

Public

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July 2025 Response and Reserve Webinar

**Locational
Procurement**



Agenda

- Current Market Design
- Key Drivers and Interactions
- Unit Aggregation and Zones
- Design Building Blocks
- Next Steps
- Q&A

Current Market Design

- Frequency Response and Reserve services are procured together in a **single auction**.
- The objective function finds the order selection that **maximises the market welfare** and the clearing prices that minimises total procurement costs.

- **Co-optimisation** – Participants can submit alternative offers to the auction. The auction will clear the alternative that optimises the market most efficiently.
- **Splitting** – Units can simultaneously deliver products from different services within frequency response.
- **Negative Pricing** – Sell orders can be priced below £0/MW/h. Clearing prices may also be negative.
- **Overholding** – Cleared quantities of sell orders can exceed the NESO requirements if this results in a more efficient (higher welfare) solution overall.
- **Global Market** – **Service requirements can be met by units located in any part of the network, without considering transmission capacities.**

Key Drivers and Interactions

Drivers for Locational Procurement

Network Constraints

- Transmission Level
- Distribution Level

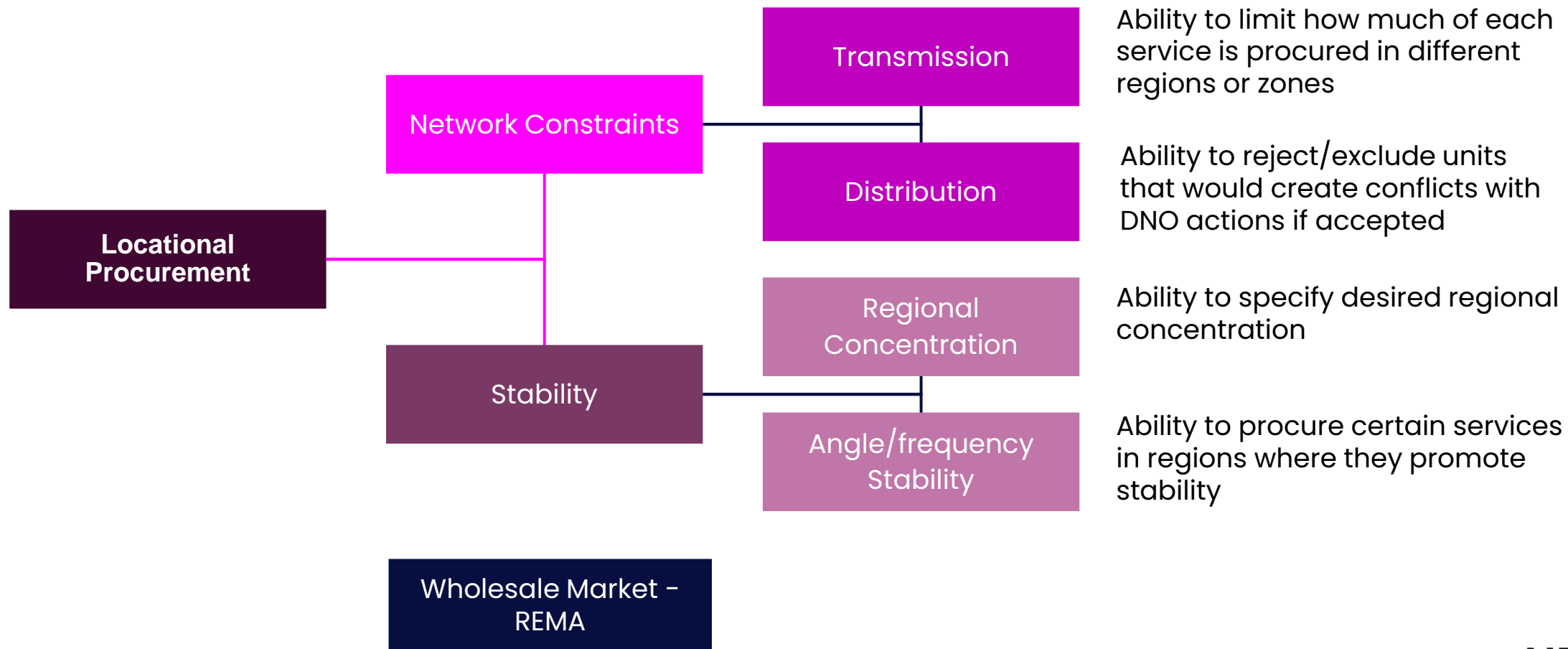
Stability

- Angle and frequency stability
- Regional Frequencies

Wholesale Market Pricing – REMA

- Potential Zonal GB market
- Alignment between AS and wholesale markets

Classification



REMA Interactions

One of the key remaining decisions is whether to **reform the existing national market** or **introduce a zonal wholesale pricing** in GB. DESNZs decision is expected in **mid-2025**.

National

One price for the entire system for each settlement period. Locational signals would be sent via other mechanisms.



Status quo

Zonal

System divided into zones with boundaries reflecting congested regions. Each zone would have a different price and would reflect system congestion.



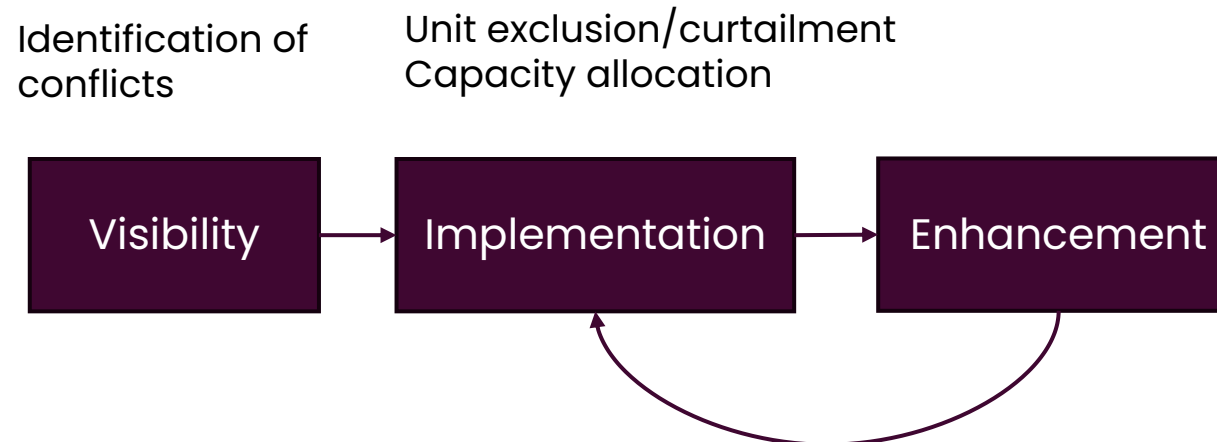
For illustrative purposes only

- If the decision is for **Zonal prices**, we will aim to use the same zonal boundaries developed for the wholesale market.
- If the decision is for a single **National price**, a methodology to determine the zonal boundaries for AS will need to be developed.

Primacy Interactions

- **Primacy** rules dictate the coordination of access to flexibility between NESO and DNOs.
- These rules minimise instances of DNO actions negating NESO actions.

- If we are aware of ANM schemes impacting specific units, we can reject/exclude them to prevent the necessity for DNO counter-activation in real time.
- Alternatively, DNOs can supply their maximum limits at constrained GSPs/BSPs, and we can restrict procurement at those locations.



Thermal Constraints

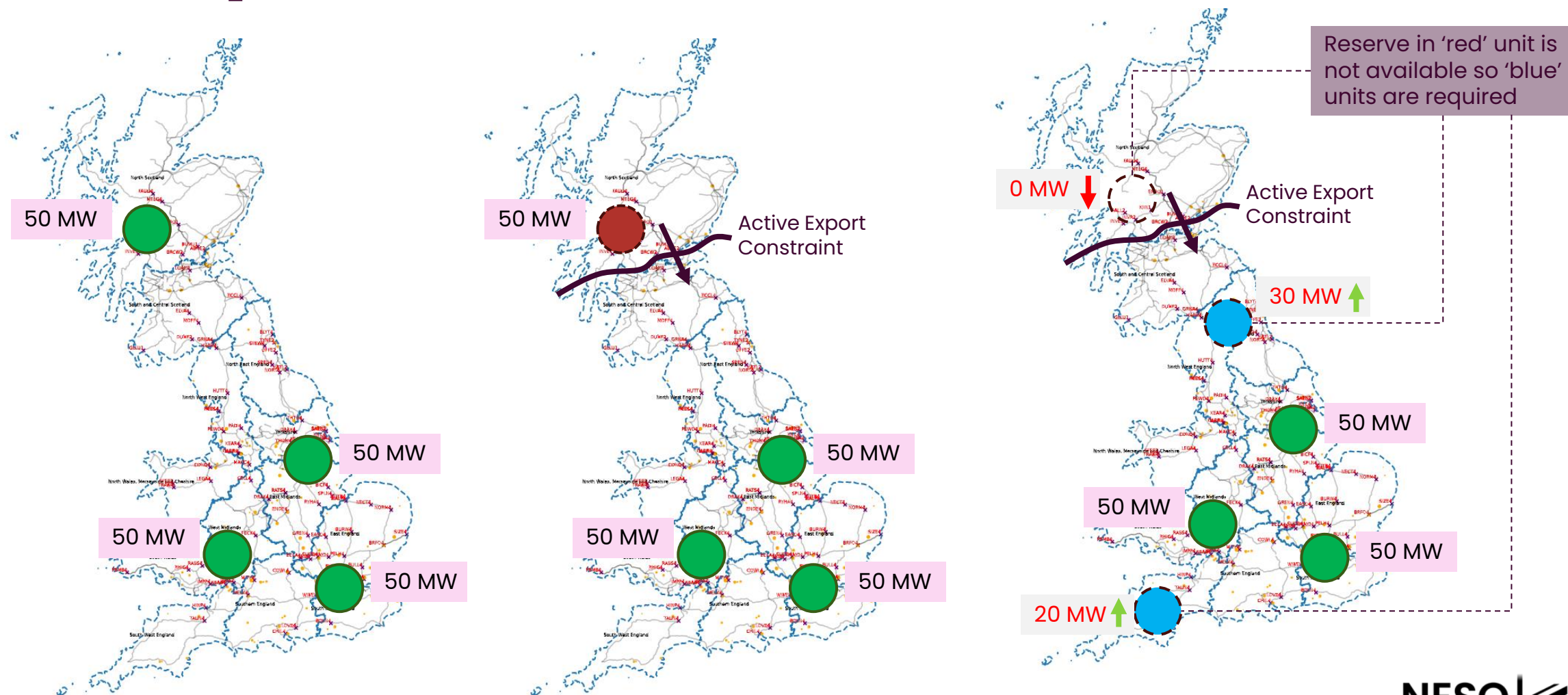
- Thermal constraints actions are taken when the amount of energy that would flow naturally from one region to another exceeds the capacity of the circuits connecting the two regions.
- These actions can serve multiple purposes, such as providing access to reserve, or supporting voltage/stability requirements.
- **Thermal constraint costs have increased by 64% in 2024/25, totalling £1.7bn.** This follows a large increase in thermal constraint volumes, rising 81% year-on-year to 13.5TWh.

Outturn thermal constraint costs and volumes
2018/19 – 2024/25



[2025 Annual Balancing Costs Report](#)

Example Constrained Headroom



Implications for AS Markets

In a National market, a portion of our AS contracted at day-ahead will naturally be behind active constraints.

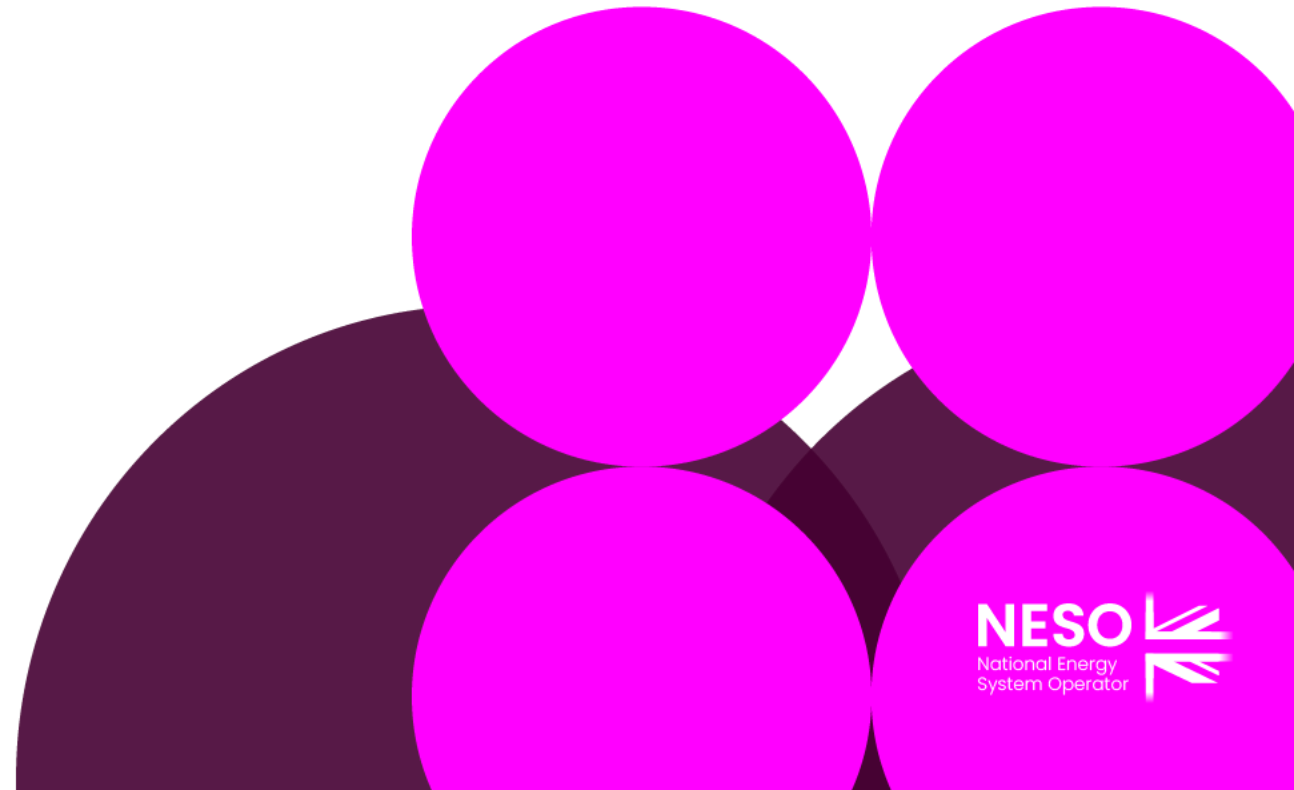
This implies that:

- There will be **expensive repositioning efforts** needed to transfer reserves from constrained units to those that are unconstrained.
- Payments for capacity at the day-ahead stage are **essentially lost**.

Our goal is to incorporate details regarding the physical transmission layer (e.g. constraint forecasts) into the ancillary service market, **enabling the procurement of such services where they are feasible**. Thus

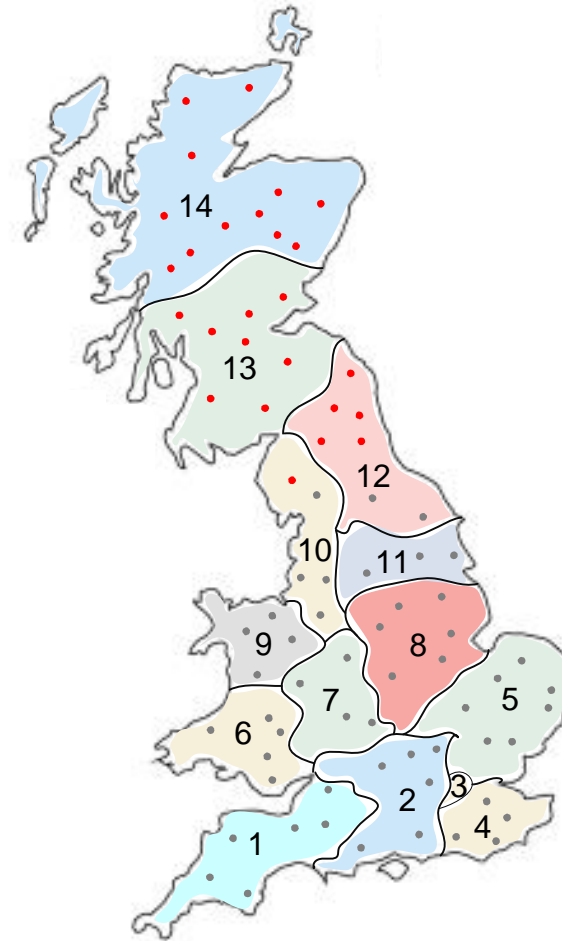
- reducing repositioning costs and actions within day.
 - improving market signals in investment and dispatch timeframes.
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Unit Aggregation and Zones



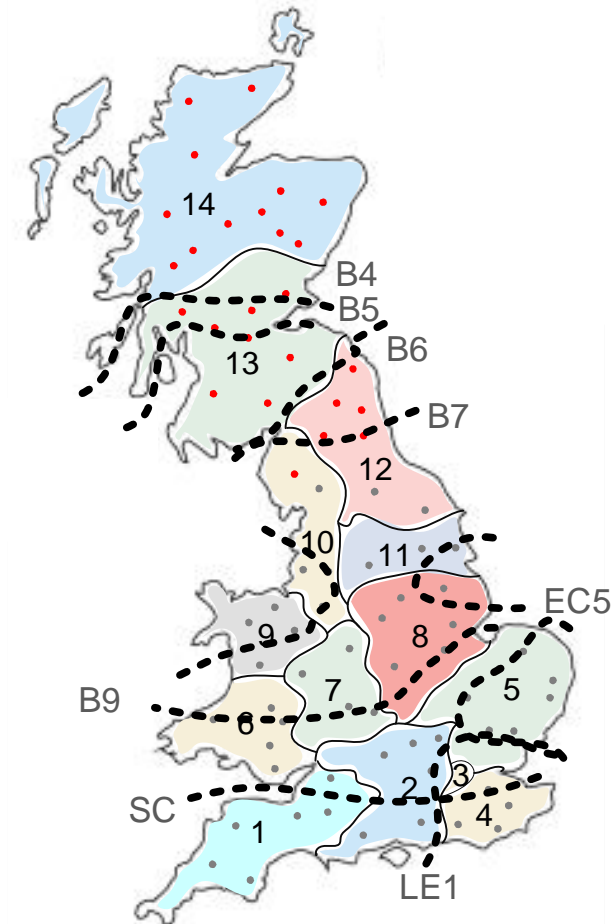
Unit Aggregation & Zones

- Existing units can aggregate at GSP Group level. Could we set requirements at this level to reduce sterilised capacity?



Unit Aggregation & Zones

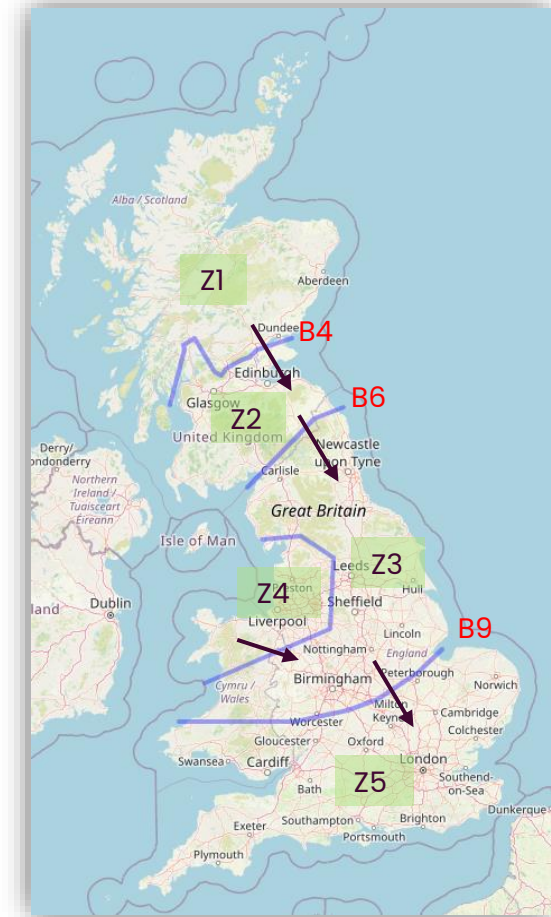
- **Existing units can aggregate at GSP Group level. Could we set requirements at this level to reduce sterilised capacity?**
 - No. Because these boundaries do not align well with key transmission boundaries resulting in intra-zone constraints and visibility issues.



Unit Aggregation & Zones

- We are exploring alternative aggregation zones that align better with key boundaries and result in **less intra-zone sterilised capacity**.
- More zones, means **less capacity available per zone** which has an impact on market liquidity.
- Other considerations include:
 - Alignment with existing DNO zones.
 - Operational simplicity.
- **Participants are permitted to aggregate units at the zone level.**
- Little or no change to participant's existing EAC bidding process.

Example 5-Zone model



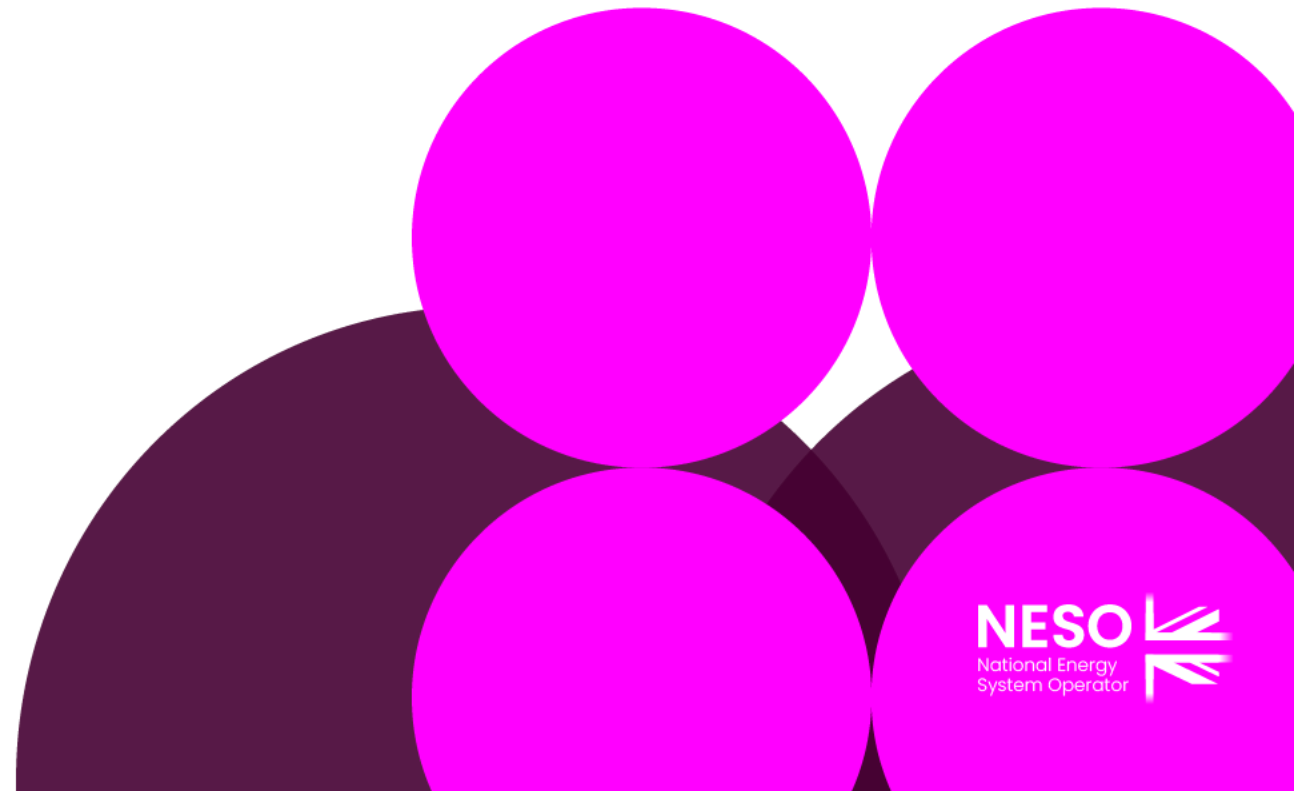
Note: This is not an indication of possible REMA decision or zones and is purely for illustrative purposes

Pricing Rules

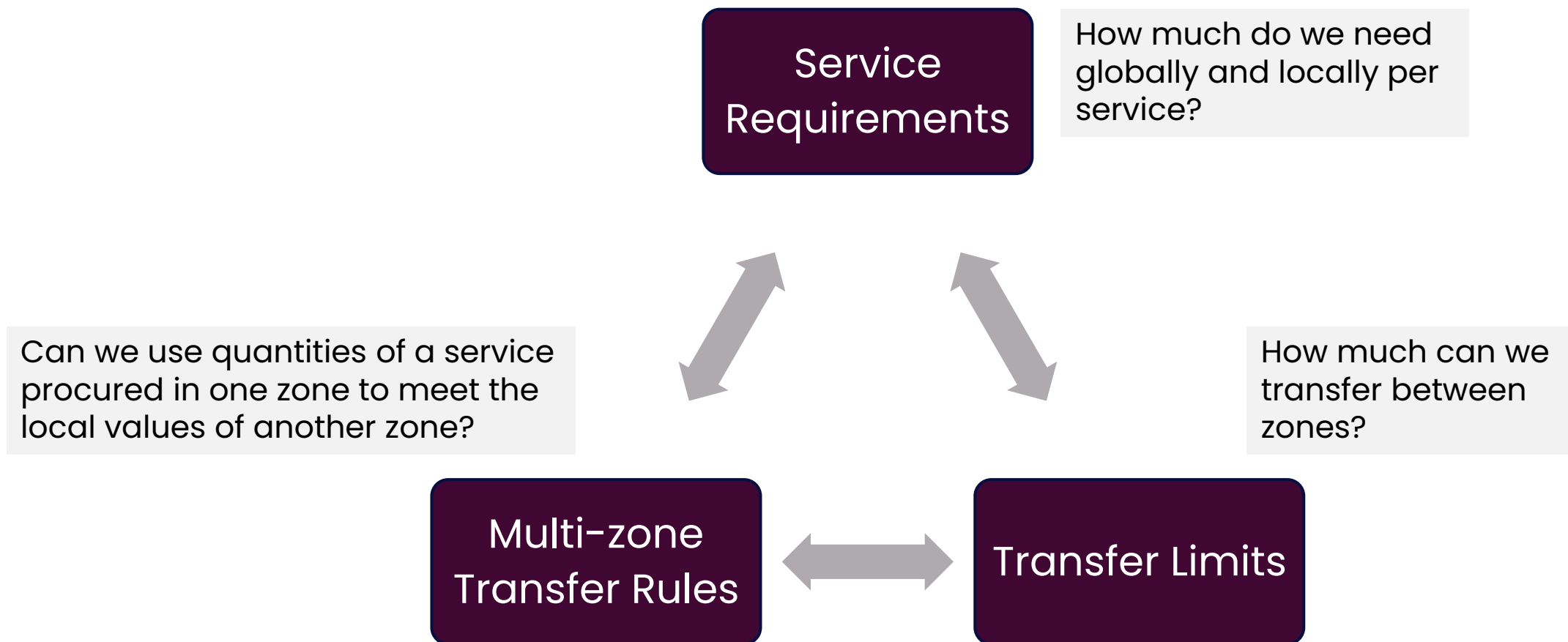
- Current Procurement Rules define a single clearing price per **Auction Product** and **Service Window**.
- With Locational Procurement
 - If constraints aren't binding, all zones get the same clearing price for the same service.
 - If constraints are binding, **there may be a different clearing price** in the constrained zones, for the same service.

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- This illustrates the fact that **active transmission constraints** render capacity in various zones as economically different products that cannot replace one another.
 - It also gives clearer indicators of where capacity investments can generate the greatest value for the system.
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Design Building Blocks

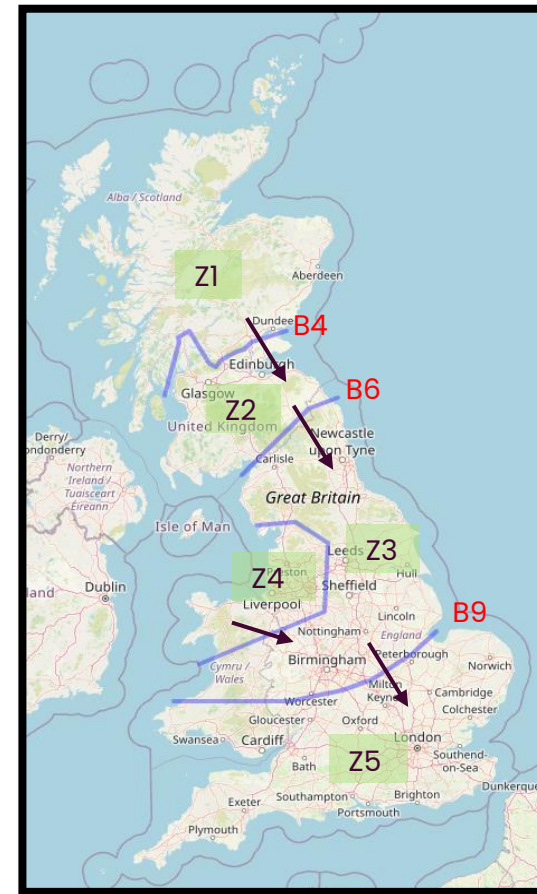


Design Building Blocks

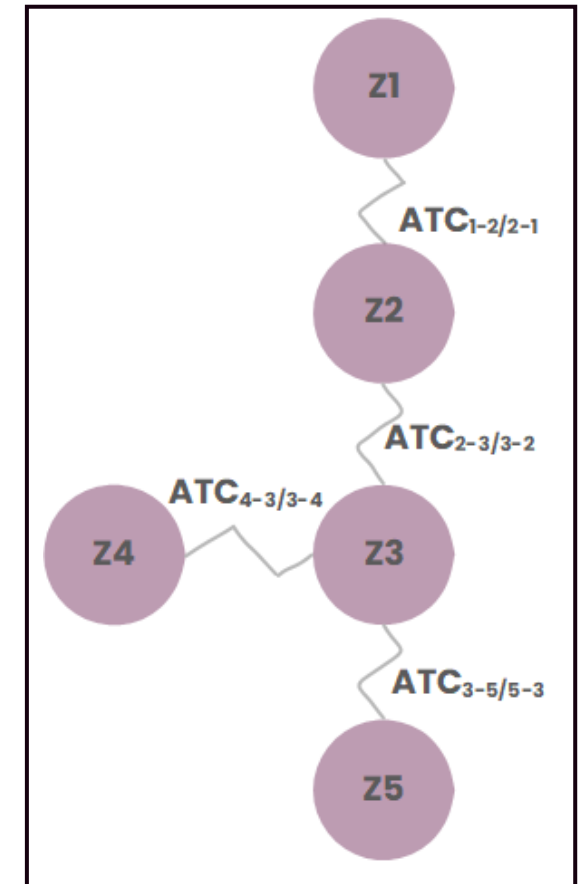


Transfer Limits

- We are exploring the concept of **Available Transfer Capacity** or ATC to represent cross-zonal capacity.
- This is an estimate of the maximum allowable flow between two zones, for the purpose of ancillary services delivery.
- The clearing algorithm will ensure that **ATC is allocated to most valuable service (s)**.
- More detailed network representations could be explored e.g. flow-based models.



Example: 5-Zone model
For illustrative purposes



Graph representation

Multi-zone Transfer Rules

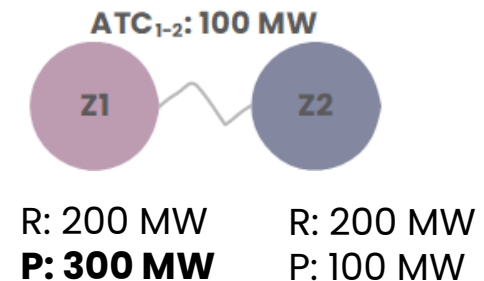
Exchange

Procured quantities in one zone can serve requirements of another zone. Provided ATC is sufficient. One to one relationship.

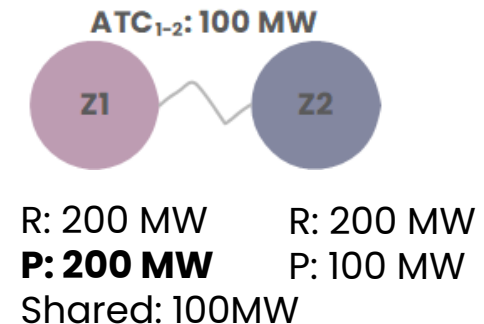
Sharing

Procured quantities can serve requirements in more than one zone at the same time. Provided ATC is sufficient. One to many relationship.

Suited for correlated requirements e.g. to address wind forecasts errors across a set of zones.



Suited for uncorrelated requirements e.g. large generation losses in different zones are assumed independent.



Service Requirements

Global

As specified today. No geographical considerations. Can be met by units in any zone.

Local

For a particular zone. Must be met by units in the zone, or by **sharing or exchanging** of the service from units located in other zones, provided sufficient ATC.

Min/Max

Minimum and maximum quantities per zone. Must be met by units in the zone.

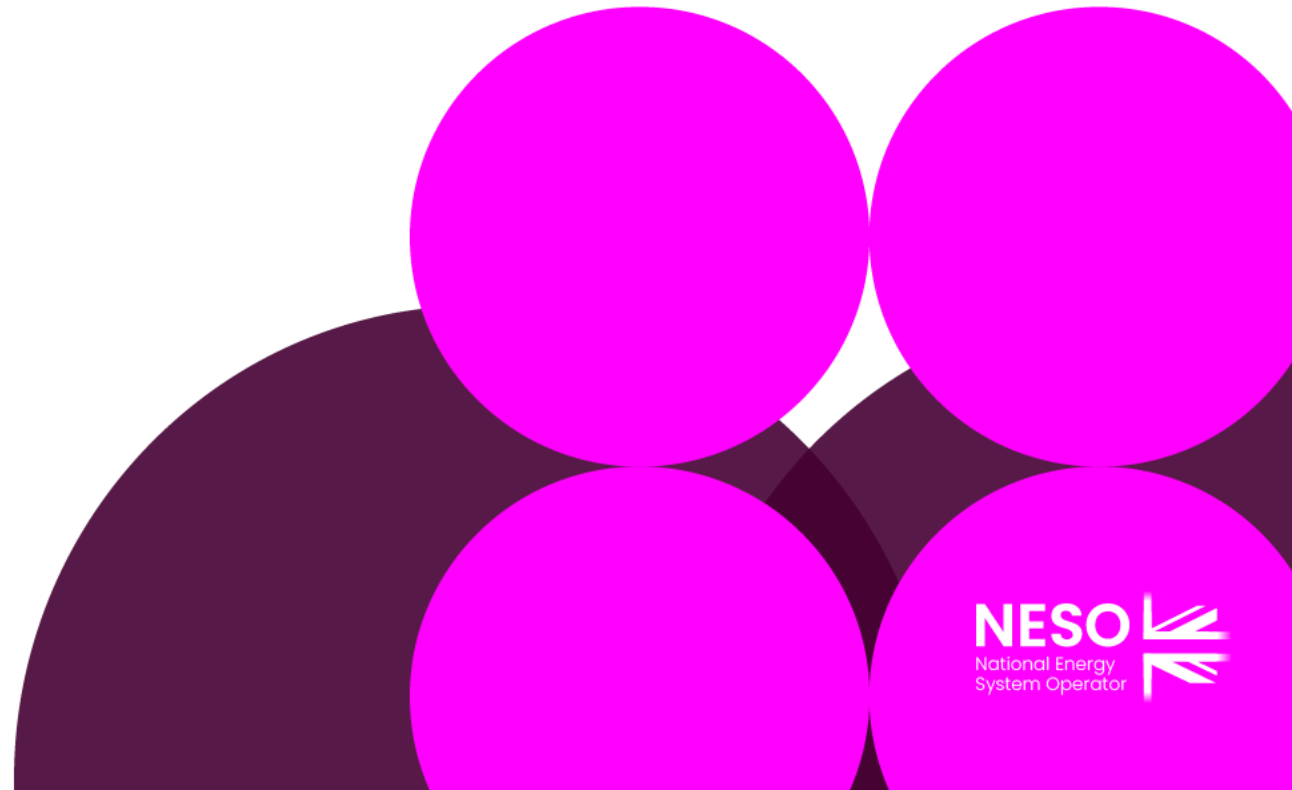
For example, the largest loss **in the system**.
Equivalent to current buy-order.
Suited for **all services**.

For example, proportional to the largest loss **in the zone** or to the **typical zone imbalance**.
Suited for all services **except DC**.

Could be used to **limit overconcentration in some zones** for stability or voltage reasons.
Suited for **Response** services.

Next Steps

Quantitative Analysis



Quantitative Analysis

- A replica of the EAC is being developed and will be used to estimate a lower bound on the benefits of locational procurement.
- It will use the example **5-Zone** and **12-Zone** models.
- Existing units will be mapped to a zone in each of the models.

Inputs

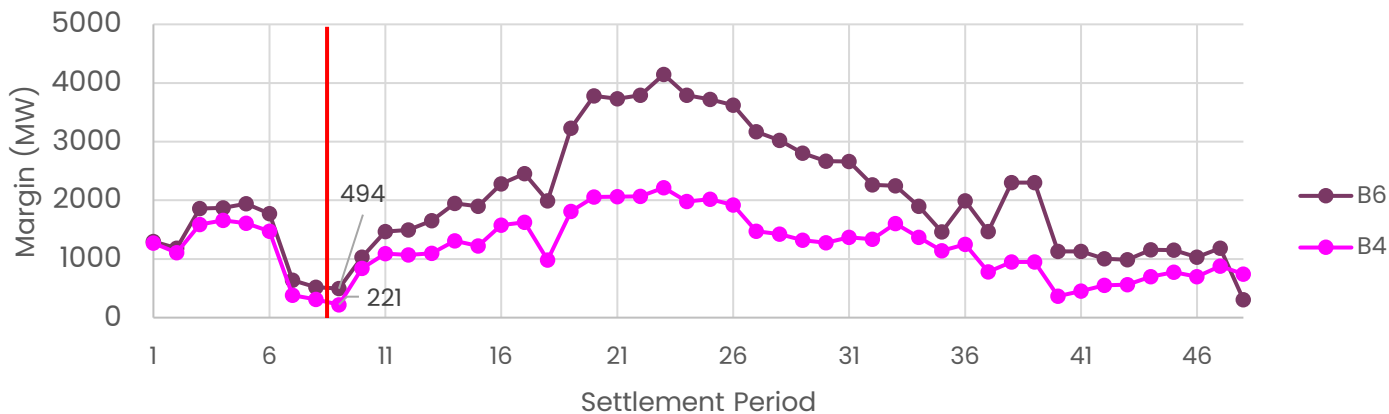
- Historical buy-orders.
- Historical sell-orders will be augmented with unit-zone mapping.
- Historical boundary flows forecasts will set maximum limits to procurement in zones.

Outputs

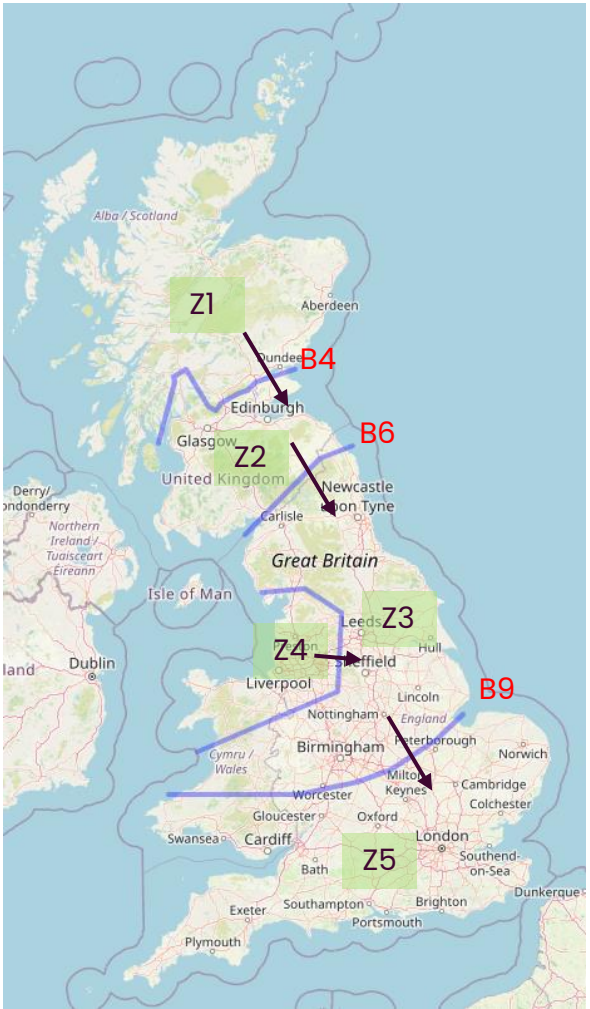
- Procurement costs.
 - Repositioning costs.
 - Sterilised capacity.
 - Savings compared to national procurement.
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Quantitative Analysis

- The **upper limits** for AS procurement in the zones will be determined by the anticipated boundary flows and thermal or stability constraints.
- The illustration below demonstrates how the expected margins on B4 and B6 boundaries affect the maximum procurement amounts in Zones 1 and 2 during a specific Settlement Period.



Boundary	Max Procurement Zone	Example (SP 9)
B4	Zone 1	$(PQR_Z1 + PBR_Z1) \leq 221 \text{ MW}$
B6	Zones 1 and 2	$(PQR_Z1 + PBR_Z1) + (PQR_Z2 + PBR_Z2) \leq 494 \text{ MW}$



Example 5-zones
For illustrative
purposes

Next steps

Q2 2025	Qualitative analysis	»»»	Sketch for Market Design
July 2025	Industry Engagement		
2025	Quantitative analysis	»»»	Proposed Market Design
2026	Impact Assessment		
2026	Consultation		
2027	Implementation		



Feedback on areas mentioned today



1-2-1 conversations with current and prospective providers



Follow-up session to discuss options for Market Design

Update on NESO Email Changes

Since becoming the National Energy System Operator in October 2024, we have been on a journey to separate our systems, processes and services from National Grid.

We are now migrating to NESO Microsoft M365. This change has been in progress, and it is expected to conclude by end of July 2025, affecting all personal mailboxes, shared mailboxes and distribution lists.

What is changing?

We're migrating to Microsoft 365 and updating our email domain to **@neso.energy**.

- Emails sent to **@nationalenergyso.com** will still reach us.
- You may receive an auto-response from our mailboxes notifying you of the change.
- We are phasing out the use of **@nationalgrideso.com** and **@nationalgrid.com** for NESO communications. If you communicate with one of these domains, the message will not be received and you will **receive an automatic out-of-office (OOO) reply** from the old mailbox, advising of the new **@neso.energy** address.
- **This also applies to all mailboxes, including shared & operational mailboxes.**

What does this mean?

- Start using our new email addresses ending in **@neso.energy** for all correspondence with NESO.
- Stop using **@nationalgrideso.com** and **@nationalgrid.com** when contacting NESO.
- **If you contact mailboxes**, please update the email address by replacing the old domain with **@neso.energy**.
For example:
old: name@nationalgrideso.com
new: name@neso.energy

If you use Microsoft Teams to contact us:

- Ask your IT administrator to whitelist the domain **neso.energy** in your Microsoft 365 environment.
- To ensure continued access to Teams and smooth communication, we have proactively whitelisted known domains for our customers. However, if you experience any access issues, please raise an incident ticket by calling 0800 917 711 so we can investigate and whitelist your domain if necessary.

Q&A

Please submit any questions via Slido using the QR code or #3988483

