Net Zero Communities Webinar: Energy Markets and Connections

7 March 2024

About Regen

Who we are and how we drive change

Experts

We approach the energy transition from a position of knowledge and evidence. By understanding the technical, financial, political and societal enablers needed to make sustainable energy work, we can tackle the barriers preventing progress.

Pioneers

We choose to work in areas that are innovative or new. We take on challenges; we get cutting edge projects off the ground and we share the learning to inspire and enable others to follow.

Convenors

We bring the right people and organisations together to create ideas and solutions to achieve change. We work across the energy industry and its wide range of stakeholders.

Agenda

14:00 **Welcome from the chair and from National Grid**

Poppy Maltby, head of cites and regions, Regen (Chair)

Faithful Chanda, development engineer (Community Energy), National Grid

14:05 **Update on the Review of Electricity Market Arrangements**

Ellie Brundrett, net zero project manager, Regen

14:20 **Challenges and opportunities in local energy markets**

Jeff Hardy, director, Sustainable Energy Futures

14:35 **Q&A on energy markets**

14:55 **Break**

Agenda

15:05 **Connecting to the network: A connections session with Kester Jones**

Kester Jones, head of connections, National Grid

15:20 **Connections Q&A session**

15:40 **National Grid innovation update**

George Middlemiss, local energy analyst, Regen

15:50 **Feedback**

15:55 **Close**

Electricity Distribution

Welcome from National Grid

Faithful Chanda
Development Engineer (Community Energy)
March 2024

nationalgrid

Who we are

We are part of the largest electricity transmission and distribution business in the UK

- We distribute power to 8 million homes & businesses, covering the East and West Midlands, South Wales and South West England
- Provide direct support for community energy, to help new schemes connect to our network
- Drive innovation projects and access to funding for community energy groups
- Your community's location, aims, and capacity will influence which topics and help would be of interest – Connection surgery, Community Energy, Net Zero Surgeries
- Flexibility and low carbon technologies (what flexibility is and what the benefits are, who can participate in flexibility, the rise of low carbon technologies)

nationalgrid

The Review of Electricity Market Arrangements (REMA) and what it means for community energy

Ellie Brundrett, net zero project manager, Regen

regen
transforming energy

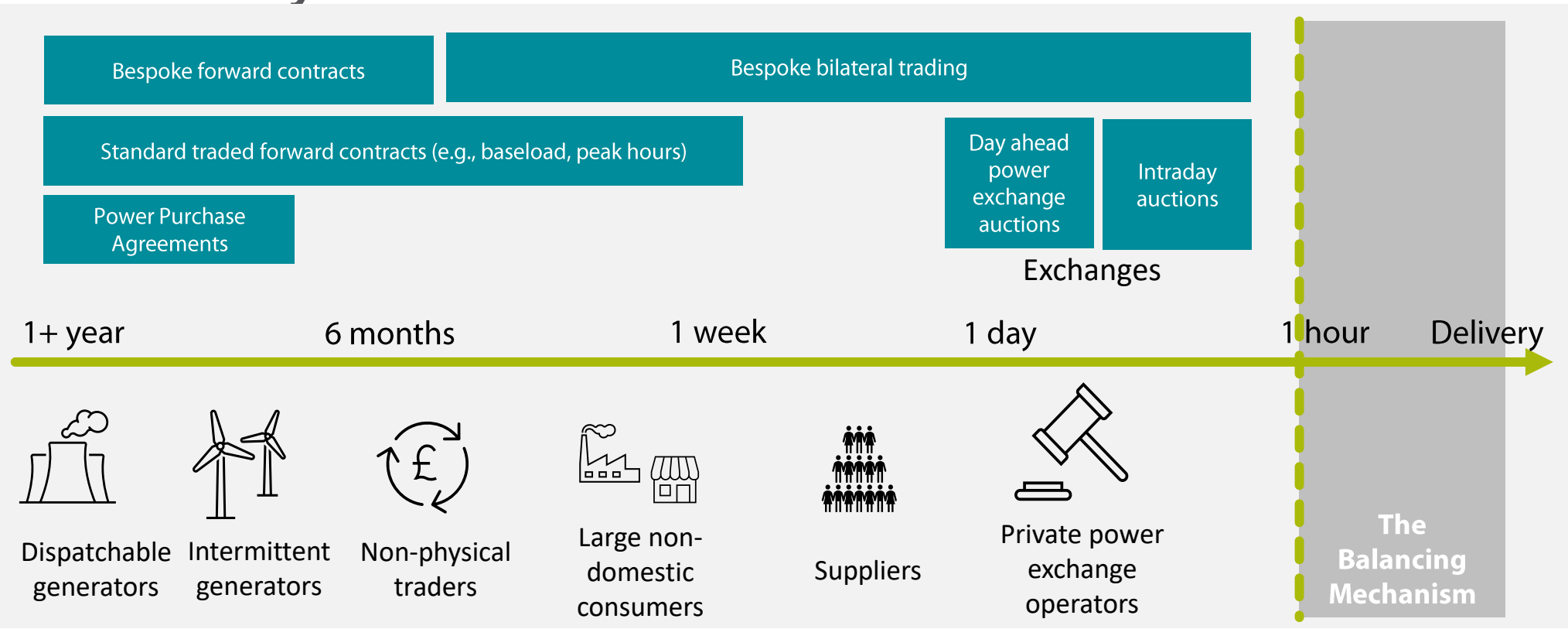
What do we mean by energy markets?

Today, electricity markets can broadly be split into two areas:

- **Retail markets cover the relationship between suppliers and end users of electricity, and the structures which protect consumers.**
- **Wholesale markets cover the relationship between generators and suppliers, the structures that facilitate the balancing of supply and demand of electricity, and the policies or mechanisms that provide signals to invest in and operate assets that generate or use electricity.**

GB's current market arrangements

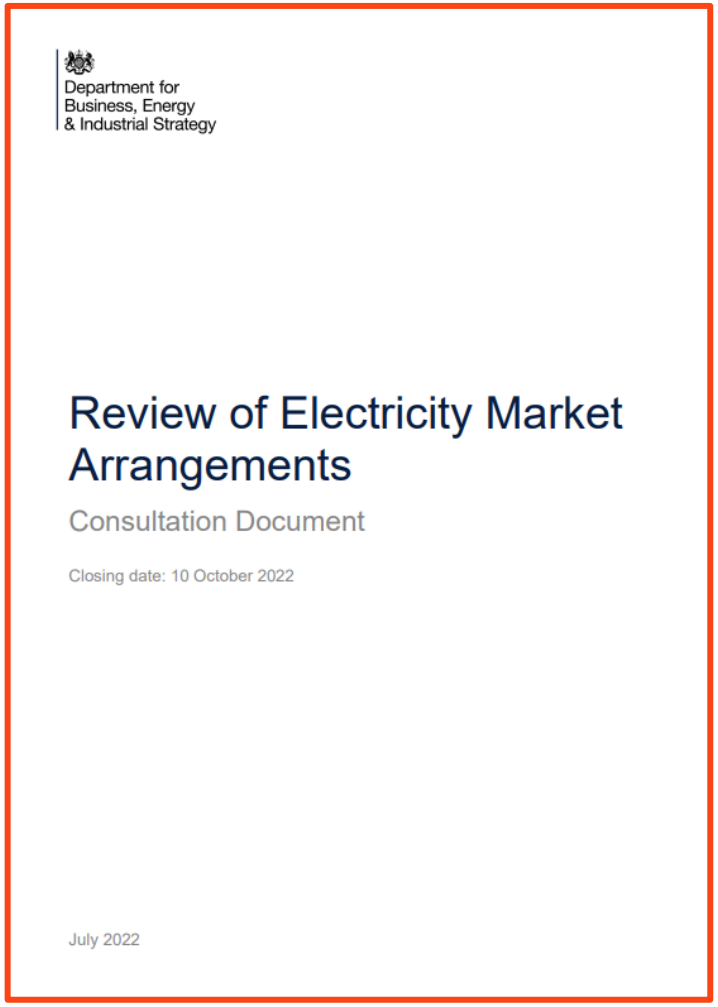
The current wholesale market is characterised by bilateral trading and decentralised dispatch, followed by a centralised Balancing Mechanism in the last hour before delivery



REMA: what and why

"Our core objective for the REMA programme is to **reform** our electricity market arrangements so that they facilitate the **full decarbonisation** of the electricity system **by 2035**, subject to **security of supply**, and are **cost effective** for consumers."

BEIS, July 2022


Department for
Business, Energy
& Industrial Strategy

Review of Electricity Market Arrangements

Consultation Document

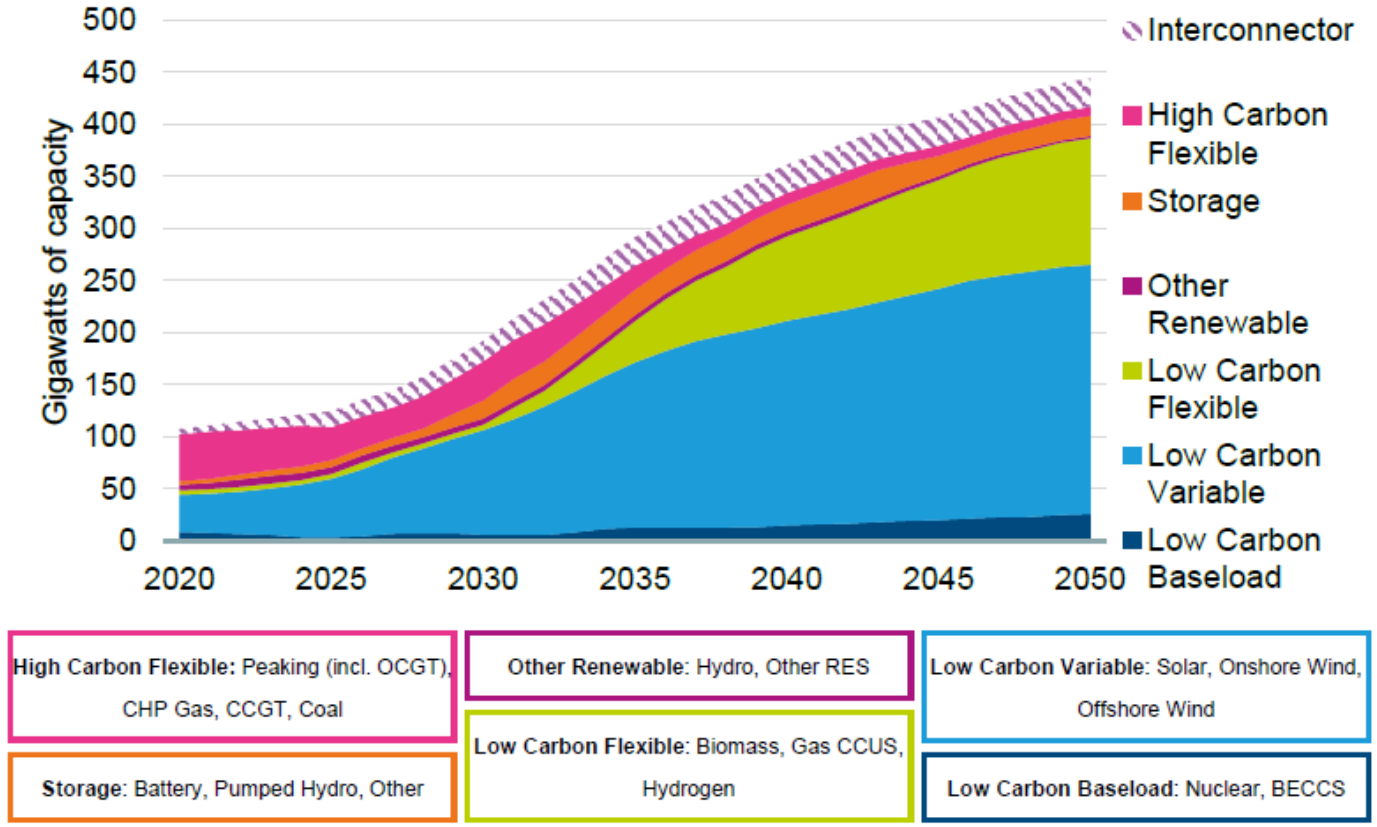
Closing date: 10 October 2022

July 2022

The energy system of the future

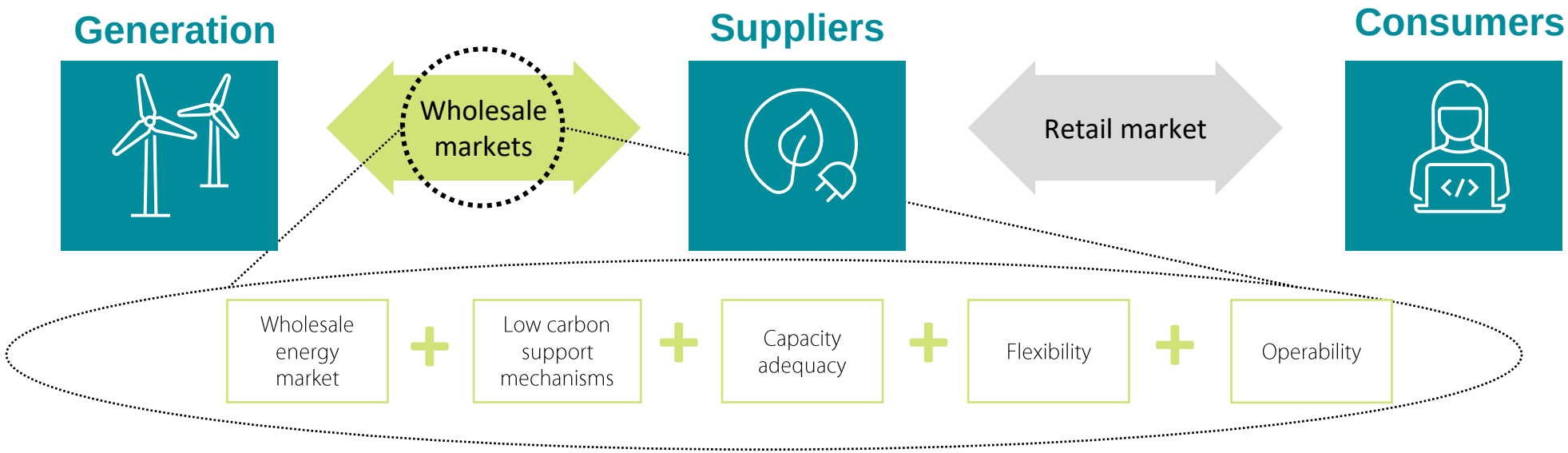
REMA is intended to support a future system that looks very different to today's, with the need for around 2.5 times more generation capacity by 2035 and over 4 times more by 2050.

Future market arrangements need to enable the scale of investment required to achieve this, but also manage the system impacts of an evolving generation mix.



What is in scope?

The scope of REMA focuses on reforming the structure and operation of wholesale markets, as well as the mechanisms that support investment in renewable generation, flexibility and capacity, such as the Contracts for Difference (CfD) scheme and the Capacity Market (CM).



Main market design options under consideration

The debate has evolved into two groups of options: radical market redesign options and a more incremental but progressive reform package

‘Split’ market option

OR

Nodal Locational Marginal Pricing (LMP)

OR

Zonal Locational Pricing

V

Reforms within existing market structures

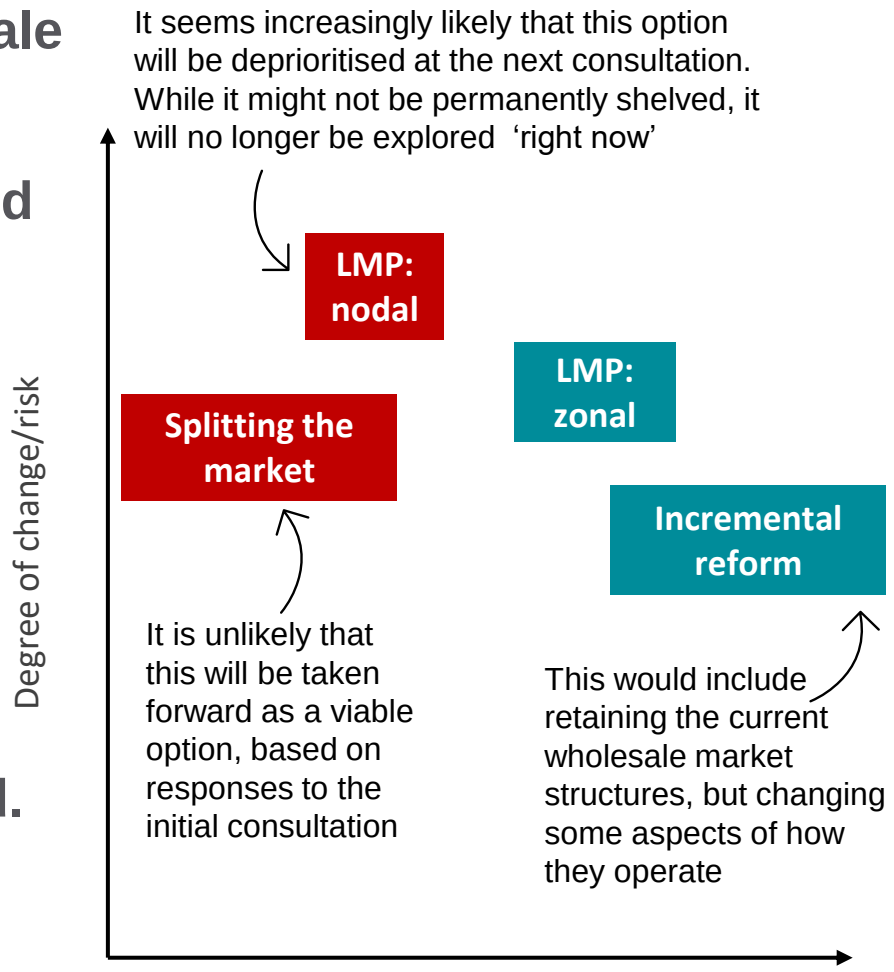
What does REMA mean for communities?

The REMA process of reform aims to make the GB wholesale market structures more dynamic and flexible.

This could open up more opportunities for innovation could create new revenue streams for existing renewable energy and flexibility projects, or make it easier to invest in new projects.

However, any period of uncertainty can lead to the introduction of risk and some of the reform options introduced in the initial consultation represent a radical overhaul of the existing market structures.

This could make it harder for new projects to be developed.



Next steps

October 2022

First REMA consultation closed

March 2023

Summary of consultation responses published

Summer 2023

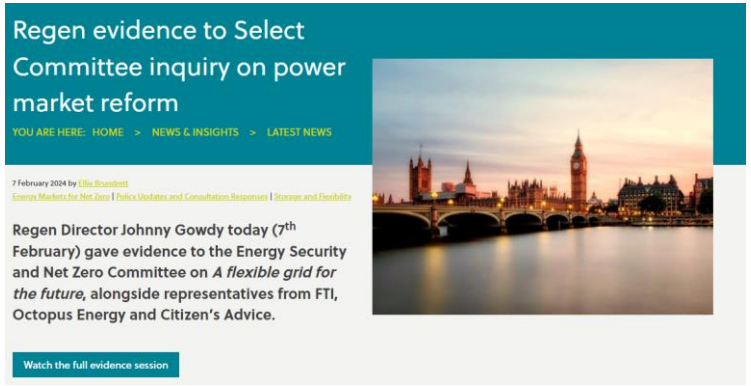
Ongoing industry engagement

Spring 2024

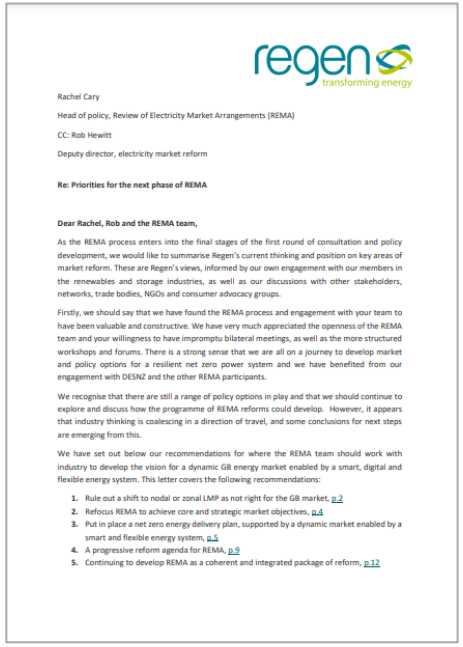
Second consultation expected

Regen's work in this space

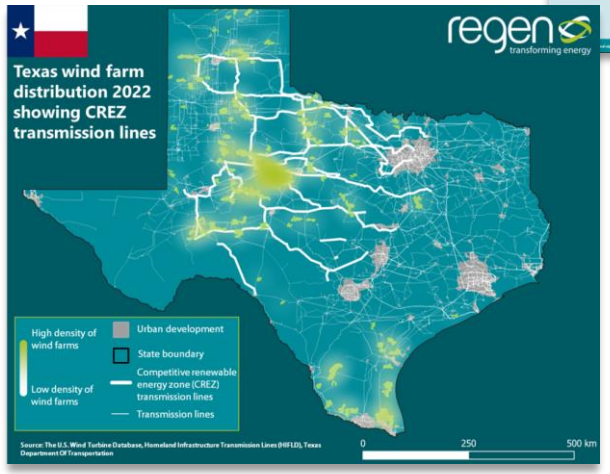
Regen evidence to Select Committee inquiry on power market reform



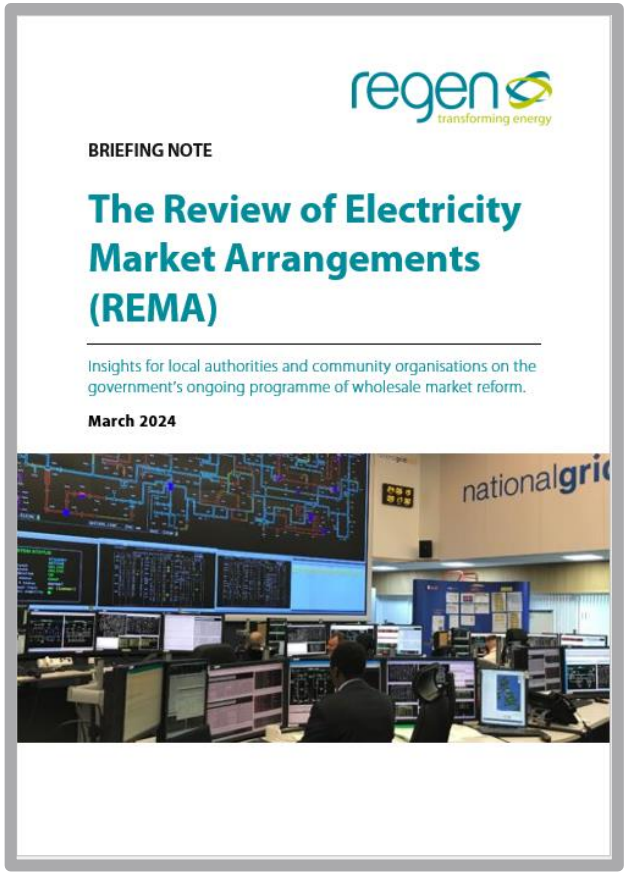
Regen sets out priorities for market reform in letter to REMA team



Regen: Wild Texas Wind



Regen: exploring alternatives to locational pricing



REMA for communities briefing note

Challenges and opportunities in local energy markets

Dr Jeff Hardy
Director, Sustainable Energy Futures Ltd &
Visiting Research Fellow, Grantham Institute,
Imperial College London

Sustainable Energy Futures Ltd

Appetite for local supply

- Many communities are interested and active in local supply.
- A consistent ambition is to supply local consumers with local (community) electricity generation.
- Numerous models exist to achieve this, with varying levels of complexity.
- Most models that involve supply to local domestic (and other) consumers require(s) an energy supplier.
- It is not easy being local supply, but it is possible.

Hypothetical case study

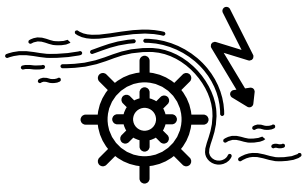
All assets on the same substation

Local hydropower scheme

- Energy-intensive local business
- A mixture of local SMEs – e.g., bakers, hairdressers, garages, etc
- Social housing, schools and public buildings
- Homes – including owner-occupied and private rentals
- Homes, businesses, public buildings with behind the meter DER

Local supply options energy-intensive business

All assets on the same substation



Local hydropower scheme

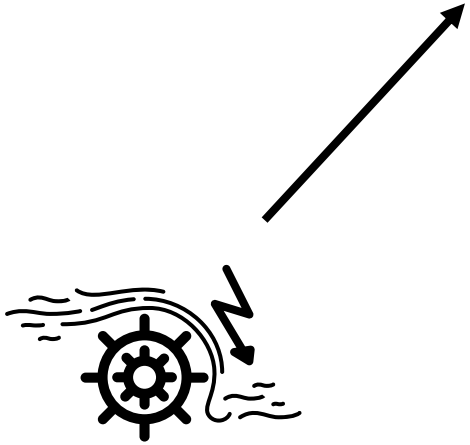
Energy-intensive local business

Standard PPA – The business could PPA with the hydropower scheme via usual route (e.g., employing PPA professionals). A supplier is involved in 'sleeve' the power from the generator to the customer.
Licence-exempt supply – For generating assets under 5MW a virtual private wire PPA is possible. The benefit is that it is exempt from certain system costs. These can be shared between the generator and the customer. A supplier is needed as above.
Private wire – The business could build a private wire to the hydropower scheme for direct supply under licence exemption rules.
P2P marketplace– The business could form part of an Urban Chain B2B market where the hydropower scheme sells its power to multiple local companies, via a licensed energy supplier.

Local supply options SMEs

All assets on the same substation

A mixture of local SMEs – e.g., bakers, hairdressers, garages, etc

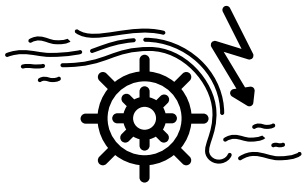


Local hydropower scheme

Standard PPA – The business could arrange a PPA with the hydropower scheme. Usually, a supplier is involved in 'sleeving' the power from the generator to the customer
P2P marketplace– The business could form part of an Urban Chain B2B market where the hydropower scheme sells its power to multiple local companies via a licensed energy supplier.
Local tariff – Local tariffs, such as those through suppliers (e.g., tariffs associated with Ripple Energy).

Local supply options social housing/schools

All assets on the same substation



Local hydropower scheme

Social housing, schools, public buildings

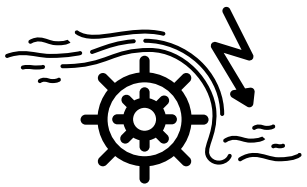
Standard PPA – The Local Authority (assuming they own housing/schools) could arrange a PPA with the hydropower scheme via usual routes (e.g., employing PPA professionals or via exchanges). Usually, a supplier is involved in 'sleeving' the power from the generator and supplying the residual energy needs.

P2P marketplace– The business could form part of an Urban Chain B2B market where the hydropower scheme sells its power to multiple local companies via a licensed energy supplier.

Local tariff – Local tariffs, such as Ripple Energy via Octopus Energy (and other suppliers) and Energy Local allow local customers to benefit from the local hydropower scheme.

Local supply options homes

All assets on the same substation



Local hydropower scheme

Homes – including owner-occupied and private rentals

Local tariff – Local tariffs, such as Ripple Energy and Fan Club (if close to specific assets) via Octopus Energy (and other suppliers) and Energy Local allow customers to benefit from the local hydropower scheme.

Local supply options for behind-the-meter Distributed Energy Resources (DER)

All assets on the same substation

Homes, businesses, public buildings with behind-the-meter DER

Local hydropower scheme

Local tariff – Local tariffs, such as Ripple Energy via Octopus Energy (and other suppliers) and Energy Local allow customers to buy power from the local hydropower scheme.

DER optimisation – An organisation (a supplier or intermediary (e.g., an aggregator) could offer to optimise DER to maximise benefit from local energy tariffs (e.g., set a battery strategy to optimise home solar and local energy import).

Peer-to-peer trading – In principle, there is value in enabling local buildings to trade electricity with one another as this will maximise local consumption, minimise network issues, and enable local benefit retention. This is usually difficult because buildings are with different energy suppliers. If they were all with the same supplier and tariff, it is possible. It could involve similar services to the DER optimisation above.

Five barrier themes

Sustainable Energy Futures Ltd

Solutions?

Local Electricity Bill

A

BILL

TO

A Bill to require the Secretary of State to make regulations to establish a framework to support the growth of community energy schemes; to guarantee small energy generators a stable tariff for selling their energy based on current market rates; to establish a local energy supply mechanism to enable community renewable generation schemes to sell directly to local people; to give specified duties to the Gas and Electricity Markets Authority; to require annual reporting; and for connected purposes.

PRESS RELEASE

Ynni Cymru will unlock Wales' green energy potential

A successful, community-owned renewable energy company was the perfect location for Climate Change Minister Julie James and Plaid Cymru's Designated Member Siân Gwenllian to launch Ynni Cymru – a new, a publicly-owned energy company for Wales.

First published: 7 August 2023
Last updated: 7 August 2023

P379 'Multiple Suppliers through Meter Splitting'

Print Bookmark Glossary

Formal title: Enabling consumers to buy and sell electricity from/to multiple providers through Meter Splitting

P441 'Creation of Complex Site Classes'

Print Bookmark Glossary

Formal title: P441 'Creation of Complex Site Classes'

Wholesale market - location	National pricing		Zonal pricing		Nodal pricing		
Wholesale market - tech	Unified market		Split by characteristic				
Wholesale market – balancing	National		Local then national				
Wholesale market – price formation	Pay-as-clear		Pay-as-bid				
Wholesale market – dispatch	Self-dispatch		Central dispatch				
Mass low carbon power	Existing CfD	CfD with more price exposure	Deemed generation CfD	Supplier obligation	Revenue cap and floor	Dutch subsidy	Equiv. firm power auction
Flexibility	Optimised CM	CM with flex enhancements	Supplier obligation (inc. CPS)				
Capacity adequacy		Capacity payment	Centralised reliability option	Decentralised reliability option	Targeted tender	Strat. reserve	
Operability	BAU	BAU+	Local markets	Changes to CfD/CM design	Co-optimisation	Dedicated support scheme	

Energy markets Q&A

Break

Electricity Distribution

Community Energy Event

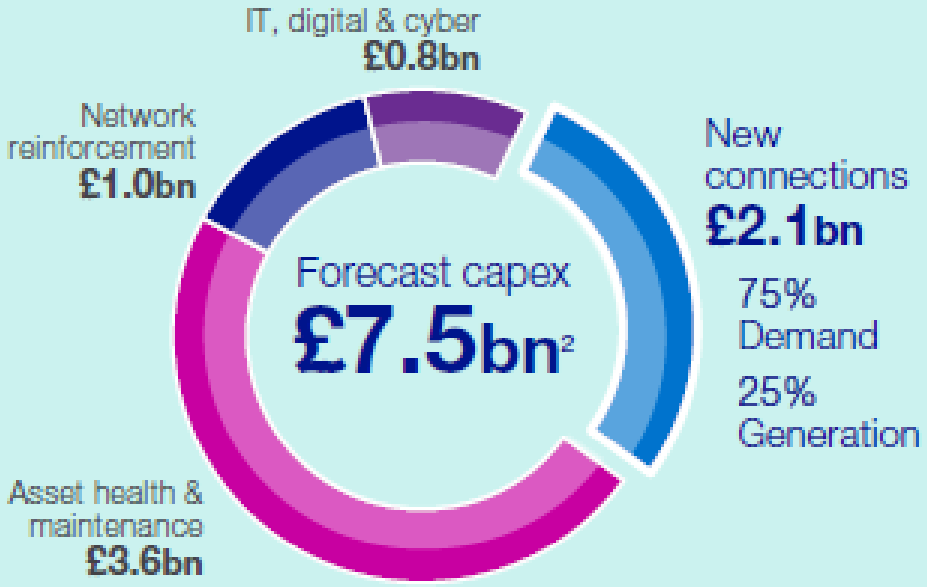
7th March 2024

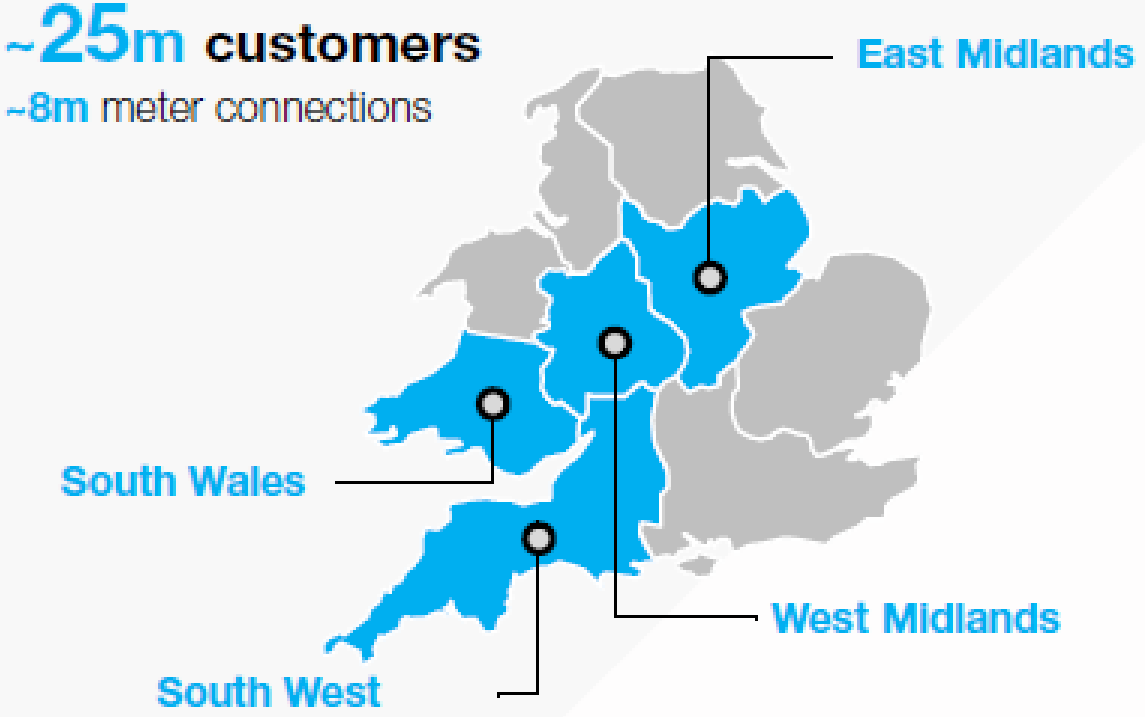
nationalgrid

National Grid Electricity Distribution: overview

The UK's largest distribution network operator

RIIO-ED2[1] capital investment





1. Price control from 1 April 2023 to 31 March 2028
2. Nominal capital expenditure, including capex funded by contributions and uncertainty mechanisms

The Energy Landscape

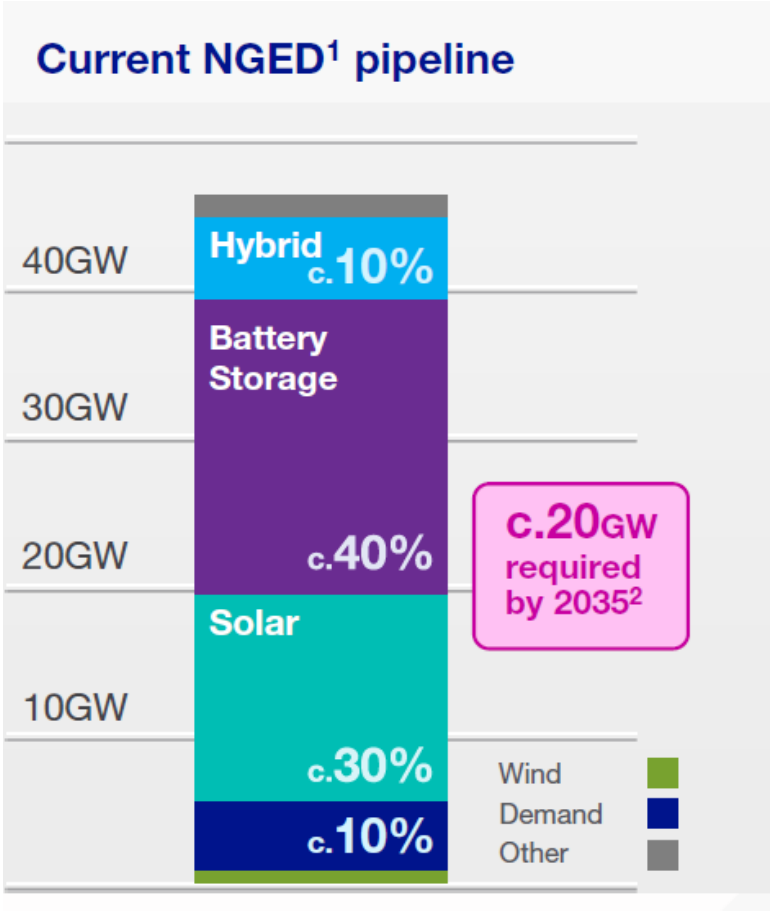
Target to fully decarbonize the power sector by 2035, with demand expected to double by 2050.

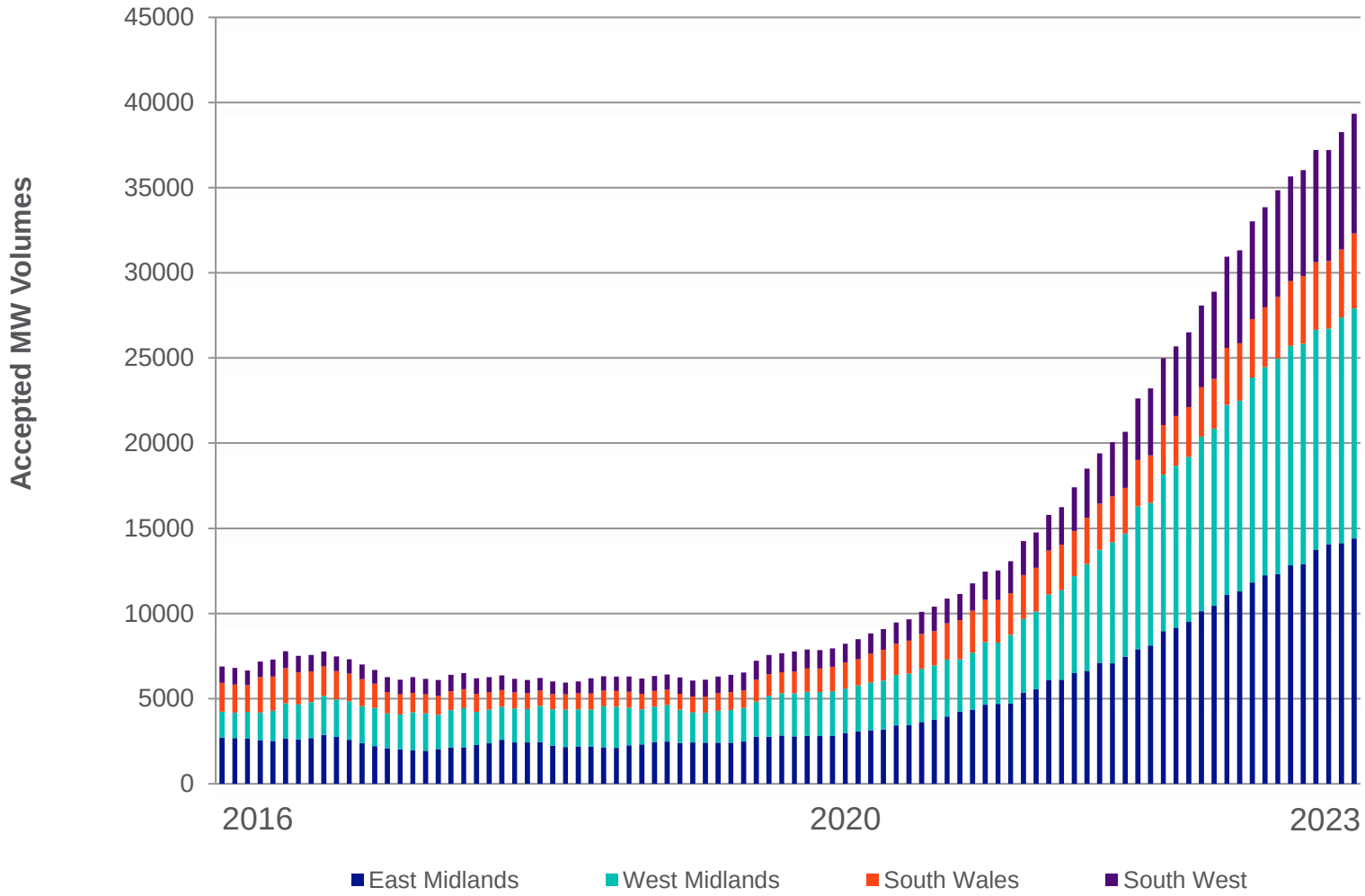
Policy and regulation need to reflect increased connection requests and changes in the types of projects.

We have c.12GW of generation capacity already connected to our network.

We have seen an exponential increase in generation and industry-scale demand, including renewable generation, data centres, electrifying manufacturing and low-carbon tech.

Our connections queue has grown exponentially over the last 3 years





1 NGED: National Grid Electricity Distribution

Distribution connections: overview

nationalgrid

Exponential increase in larger connection requests

- Enacting reform to connect 'shovel ready' projects

Steady rise in domestic demand connections

- Understanding consumer adoption of new technologies

The distribution grid is not full

- We're connecting everyday

Connections Reform

Transmission

- 10GW of battery storage accelerated, by an average of 4 years.
- Queue Management proposal approved, with milestones being added retrospectively.
- ESO's reformed connection process to go-live in 2025, enabling 'first-ready, first connected'.

Connections Action Plan – Outlines 6 Key Actions

- Raising entry requirements
- Removing stalled projects
- Utilising existing network capacity
- Better allocating available network capacity
- Improving data and processes, sharpen obligations and incentives
- Develop longer term connections process models

At NGED:

Progress has continued against the ENA 3-Point Plan

1.3GW capacity now available due to removing 63 stalled projects.

Released 10GW capacity allowing 200 customers to accelerate their offers.

Forecasting 25% more volume connected to our network this year.

The 3-step Action Plan to improve and accelerate connections

ACTION 1

Reforming the distribution network connection queue

- Spring clean. Migrate pre 2017 offers to milestones contracts
- First ready, first connected. Prioritise ‘shovel ready’ connections

ACTION 2

Changing how Transmission and Distribution coordinate connections

- Clear & consistent boundaries. Create technical boundaries.
- Co-ordinating the queue. Reallocate capacity.

ACTION 3

Greater flexibility for storage distribution customers

- Flex capacity. Connect battery customers more quickly and improve the network’s ability to manage capacity

Since April, NGED has now removed over 1.3GW of stalled projects from the connections queue

The total number of schemes removed (>1MW) since April is 63.

NGED's Actions:

- New team established to support with the progression of slow-moving schemes.
- Updated systems to support with customer engagement on progression milestones.
- Projecting an additional 5GW of stalled projects progressed into 'on-track' or removed from the queue, over the next 12 months.

Queue Management and Optimisation

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.

Shovel Ready – Must evidence the minimum requirements listed below:

- Secured land
- Obtained planning consent
- Secured sufficient funding
- That design and engineering readiness is advanced
- That overall development of the project is in a stage that can enable construction to start within a short space of time.

At present, we offer Shovel Ready projects, where possible, non-firm access to facilitate a quicker connection to the network.

Two case studies being explored, as NGED are keen to be an industry leader on this approach.

The 3-step Action Plan to improve and accelerate connections

ACTION 1

Reforming the distribution network connection queue

- Spring clean. Migrate pre 2017 offers to milestones contracts
- First ready, first connected. Prioritise ‘shovel ready’ connections

ACTION 2

Changing how Transmission and Distribution coordinate connections

- Clear & consistent boundaries. Create technical boundaries.
- Co-ordinating the queue. Reallocate capacity.

ACTION 3

Greater flexibility for storage distribution customers

- Flex capacity. Connect battery customers more quickly and improve the network’s ability to manage capacity

In September we launched the T- D capacity release EOI for Phase 1a: customers engaged well and we are now assessing a plan of work

22 NGED GSPs

included in Phase 1a – 212 customers contacted

70%

of customers submitted EOIs

68%

requested earlier connection with curtailment

9%

requested later connection than current offer

31%

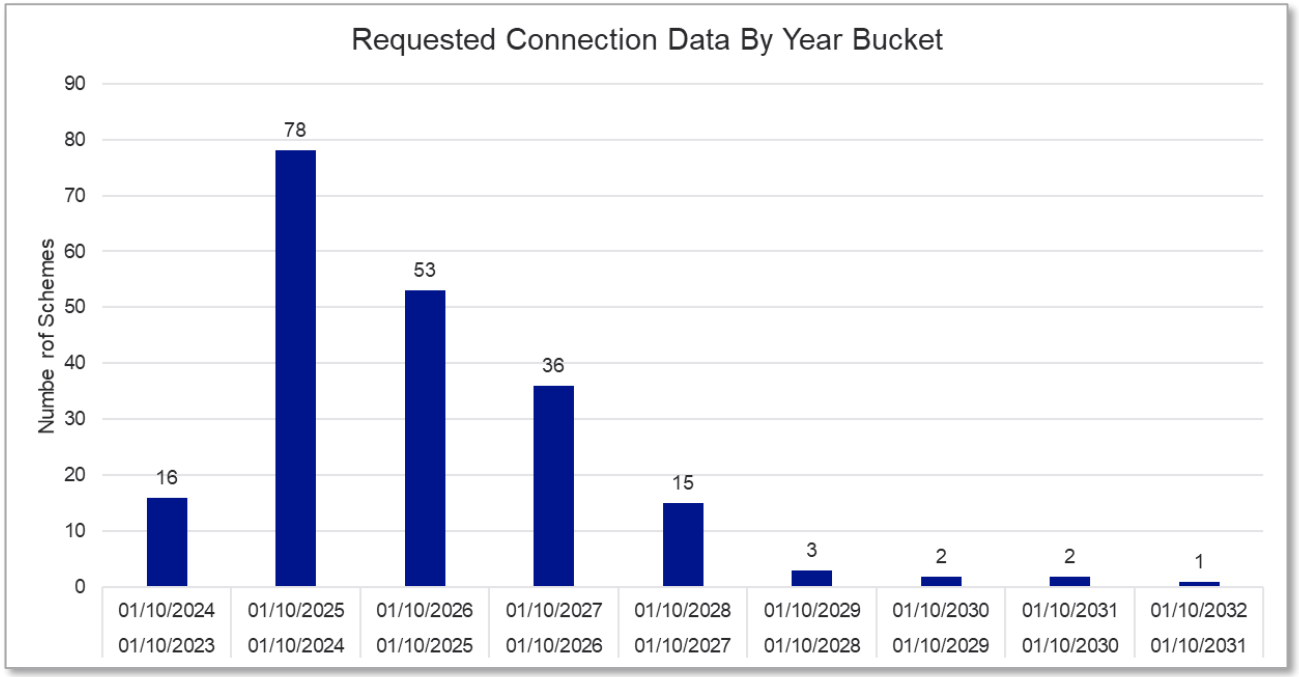
requested earlier connection but no curtailment

1 customer

requested curtailment for existing energisation date

24-25

Most popular energisation date and peak of requests



Next steps:

- **13 Oct: contacted all relevant customers directly**
- **End of Oct: webinar for update on Phase 1A and next steps and launch Phase 1B**
- **Ongoing: Variations being sent to customers, and are subsequently being accepted.**

Technical Limits to Date

Phase 1a

- 65 variations sent, 46 signed and returned.
- 1,492 months saved across 46 accepted schemes (~32.4 months each).
- First customer connecting in March under Technical Limits contract, with an accelerated connection of 12 years and 9 months!

Phase 1b

- 22 schemes under Phase 1b GSPs.
- Total requested acceleration of 142 years (~6.5 years per scheme).
- Improvement on Phase 1a: Communication around curtailment, extending signing period to allow for review of additional data and reports.

The 3-step Action Plan to improve and accelerate connections

ACTION 1

Reforming the distribution network connection queue

- Spring clean. Migrate pre 2017 offers to milestones contracts
- First ready, first connected. Prioritise ‘shovel ready’ connections

ACTION 2

Changing how Transmission and Distribution coordinate connections

- Clear & consistent boundaries. Create technical boundaries.
- Co-ordinating the queue. Reallocate capacity.

ACTION 3

Greater flexibility for storage distribution customers

- Flex capacity. Connect battery customers more quickly and improve the network’s ability to manage capacity

Tactical Solution 1 – Access Rights

Applications to connect Electricity Storage from 30/09/2023 receive a connection offer to provide capacity only when the distribution system is intact

To date, over 435MW of capacity has been offered to battery storage customers with Tactical Solution 1 Access Rights.

Tactical Solution 2 – Common EREC P2 Application

Curtailment of controllable Electricity Storage will be treated as Demand Side Response

To date, over 2.7GW of offers have been made, treating electricity storage import capacity as Demand Side Response.

Other NGED initiatives

Introduce a Letter of Authority for **Applications post 1st March 2024**

Demand & Generation – (Section 15 & 16)

Charge upfront for more quotations to align with industry (Quotations for connections greater than 250kVA at 11kV)

Demand & Generation – (Section 15 & 16) **Applications post 1st April 2024**

Online self-serve tools to aid customers prior to making an application. Such as capacity maps, data portals, budget estimate tools, **ClearViewConnect** and information provided following our recent curtailment consultation.

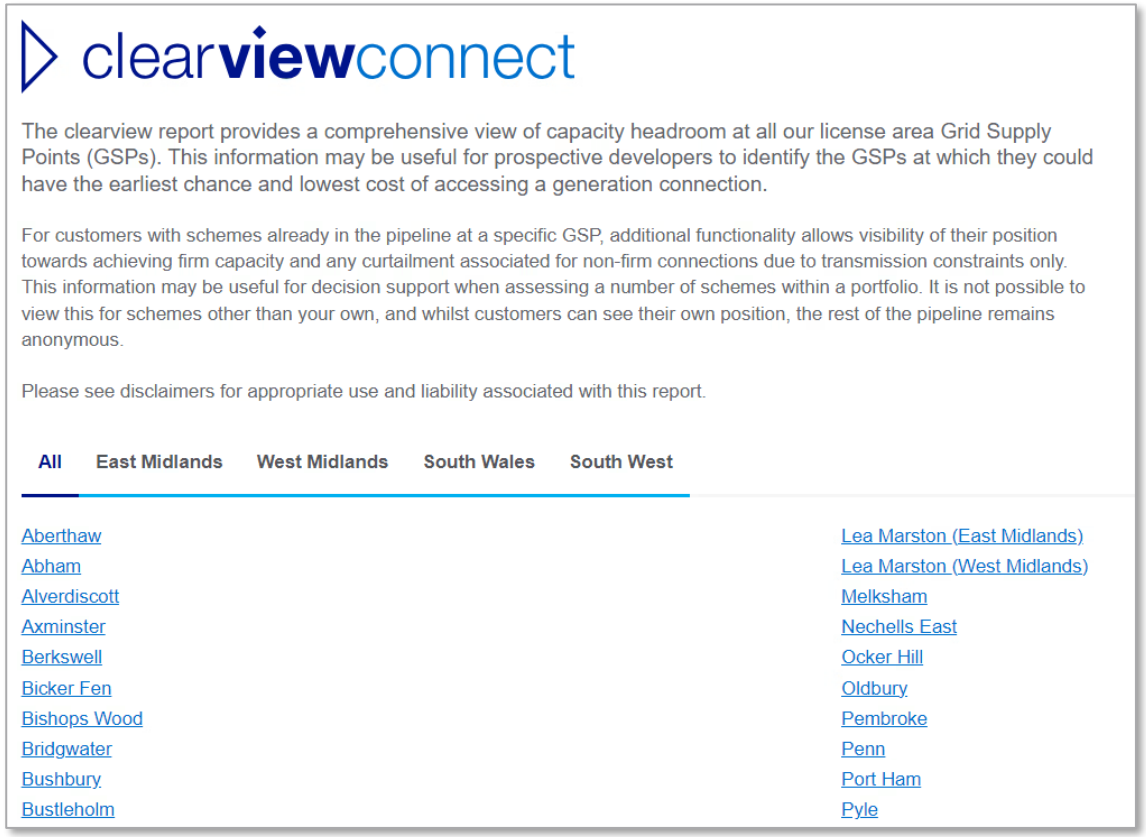
Engagement events and webinars. Dedicated Community Energy Engineer. Community Energy Connection Surgeries

Electricity Distribution

clearviewconnect

nationalgrid

Clearviewconnect will show all data for curtailment on the Connected Data Portal



clearviewconnect

The clearview report provides a comprehensive view of capacity headroom at all our license area Grid Supply Points (GSPs). This information may be useful for prospective developers to identify the GSPs at which they could have the earliest chance and lowest cost of accessing a generation connection.

For customers with schemes already in the pipeline at a specific GSP, additional functionality allows visibility of their position towards achieving firm capacity and any curtailment associated for non-firm connections due to transmission constraints only. This information may be useful for decision support when assessing a number of schemes within a portfolio. It is not possible to view this for schemes other than your own, and whilst customers can see their own position, the rest of the pipeline remains anonymous.

Please see disclaimers for appropriate use and liability associated with this report.

All | East Midlands | West Midlands | South Wales | South West

Aberthaw
Abham
Alverdiscott
Axminster
Berkswell
Bicker Fen
Bishops Wood
Bridgwater
Bushbury
Bustleholm
Lea Marston (East Midlands)
Lea Marston (West Midlands)
Melksham
Nechells East
Ocker Hill
Oldbury
Pembroke
Penn
Port Ham
Pyle

GSP Overview

Connected Capacity to date (MW)	177.83
Developer Capacity Available (MW)	0
TD Boundary Capacity Notes	PHASE1B
Transmission Reinforcement Expected Completion Date	December 2036
Connection Asset Reverse Power Limits (MVA)	-
GSP Technical Export Limit*	180.36
GSP Technical Import Limit Winter*	-382.67
GSP Technical Import Limit Summer*	-325.35
GSP Technical Import Limit Access Period*	-368.46

Clearviewconnect will show all data for curtailment on the Connected Data Portal

List of Schemes and rolling MW export capacity currently being developed in pipeline order

Use your reference number to see where you are currently in the pipeline:

1234567 Search

Generator Type	Export Capacity (MW)	Position	Cumulative Export Capacity (MW)	Non Firm Transmission Curtailment (Worst Case) (%)	Non Firm Transmission Curtailment (Diversified) (%)
Photovoltaic	16	1	16	-	-
Photovoltaic	1.82	2	17.82	-	-
Stored Energy - Storage - Electrochemical Classic Batteries - Lithium Ion (Li-ion)	49.5	3	67.32	Pending	Pending
Fossil (Gas) - Gas turbine (OCGT)	25.3	4	92.62		
Photovoltaic	2	5	94.62		
Photovoltaic	5.6	6	100.22		

Data descriptions

- Connected Capacity to date
- Developer Capacity Available
- TD Boundary Capacity Notes
- Transmission Reinforcement Expected Completion Date
- Connection Asset Reverse Power Limits

Provides the maximum reverse power flow limit through the transmission-distribution boundary transformers that National Grid Electricity Distribution must not exceed beneath, which is achieved via a control scheme (active network management). The result of this active network management system is that customers' generation may be curtailed to control power flow in the reverse direction through these transformers.

Technical Limits

For GSPs that have been assessed for Technical Limits (currently in progress for Phase 1A and Phase 1B GSPs), export and import limits are provided to NGED:

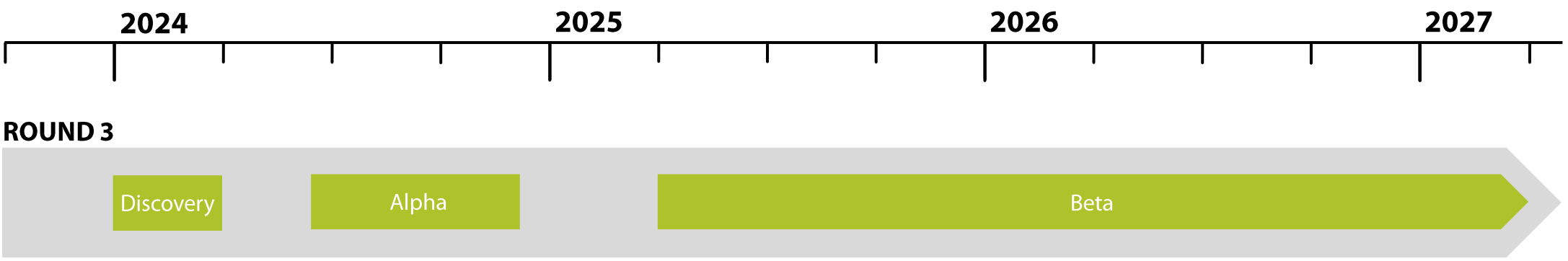
- Technical Export Limits
- Technical Import Limits

nationalgrid

Grid connections Q&A

Feedback

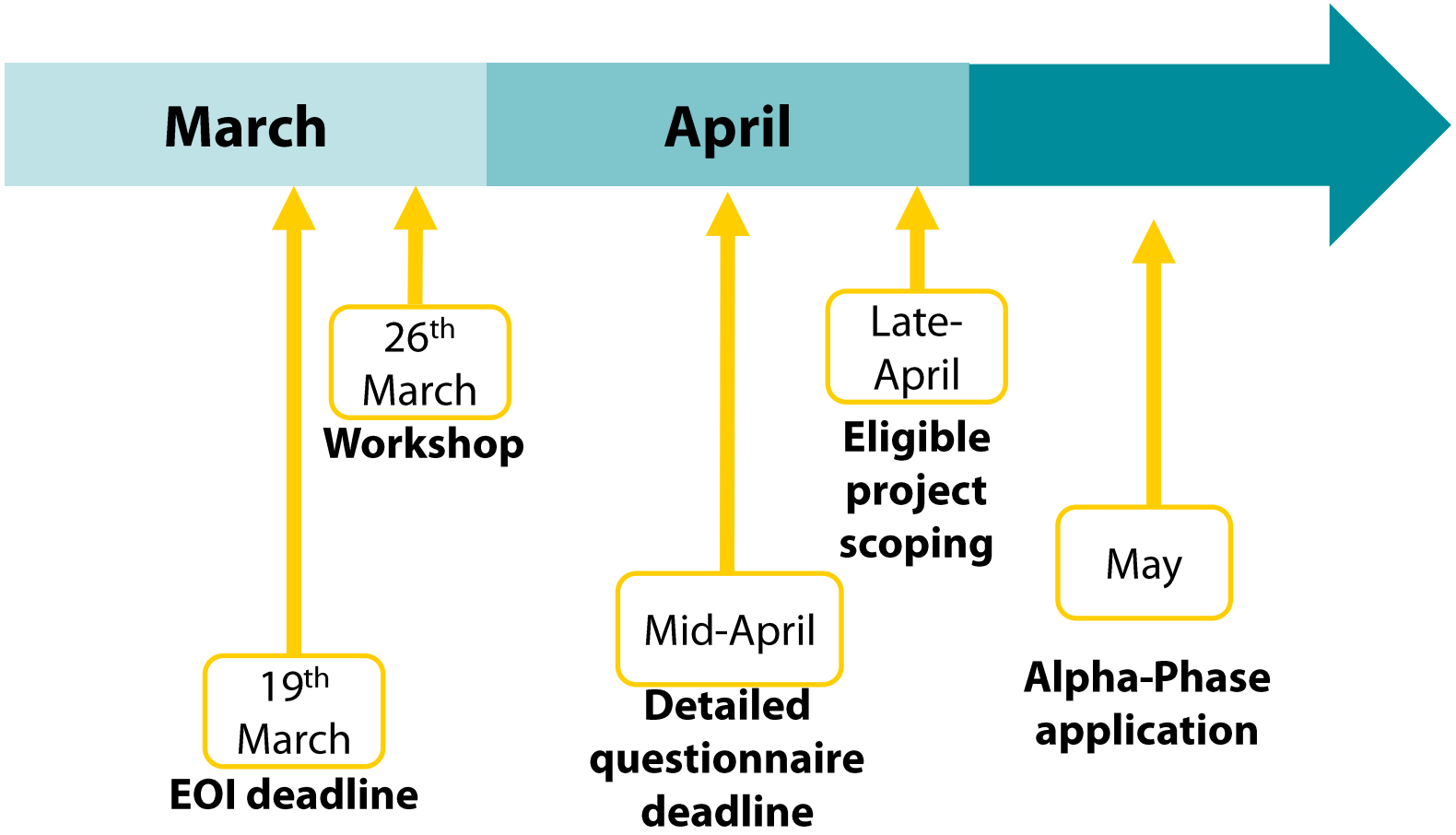
REACH – Rural Energy And Community Heat



Who can get involved?

- Community energy organisations
- Local councils
- Other rural or community organisations

What are the next steps?



: Bradninch Court, Castle Street, Exeter, EX4 3PL

: 01392 494 399

15 March, 2024