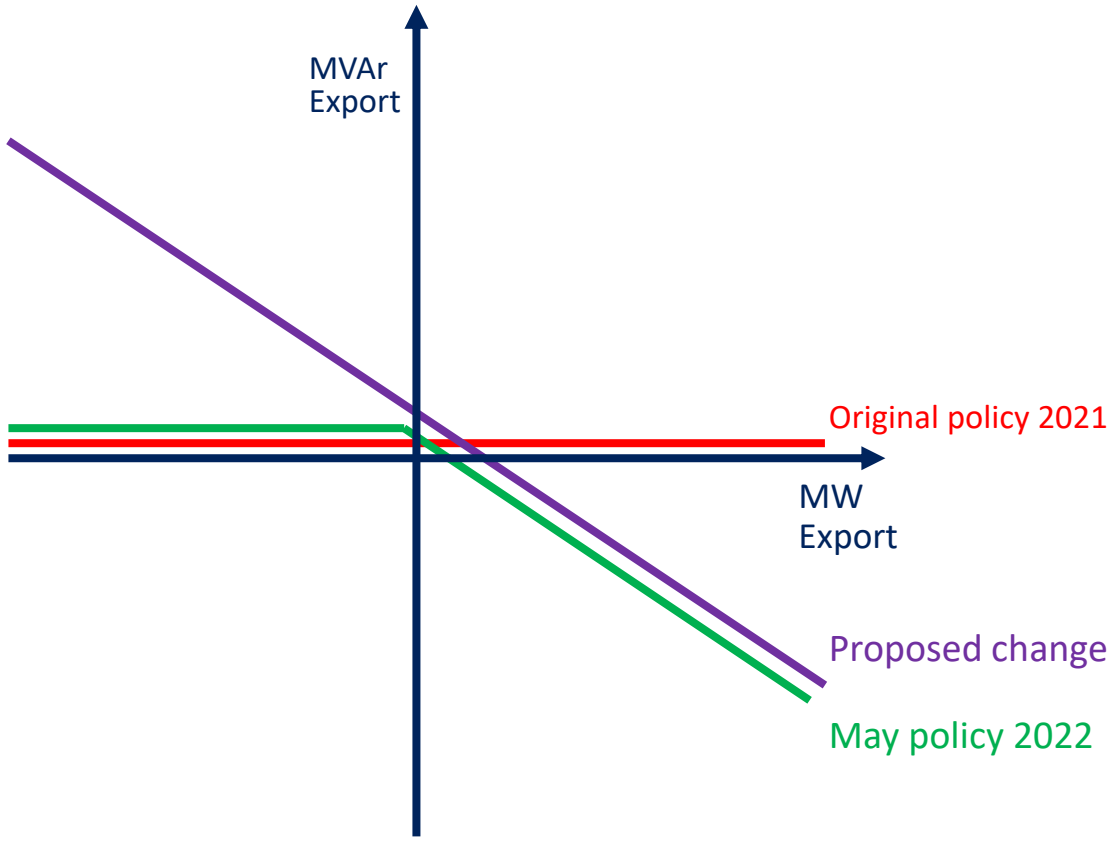
- Latest analysis shows that most of our current GSP groups are closed to battery technology due to P28 compliance
- Under our current method of study we are non-compliant and could potentially trigger significant reinforcement / network re-arrangement to fix

P28 Voltage step limit is 3%, credible outages should be considered

Reinforcement options

- Current analysis shows that 8/14 GSP groups are full to battery technology due to energised and accepted battery connections (c.2GW)
- There is no obvious solution to fixing this issue except:
  - Building more GSP groups and reconfiguring the network accordingly (to bring the network impedance down) (c. £5million)
  - Upgrading connections onto a higher voltage (on-cost to ENWL upwards of £2 million per intervention)
- These solutions are prohibitively expensive and not a good use of funding

Step change reduction – power factor control



- Power factor has a significant effect on voltage, particularly at 132kV and 33kV
- Original connection studies assumed unity power factor
- May 2022: change to use leading pf when exporting real power P – that is importing reactive power Q
- Unity pf for importing P – this still created voltage step
- New proposal – operate at leading power factor for both import and export of P

Benefits of Power Factor control

Previous policy

S. No.	GSP / Site	Highest Difference	Busbar (with highest diff)	Number of Busbar > 3%	Total BESS Real Power at Gen Mode (MW)	Total BESS Reactive Power at Gen Mode (MVAr)	Total BESS Real Power at Load Mode (MW)	Total BESS Reactive Power at Load Mode (MVAr)
1	Bredbury	4.02%	welkin_33	39	102.6	0	-102.6	0
2	Carrington	3.89%	taylor_LV	1	16	0	-16	0
3	Harker/Hutton	4.81%	roosco_11_a	136	179.9	0	-100.5	0
4	Heysham	4.76%	kidds_0.55	49	250	0	-250	0
5	Kearsley & Kearsley Local	5.28%	shoret_11_a	169	121.5	0	-120.5	0
6	Kirkby/Washway Farm	4.14%	steelp_33_a	95	280	0	-280	0
7	Macclesfield	1.19%	hulley_33_a	0	20	0	-20	0
8	Padiham & Rochdale	6.19%	KingBP_33	359	409	0	-409	0
9	Penwortham East	5.66%	petcho_33_a	132	193.4	0	-193.4	0
10	Penwortham West & Stanah	6.31%	poultn_6.6_b	250	317.96	0	-307.96	0
11	South Manchester	2.81%	peakno_132_a	0	258.4	0	-262.5	0
12	Stalybridge	4.87%	tunste_33_b	101	112	0	-112	0
13	Whitegate	2.43%	zetex_6.6_a	0	50	0	-50	0
				1331	2310.76	0	-2224.46	0

Proposed policy

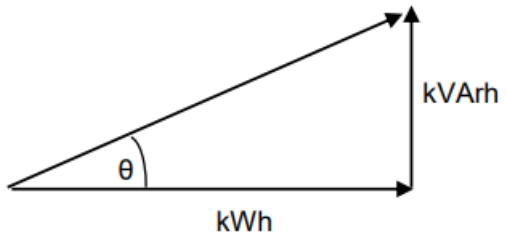
S. No.	GSP / Site	Highest Difference	Busbar (with highest diff)	Number of Busbar > 3%	Total BESS Real Power at Gen Mode (MW)	Total BESS Reactive Power at Gen Mode (MVAr)	Total BESS Real Power at Load Mode (MW)	Total BESS Reactive Power at Load Mode (MVAr)
1	Bredbury	1.37%	distis_11_a	0	102.6	-13.395	-102.6	13.395
2	Carrington	1.75%	taylor_LV	0	16	-3.249	-16	3.249
3	Harker/Hutton	1.78%	gleaston_33	0	179.9	-23.613	-100.5	15.643
4	Heysham	2.11%	kidds_0.55	0	250	-27.661	-250	27.661
5	Kearsley & Kearsley Local	2.70%	elcoal_33	0	121.5	-18.918	-120.5	18.715
6	Kirkby/Washway Farm	1.48%	orrell_33	0	280	-31.054	-280	31.054
7	Macclesfield	0.36%	hulley_33_a	0	20	-2.85	-20	2.85
8	Padiham & Rochdale	3.22%	widhil_132	4	409	-46.55	-409	46.55
9	Penwortham East	1.89%	blackb_132_gt2	0	193.4	-23.581	-193.4	23.581
10	Penwortham West & Stanah	2.07%	poultn_33_t12	0	317.96	-39.427	-307.96	38.002
11	South Manchester	0.77%	peakno_132_a	0	258.4	-26.315	-262.5	27.148
12	Stalybridge	2.23%	buxton_132_gt1	0	112	-16.565	-112	16.565
13	Whitegate	0.77%	greenh_132_gt2	0	50	-7.125	-50	7.125
	* Calculated for Total Import Capacity			4	2310.76	-280.303	-2224.46	271.538

Commercial considerations

- Batteries are not charged for excursions away from unity as long as it stays between ±0.95pf
- See extract from Use of System Charging Statement 2019
- They only pay for increased losses on their system
- Does not affect ability to export full MW rated value

2.49. Power Factor is calculated as follows:

Cos θ = Power Factor



2.50. The chargeable reactive power is calculated as follows:

Demand chargeable reactive power

$$\text{Demand chargeable kVArh} = \max\left(\max(RI,RE) - \left(\sqrt{\left(\frac{1}{0.95^2} - 1\right)} \times AI\right), 0\right)$$

Where:

AI = Active import (kWh)

RI = Reactive import (kVArh)

RE = Reactive export (kVArh)

Questions

- Can BESS operate in this power factor range?
- Can BESS alter power factor during operation?
- What are your initial views?

Voltage Level	Power Factor	PSE Guide
132kV	0.99	Leading in both directions
33kV	0.98	Leading in both directions
6.6 and 11kV	0.98	Leading in both directions

Power factor definition – “Leading in both directions” is defined as follows –

- BESS site should be Importing reactive power when exporting MWs
- BESS site should be Exporting reactive power when importing MWs

Ofgem’s Access Significant Code Review Decision

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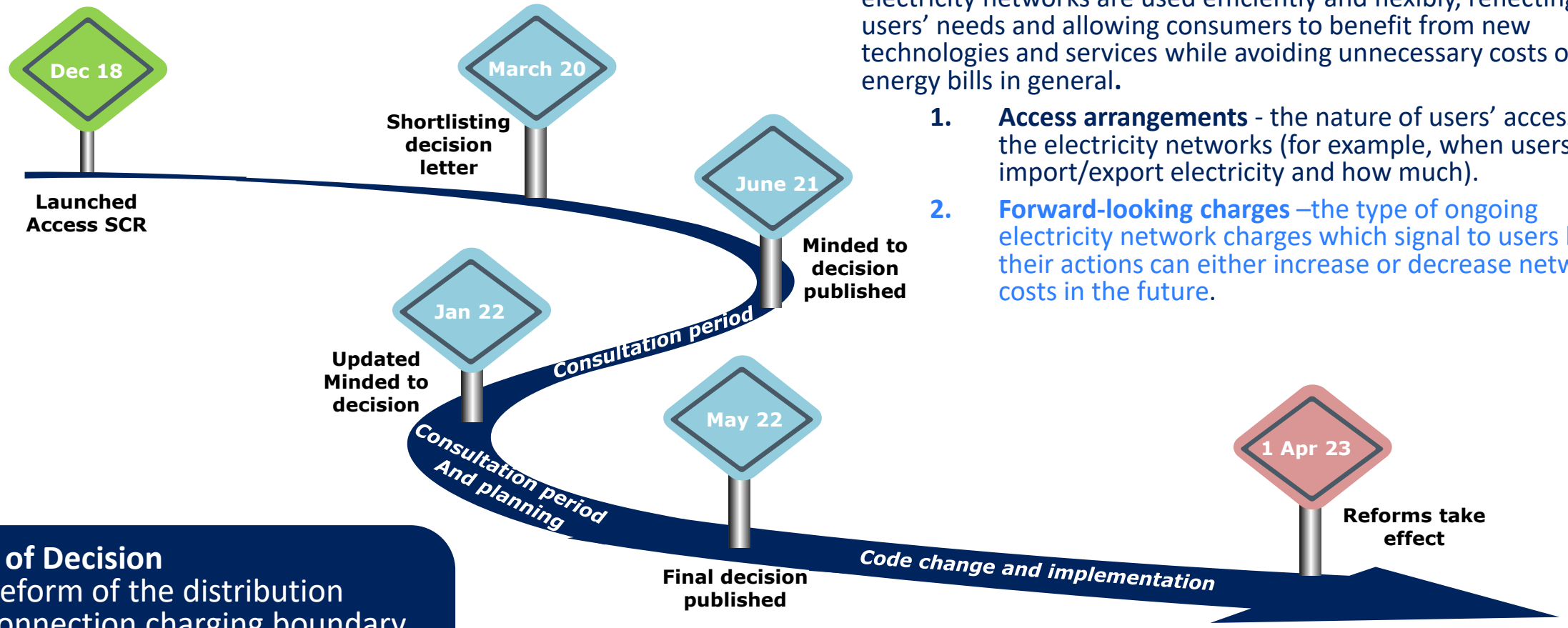
Access Significant Code Review



Objective of Access Significant Code Review (SCR): to ensure electricity networks are used efficiently and flexibly, reflecting users' needs and allowing consumers to benefit from new technologies and services while avoiding unnecessary costs on energy bills in general**.**

1. **Access arrangements** - the nature of users' access to the electricity networks (for example, when users can import/export electricity and how much).
2. **Forward-looking charges** –the type of ongoing electricity network charges which signal to users how their actions can either increase or decrease network costs in the future.

Scope of Decision

- Reform of the distribution connection charging boundary
- Improved definition and choice of access rights for distribution users

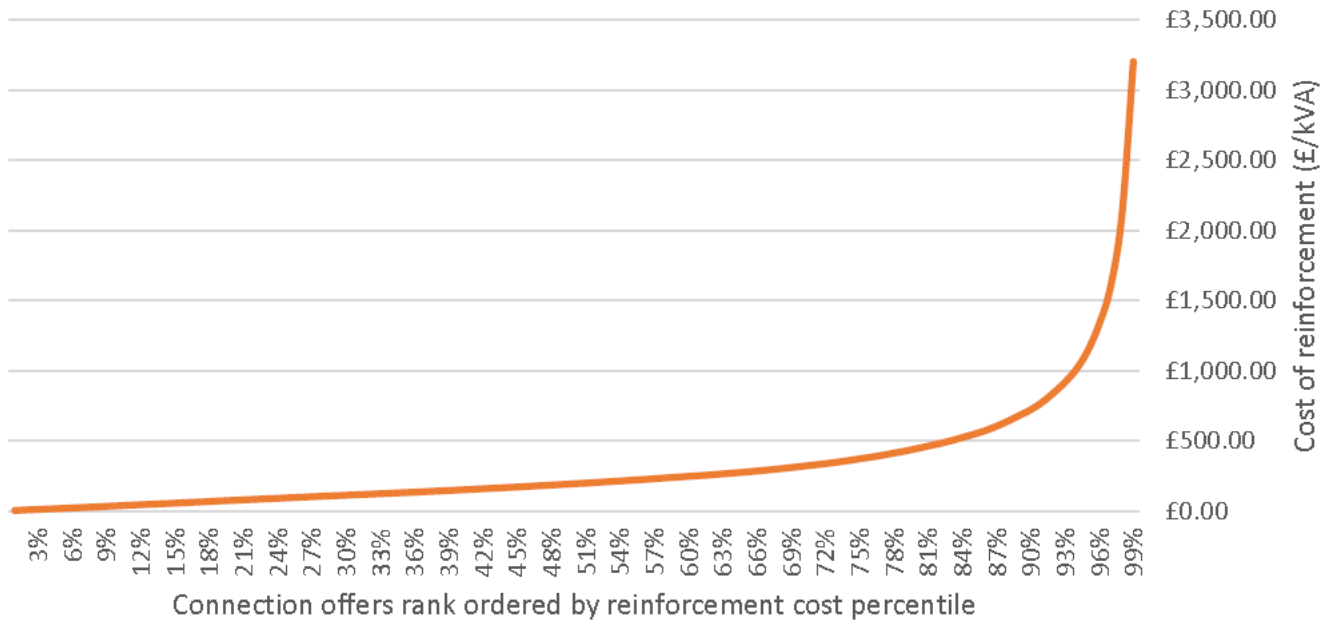
Reform of the distribution connection charging boundary

- Different charging arrangements for Demand and Generation connections
  - Demand – no reinforcement charges
  - Generation – reduced reinforcement charges
    - Storage treated as Generation
- Some exceptions…

	Extension assets	Reinforcement assets at connection voltage	Reinforcement assets at connection voltage +1
Current arrangements	Connecting customer pays 100%	Connecting customer pays a proportion of the reinforcement costs	Connecting customer pays a proportion of the reinforcement costs
New arrangements (Demand)	Connecting customer pays 100%	Fully funded by the DNO via DUoS	Fully funded by the DNO via DUoS
New arrangements (Generation)	Connecting customer pays 100%	Connecting customer pays a proportion of the reinforcement costs	Fully funded by the DNO via DUoS

Exceptions

Figure 3: Connection offers issued by DNOs over the course of RIIO-ED1 to date, rank ordered by reinforcement cost percentile on the x-axis and cost of reinforcement in £/kVA on the y-axis



- High Cost Thresholds - customer pays for reinforcement above threshold
  - Retained for Generation at £200/kW
  - Introduced for Demand at £1,720/kVA
- Speculative Developments – reinforcement charged in full
  - Approach retained but further clarity needed
- Three phase connections/supply voltage
  - If customer requires three phases where not necessary for the capacity requested then would pay for reinforcement in full

Improved definition and choice of access rights for distribution users

What are Access Rights?

- Network access rights define access to the network and the capacity connectees can use, eg Level of import or export, when and for how long, and whether access can be interrupted.

When would they be used?

- Could be used as a interim solution to facilitate an earlier connection whilst reinforcement is undertaken
- Could be an enduring solution where customer can choose to avoid reinforcement charges
- Defined in relation to the time users could be curtailed
- Customer will be protected from risk of DNOs exceeding agreed level of curtailment

Further clarifications

Curtailment definition

- Defined as action by DNO to restrict conditions of a connection:
  - excludes customer interruptions
  - excludes interruptions resulting from the transmission network

How curtailment limits will be calculated

- DNOs to define and agree common, repeatable approach for calculating limit

Duration of non-firm arrangements

- Proposal for explicit end dates for non-firm arrangements
- Dates should allow time for wider development to take place

What happens if curtailed above limits

- DNO needs to procure flexibility service from market
- Cap will be introduced on the price DNO pays for the flexibility service.
- DNOs will pay customers when curtailment exceeds limit

Implementation

The Ofgem Decision includes a Direction for DNOs to raise code changes to codify these reforms

Four DCUSA change proposals have been raised and working groups established

DNOs are required to submit final DCUSA changes to Ofgem by end October 2022

All changes need to be ready for implementation for **1 April 2023**

SCR Session

✓Webinar to review Ofgem SCR decision planned 27th July 13:00 – 14:30
✓Sign up online
✓Recording will be available online afterwards
✓Any questions ICE@enwl.co.uk

- To receive further updates, please sign up to our distribution list here

Appendix G & Project Progression

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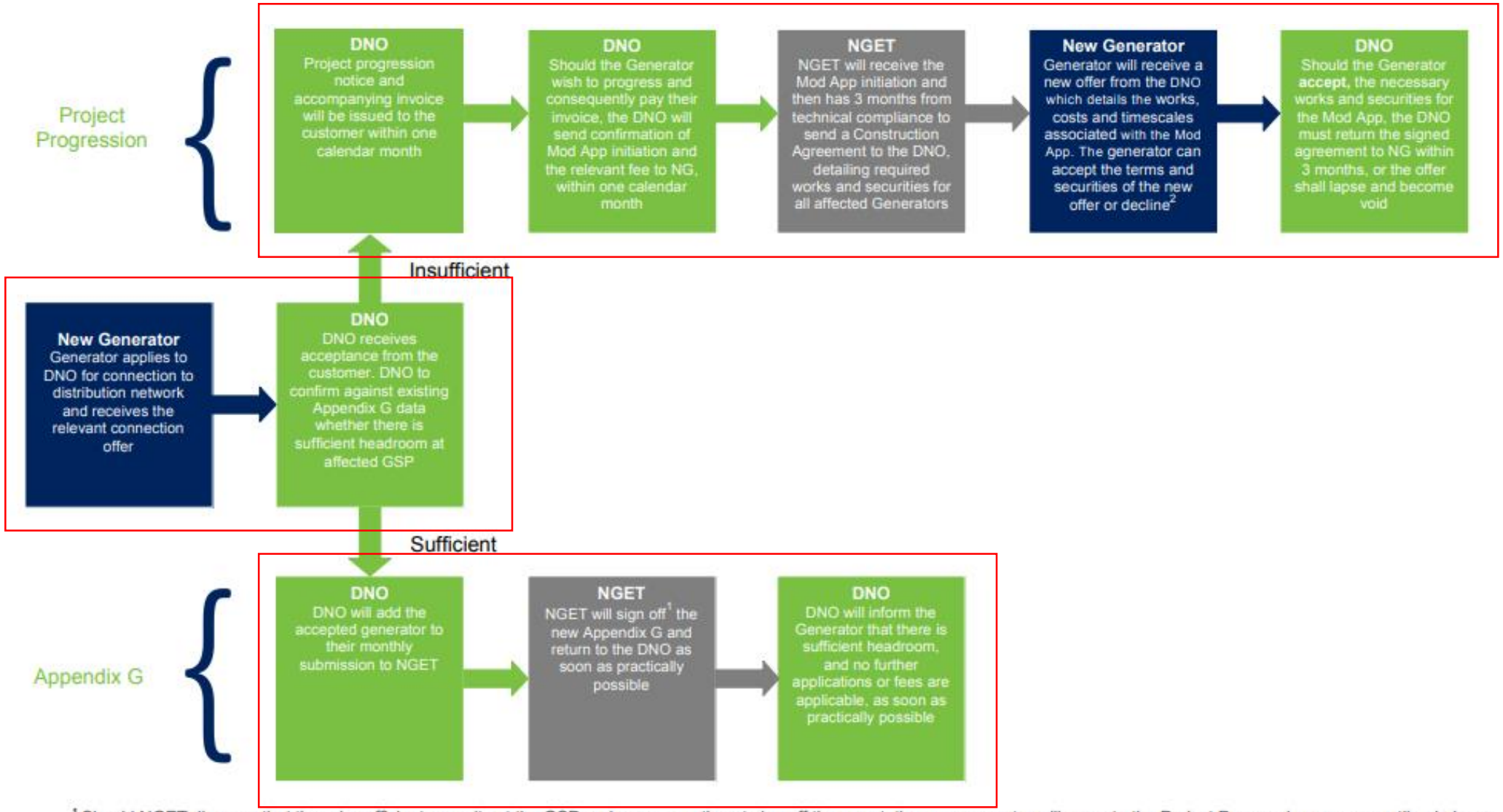
Principles of Appendix G

- Established on a GSP basis via a Project Progression study triggered by ENWL. All GSPs on the ENWL network have Appendix Gs in place.
- Appendix G provides Materiality Headroom, for both thermal capacity and fault level at each GSP.
- Captures all the Distributed Energy Resources (DER) at 1MW or larger that are either connecting or connected at the GSP by date and technology.
- ENWL provides a monthly update to NGESO for each Appendix G to add, amend and remove DER within the given Materiality Headroom limit.
- Any new connecting DER that is outside of the Materiality Headroom for Thermal and/or Fault Level at any GSP requires a Project Progression to be invoked.

Appendix G Process



[1] Should NGET disagree that there is sufficient capacity at the GSP and consequently not sign off the report, the new generator will move to the Project Progression process outlined above

[2] Should You decline the terms and not wish to progress, please note this will be a full withdrawal of Your generation connection offer

GSP Status and Implications

All GSPs on the network are broken down into 3 groups: GSPs with Materiality Headroom to connect, GSPs without Materiality Headroom and require a Project Progression or have a Project Progression triggered awaiting a response/acceptance and GSPs where there is insufficient capacity to connect further generation without works on the Transmission network.

GSPs with Materiality Headroom

- Carrington
- Macclesfield
- Stalybridge
- Stanah
- Whitegate

GSPs requiring a PP

Data Submitted but Clock Not Started

- Bredbury
- Kearsley
- Kirkby

Offer with ENWL

- Padiham
- Penwortham
- Rochdale
- Heysham
- South Manchester
- Washway Farm

GSPs with Transmission Works Triggered

- Harker (Switchgear Replacement and SGT Replacement)
- Hutton (Switchgear Replacement and SGT Replacement)

Further Information

Heat Map

•Tab 6 on the ENWL heatmap lists the status of each GSP and is updated monthly.

NGESO

•For those customers connecting at GSPs with a PP, further information on charges can be found on the NGESO website

Any Questions?

Accelerated Loss of Mains Change Programme

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Time to declare compliance

- The Accelerated Loss of Mains Change Programme (ALoMCP) has allowed generator owners to apply for funding to make the necessary changes to their equipment to ensure compliance against an updated regulation. The change means that all existing generation with loss of mains protection must meet the current protection settings required for any new generation and upgrades must be completed by 31st August 2022.
- The opportunity to apply for funding has now closed, but there is still time for generator owners to make the changes and inform us that they are compliant.
- Any generators that are not compliant after 31st August 2022, will be subject to an enforcement programme, which may result in de-energisation.

Enforcement programme

WEEK 0	WEEK 4	WEEK 8	WEEK 16	WEEK 22	WEEK 26
First notice	Second notice	Third notice	Fourth notice	Final notice	de-energisation
Written notification sets out to generator owner the non-compliance or unknown status of their generator site and sets out the actions to address non-compliance.	Written notification sets out whether a response has been received to the first notice. If no response is provided then a physical, durable copy of the notification will be attached at, or as close to, the generator site as possible. The notification will repeat the actions to address non-compliance.	Repetition of second notice: written notification sets out whether an appropriate response to non-compliance has been provided. If no response is provided, another physical copy of notification attached at, or close to, the generator site.	Repetition of second notice.	Repetition of second notice.	If no evidence of compliance provided or evidence is not sufficient to demonstrate compliance with the Distribution Code, the DNO will make arrangements to de-energise the generation site's Connection Point in accordance with Distribution Code DGC12.

Contact information

- ALoMCP@enwl.co.uk

- https://www.enwl.co.uk/get-connected/network-information/accelerated-loss-of-mains-change-programme/

- https://futureproofyourpower.co.uk/

ICE Update

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ICE 2022-23 Workplan Performance

➢ We will **brief stakeholders** on the **changes to connection charges** being made by Ofgem	➢ Session arranged 28th July
➢ We will develop reporting mechanisms for **Queue Management principles** in conjunction with other DNOs.	➢ Draft has been developed and circulated to DNOs for comment. ➢ Update to follow
➢ We will publish and share our **Network Development Plan** with our stakeholders	➢ Update in today's session
➢ We will continue to **communicate** with our stakeholders. We will **issue quarterly updates** on ICE Commitments to registered stakeholders.	➢ Q1 newsletter published
➢ We will **keep stakeholders informed** on the transition of Distribution Network Operators (DNO) to carrying out enhanced **Distribution System Operation (DSO)** functionality	➢ Update in today's session, further updates to follow.
➢ We will continue to offer opportunities for stakeholders to **engage** with us. We will offer a minimum of **3 engagement opportunities** across webinars and workshops. We will also provide **surgery sessions** to meet	➢ Upcoming workshop in September

ICE 2022-23 Workplan Performance

➢ We will continuously improve how we provide information and **publish requirements for flexible services**. We will publish information and guidance on how to get involved. Working collaboratively with other DNOs we will look to **standardise & simplify** the **flexible services** process.	➢ Update received today.
➢ Target **Time to Quote** timescales for HV Quotations. We aim to outperform the regulatory standard by providing quotes on average in **57 working days** (compared to the guaranteed standard of 65 workings days)	➢ 43 working days
➢ Target **Time to Quote** timescales for EHV Quotations. We aim to outperform the regulatory standard by providing quotes on average in **57 working days** (compared to the guaranteed standard of 65 workings days)	➢ 59 working days

We would love to hear your feedback, please get in touch with either Lottie or Hannah should you have anything to discuss after the session.
Feel free to add any comments in today's chat or email us ice@enwl.co.uk

Influence our plans

Your feedback is critical to ensure we develop commitments that support your needs.
Please provide feedback by completing our survey here or email to ICE@enwl.co.uk

To receive further updates, please sign up to our distribution list here

Any questions?

Wrap Up & Close

- Please give us your honest feedback either email ICE or leave your feedback in the chat
- Presentation slides will be available via our website shortly.
- Future events, including webinars are available here
- Don't forget to get in touch with us at ICE@enwl.co.uk
- Thank you for your attendance.