Public

Balancing Programme Event

24 June 2025

NESO
National Energy System Operator

Housekeeping

Please note we will be taking **photos** throughout the day for use in the NESO newsletter – please let a member of the NESO team know if you don't want to be captured

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Q&A via Slido

Please post any questions you have for our speakers on Slido - **#BPJUNE25** - ensuring to list both your full name and organisation; this will enable us to follow up with you after the event where necessary.

All questions posted in Slido will be published online with answers after the event; this will include any questions we are unable to answer in the session due to time constraints or the need for further information.

Out of scope questions will be forwarded on to the appropriate NESO team or expert for a direct response. We may ask you to contact us by email to ensure we have the correct contact details for the response.

Using Slido, you can also suggest topics for future Balancing Programme engagement events & webinars.

Slido will close at the end of the event; if you have any further questions, please get in contact with us at box.balancingprogramme@neso.energy

Please scan this QR code to participate on Slido or search for Slido online and enter **#BPJUNE25**

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Welcome & Agenda

Time	Agenda Item	Details
9:00 – 9:30	**Registration (refreshments will be provided)**	
9:30 – 9:45	Balancing Programme Overview	• Balancing Programme system transformation overview & value delivered
9:45 – 10:25	Balancing Systems Update	• Delivery progress since March 2025 & associated benefits • 25/26 & 26/27 Open Balancing Platform (OBP) roadmap • Real-Time Predictor on the OBP • OBP digital enablers – Update on the EDL/EDT transition to OBP & NBM activity
10:25 – 10:40	Forecasting Systems Update	• Delivery progress since March 2025 & associated benefits • 25/26 Platform for Energy Forecasting Roadmap
10:40 – 10:55	**Break (refreshments will be provided)– 10:55 move to breakout rooms for 11:00 start**	
11.00 – 11:45	Breakout Session	Participants will rotate across the 3 sessions - you will be allocated a session order on arrival • Improving the management of constraints with OBP inc. Constraint Pathfinders & optimisation • Innovation projects & the Reveal trials platform • OBP demo
11:50 – 12:35	Breakout Session 1, 2, or 3	
12:35 – 13.15	**Lunch (provided) – 13:15 move to breakout rooms for 13:20 start**	
13.20 – 14.05	Breakout Session 1, 2, or 3	
14:10 – 14:55	A Day in the Life of a Control Room Engineer	• Managing the electricity system following the loss of several large generators; session will detail system planning, the role of response & reserve services, and the use of tools inc. OBP in securing the system
14:55 – 15:10	**Break (refreshments will be provided)**	
15:10 – 15:40	Market Services Update	• Update on market products being enabled in OBP for BM & Non-BM units inc. timeline & benefits
15:40 – 15:55	Beyond 2025 Roadmap	• Update on progress to define balancing and forecasting deliverables beyond 2025
15:55 – 16:25	Q&A	• Ask your questions to our panel of SMEs; Slido will remain open throughout the day
16:25 – 16:30	Next Steps & Closing Remarks	• Future engagement opportunities
16:30 – 17:30	**Networking event**	

Balancing Programme Overview

Brendan Lyons, Balancing Programme Director

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System Transformation - Why do we need to Transform?

1. Manage increased **number of market participants**

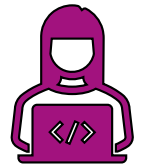
2. Quickly **adapt** to new requirements, innovation and services

3. Enable **level playing field** for new flexibility services

4. Optimise **balancing cost**

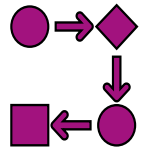
How are we delivering this transformation?

Current System Changes: Delivering changes and improvements to our current balancing systems, responding to identified need, ahead of OBP being fully implemented in 2027.

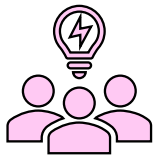


Development of New Systems: Developing and delivering two new platforms for balancing and forecasting which are reliable, resilient and secure, and modernise Control Room operations.

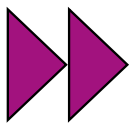
Process Improvement: Reviewing current processes to understand what changes and information are required to enhance operation in line with our objectives.



Trials & Innovation Projects: Collaborating on trials & innovation projects to build an understanding of requirements for future balancing capabilities through lessons learned.



Enabling Market reform: Through our system changes and development we enable market reform in response to evolving requirements & need.



System Transformation – Where are we?

Previous landscape

System

Energy Forecasting System (EFS)

Electricity Balancing System (EBS)

Balancing Mechanism (BM)

- SPICE (scheduling)
- SORT (dispatch)
- Vergil (dispatch)
- Demand Predictor
- Clogs (back-up system)

Ancillary Services Dispatch Platform (ASDP)

- Non-BM Response & Reserve services
- MW dispatch

June 2025

System

EFS

Platform for Energy Forecasting (PEF)

BM

- Scheduling
- National Optimisation
- Electronic Dispatch & Logging (EDL) / Electronic Data Transfer (EDT)

Open Balancing Platform (OBP Lite)

- Bulk dispatch
- Interface to Single Markets Platform, Integrated Energy Management System, & Data Analytics Platform (DAP)
- Balancing Reserve
- BM Quick Reserve
- Manual instructions
- Constraint management

ASDP - Non-BM Response & Reserve services / MW dispatch

March 2026

System

PEF

BM

15% of SORT functionality
60% of SPICE functionality

Fully Resilient OBP

85% of SORT functionality
40% of SPICE functionality

Including:

- Constraint Optimisation
- National Optimisation
- EDL/EDT Mastering
- BM & Non-BM response & reserve services
- PEF & NCMS integration
- Network Services
- Enhanced Response & Inertia
- New storage parameters
- Real Time Predictions

March 2027

System

PEF

Fully Resilient OBP

- Modern, resilient, adaptable and scalable system fit for the future
- No differentiation between BM and non-BM units
- Improved situational awareness
- More economic dispatch
- Lower consumer costs
- Reduced CO_2 emissions
- Significantly reduced system & market downtime

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Value Delivered by the Programme

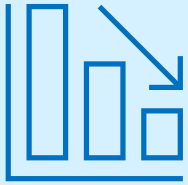
Market Participation and Technology Flexibility

Delivered automated instruction creation and send allowing use of smaller flexible assets:

- 36% increase in the number of small BMUs and battery units receiving BM instructions since Oct-Dec 2023.
- 425% increase in battery dispatch volume since OBP R1.
- 31% increase in small BMU dispatch volume since OBP R1.
- 1347% increase in dispatch instructions to batteries.
- 72% increase in dispatch instructions to small BMUs.

Adaptation, Innovation, and Services

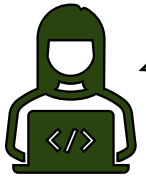
- 2000+ OBP updates delivered with minimal downtime.
- Implemented several additional deliverables aimed at improving economic dispatch & transparency.
- Implemented several Control Room improvements inc. bulk dispatch and enhancements to the management of constraints in OBP.
- Facilitated service implementation:
  - Balancing Reserve
  - BM Quick Reserve
  - MW Dispatch
- Implemented a new wind model on the Platform for Energy Forecasting (PEF).



Reduction in CO2 Emissions & Consumer Value

- Carbon intensity decreased from 172 gCO2/kWh (FY21) to 125 gCO2/kWh (FY25), saving 47 gCO2/kWh.
- 2.5% can be attributed to the Balancing Programme providing an estimated carbon saving of £46m in BP2.
- >£600m of consumer savings through improvements in forecasting, dispatch and implementation of market services

You Said, We Did . . .

Activity was needed to address partial dispatch issues in the small BMU zone		We continue to make improvements to the Bulk Dispatch Optimiser (BDO) to address partial dispatch. You can learn more about these improvements in this *recording* from our recent Optimisation Stakeholder Focus Group; slides are accessible *here*.
You asked for transparency around the benefit & impact of the Programme's delivery		We continue to present utilisation statistics for batteries and small BMUs & have expanded our benefit metric reporting to evidence how the programme is contributing to a reduction in CO2 emissions & adapting to new requirements, innovation, & services.
Input into shaping the Programme's future delivery & prioritisation process		We engaged with you via our Stakeholder Focus Groups and Beyond 2025 workstream to generate insights that will guide the development of the NESO Forecasting Strategy and our beyond 2025 roadmap – we will provide an update on progress today.
Improved transparency on how the optimiser in OBP works & further information on National Dispatch Optimisation (NDO)		Our recent Optimisation Stakeholder Focus Group discussed National Dispatch in OBP, its integration into Control Room Processes, and provided insights into the BDOs decision-making – watch the session *here*.
More info on EDL/EDT transition, Constraint deliverables & Control Room Operations		Our Technology Stakeholder Focus Group provided details on EDL/EDT testing requirements and cutover plans – watch *here*; a *guidance note* on the transition has also been shared. Today's event includes further updates on Constraint deliverables, and a session on 'A day in the life of Control Room Engineer' - back by popular demand!

Balancing Systems Update

Bernie Dolan, Principal Product Manager
Sumit Gumber, Product Manager
Nisha Bhamidimarri, Senior Delivery Manager

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Open Balancing Platform (OBP) Key Delivery to Date

12 Dec 2023
Business Go-Live
Target Dispatch via Bulk Dispatch Optimisation (BDO) - Control Room use OBP to issue first instructions

8 Dec 2023
Technical Go-Live
OBP receiving live market data updates for two zones Small BMUs and Battery

Jan 2024
Battery Dispatch Re-enabled
Fixes to protect against high-prices implemented

Feb 2024
Front End Updates
Major changes to FE following ENCC feedback

Mar 2024
30 Minute Rule
New battery capacity rule added in less than 2 weeks

May 2024
More Data
Profiles added for Wind and Interconnectors Access to data on constraints and national demand

Apr 2024
Fast Dispatch
Optimisation times reduced from 60 seconds to 10 seconds

Jun 2024
Voided Instruction Improvements
Number of voided instructions drops < 3% in Smalls <1% in battery

Aug 2024
ABCD Rule
Further improvements to voided instructions <1%

Sep 2024
Integrated Energy Management System (IEMS) Interface
OBP receiving live metering data monitoring unit behaviour

Dec 2024
Quick Reserve
Phase 1 of the new Quick Reserve (QR) service (Business Go Live)

Oct 2024
Multi Window UI
Front end architecture upgraded to allow more visualisation

Sep 2024
Single Markets Platform (SMP) Interface
OBP receiving data from auction platform

Jan 2025
Data Analytic Platform (DAP) Interface
Integration to DAP

June 2025
- **Constraint Management**
- **Manual Instructions**
- **Real Time Prediction**
- **Interface to Ancillary Settlement for NBM**
- **Non-BM APIs**
- **OBP supports clock change**

More details on the next slide!

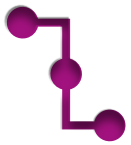
Continued delivery on BM systems – SORT, SPICE, & VERIGIL – to realise tactical benefits, until an enduring solution is available in OBP.

Deliverables have included activity aimed at improving economic dispatch & transparency e.g., dispatch efficiency monitor

Key Areas of Progress Since March 2025

Open Balancing Platform:

- **External interfaces for NBM Quick Reserve**



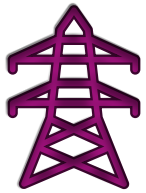
Deliverable: Application Programming Interfaces (APIs) running over a new highly secure internet gateway. Allows participants to submit data and receive instructions

Benefit: Supports Phase 2 of Quick Reserve

What does this mean for you?: New market opportunities for providers

Open Balancing Platform:

- **Constraint Management**



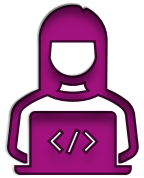
Deliverable: New OBP displays supporting the visualisation of constraints combined with a price stack so that instructions can be planned and then sent to resolve future issues

Benefit: Better constraint management

What does this mean for you? Supports improved economic dispatch

Open Balancing Platform:

- **Manual Instructions**



Deliverable: Ability for control engineers to issue individual instructions to BMUs. Initial deployment in Battery, Small, Solar and STOR Zones

Benefit: Allows functionality from legacy systems to be moved to OBP

What does this mean for you?: Allowing all instructions to be issued from OBP increases situational awareness supporting economic decisions.

New IT system:

- **Real Time Prediction (RTP) Minimum Viable Product**

Deliverable: New near real-time demand predictions using advanced machine learning algorithms

Benefit: More accurate demand profiles feeding the new National Dispatch Optimiser

What does this mean for you? More accurate balancing actions resulting in lower balancing costs

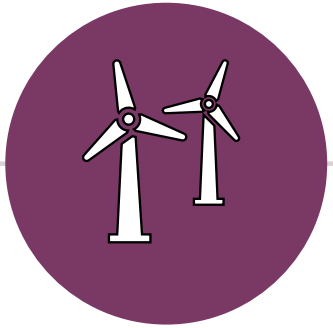
Real-Time Predictor (RTP)

Sumit Gumber

Real-Time Predictor (RTP)

What is RTP?

- A new modern & modular capability on OBP with four dedicated microservices
- Delivers minute-by-minute national demand predictions and outturns
- Introduces flexible, scalable and advanced algorithms with real-time data to improve dispatch advice
- Future-ready to incorporate new data & machine learning



What does RTP replace?

Our current demand predictor algorithm:

- Designed for a power generation landscape without embedded generation and renewables.
- Uses a complex, inflexible algorithm.

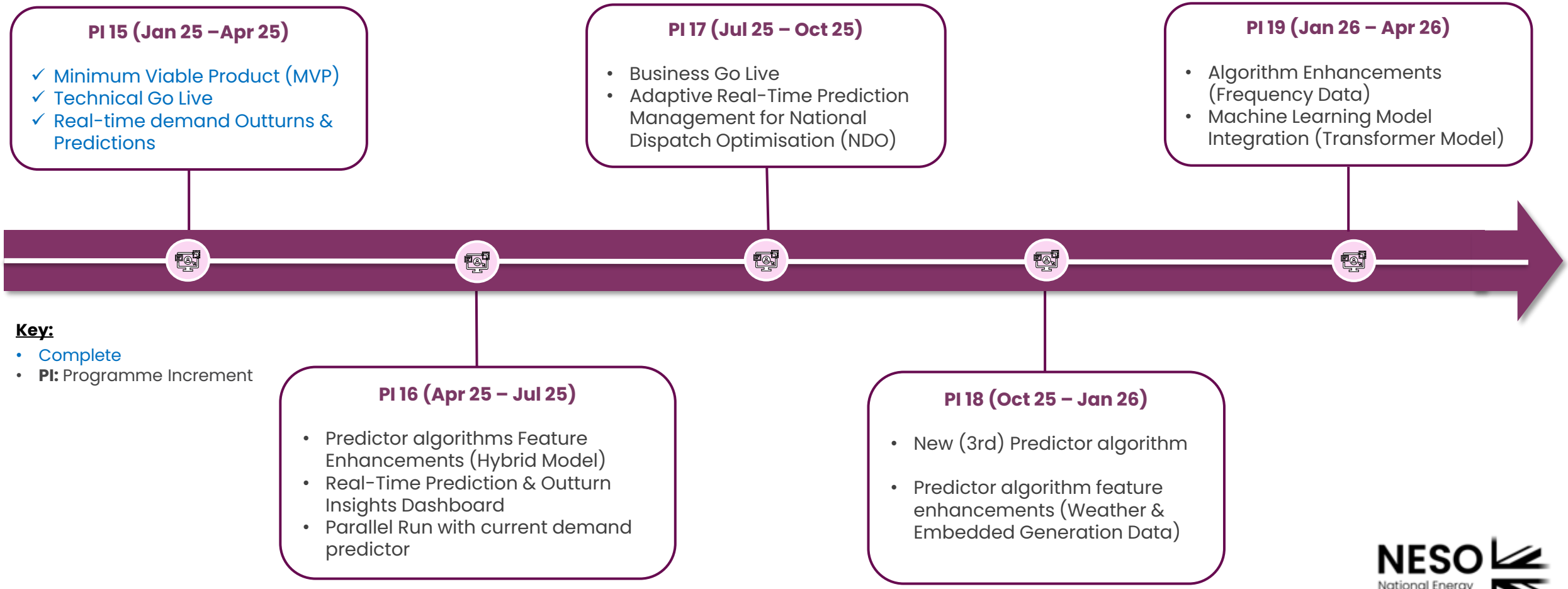
A new demand predictor is essential to ensure scalability and adaptability.

Benefits of RTP?

- To deliver consumer value (~£43m p.a.) through improved accuracy, process and user efficiency.
- Streamlined processes reduce repetitive manual data input and calculation efforts, leading to increased operational efficiency, and allowing more focus on strategic decisions to support dispatch improvements.

Real-Time Predictor Roadmap

What have we delivered & what is coming next?



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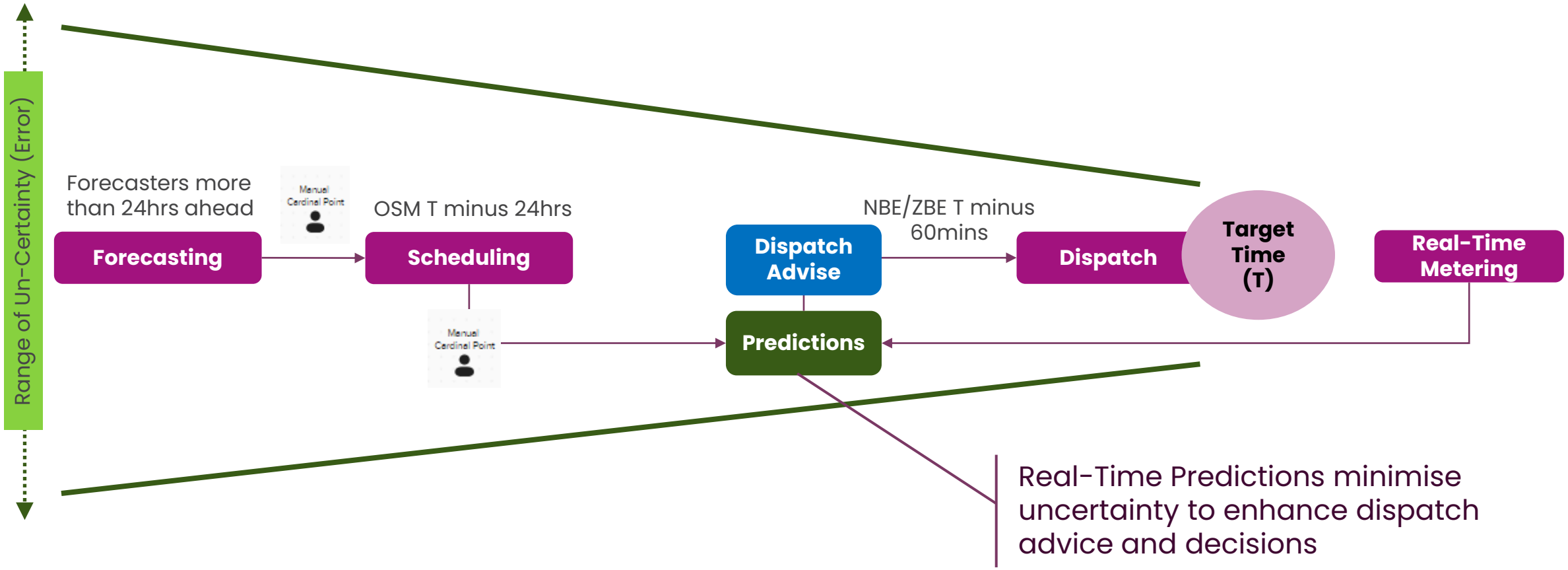
Real-Time Predictor Value Stream



Abbreviations:

- **NBE:** National Balancing Engineer
- **ZBE:** Zonal Balancing Engineer
- **OSM:** Operational Strategy Manager

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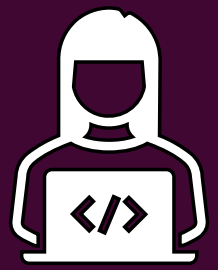
Real-Time Predictions Journey

Live Metering	Real-Time predictions	Improved Situational Awareness	Improved Prediction for National Dispatch Optimiser (NDO)	Consumer Value
NOW : Real-time operational metering (every 10s) from integrated energy management systems (iEMS) **FUTURE:** Frequency Data every second	**NOW**: Two Algorithm trained on live metering data **FUTURE:** Three Algorithms , re-trained regularly for new features and new data	**NOW**: Real-time predictor dashboard using OBP design system **FUTURE** : Enhanced user experience with an adaptive insights dashboard featuring real-time performance metrics for each algorithm	**NOW**: Parallel run with current demand predictor to validate the new algorithms **FUTURE** : User will be able to select best-performing algorithm for NDO	Real-Time Prediction improvements and enhanced situation awareness are expected to **improve dispatch advice and decisions**, potentially delivering an **estimated £43 million per annum** in savings on balancing costs

Digital Enabler Update



Nisha Bhamidimarri

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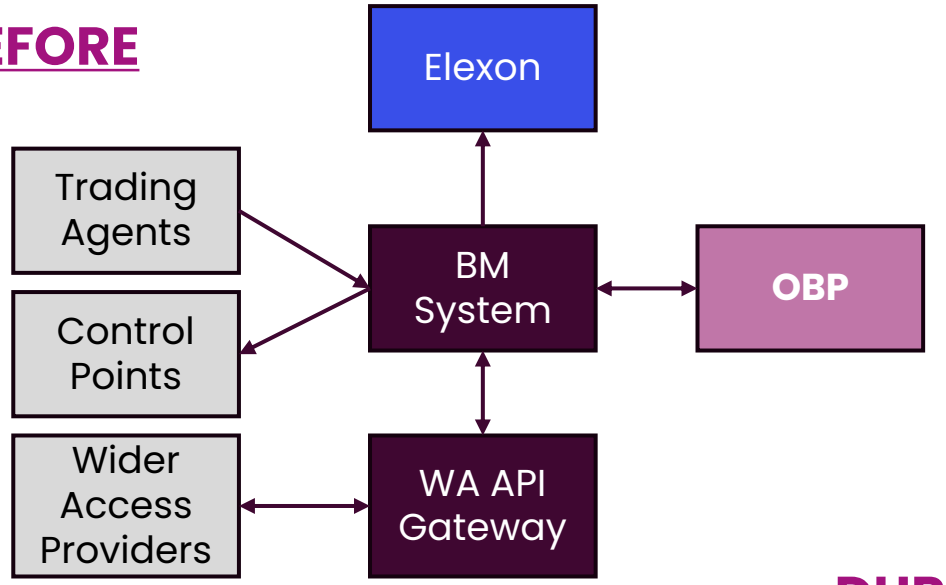
EDT / EDL Transition

BEFORE



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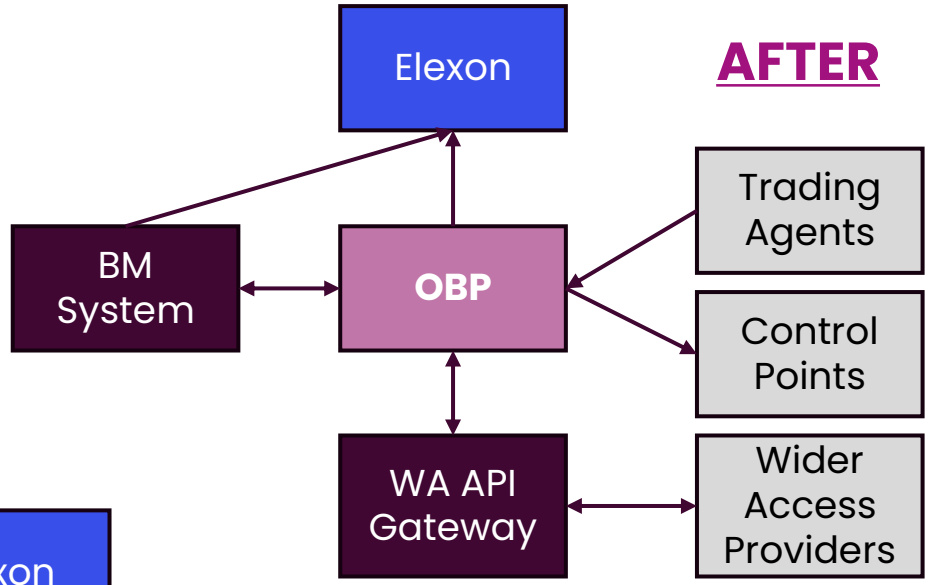
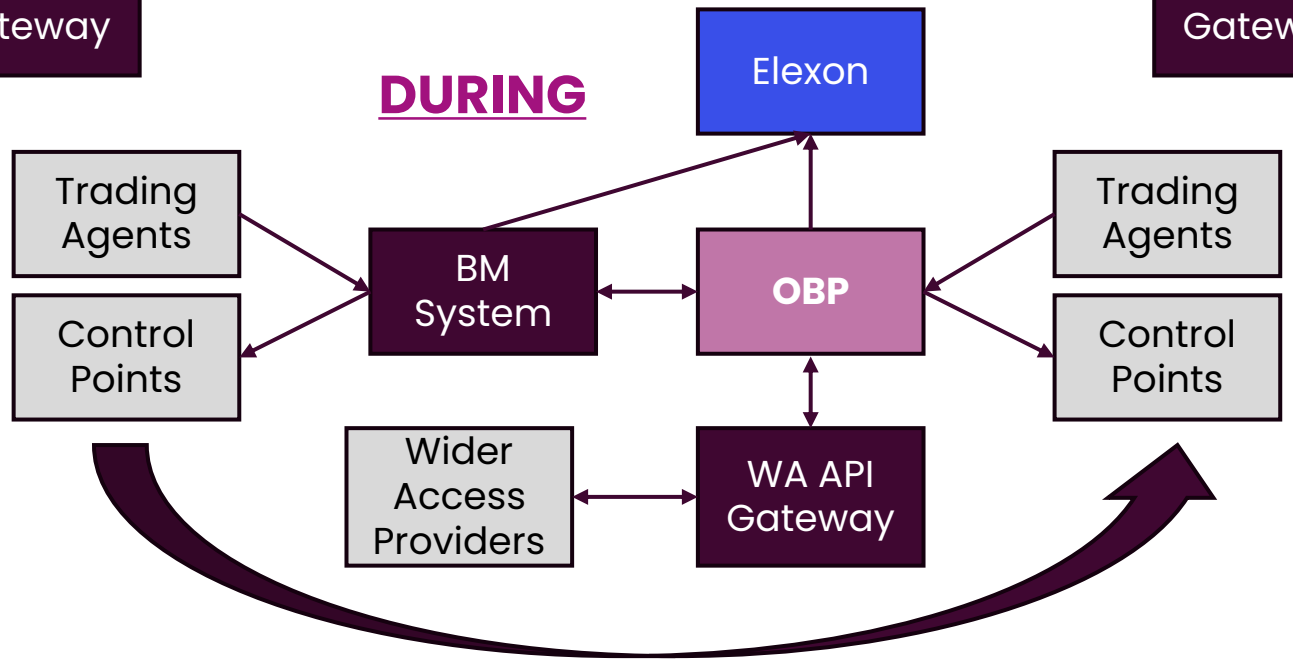


DURING



Abbreviations:

- **EDL:** Electronic Dispatch & Logging
- **EDT:** Electronic Data Transfer
- **WA API:** Wider Access API

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Market Participant Journey – Balancing Mechanism Unit

Connection

Prequalification based on unit parameters and behaviour

Connection to Transmission or Distribution System

Registration

Register Unit with NESO & Elexon

Setup Communication channel – Trading Agent, Control Point Agent or Virtual Lead Party

Entity Established in Balancing Systems (Sort static)

Submit Data

Submit Data relevant to Balancing Mechanism or Ancillary Service through EDT, EDL or WA API

Balancing Requirement

NESO identifies requirements for

Balancing actions

Constraint Resolution

Reserve and Response

Issue System Warning if margins are tight

Scheduling

Create Energy Strategy for 4 to 24 hours ahead of real time

Instruct plants to create margins or resolve constraints

BM Startup Instructions

Balancing

Balancing and System Actions

Bulk Dispatch

Manual BOA

Ancillary Instructions

Reporting

Settlements Reporting

Regulatory Reporting

Audit

Settlement

Settlement for ancillary services

Impacted by transition

Impacted by transition

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Impact on Software Vendors & Market Participants

EDT Changes:

- A new Fully Qualified Domain Name (FQDN)
- A different DNS server
- New IP addresses to be whitelisted
- A new security protocol for file transfer – FTPS; will no longer support FTP
- Updated credentials for login to new system

EDL Changes:

- Connection established from a different IP address compared to BM
- Same pool of IP addresses as EDT - may be a different IP address
- Change in pattern of outage

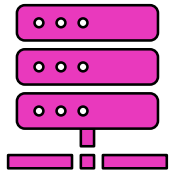
Guidance Document & Webinar:

- Details on transition phases
- Impact on Software Vendors and Market Participants
- Overview of testing Requirements

Access the Guide for Market Participants here & catch-up on the webinar here.

EDT/EDL Transition Update

Where are we?



- Network design shaped
- Delivery work in progress
- Engaged with software providers & market participants re: readiness testing for the transition - We now have EDT / EDL contact details for just over 80% of BMUs.

Wider Access API (WAAPI)

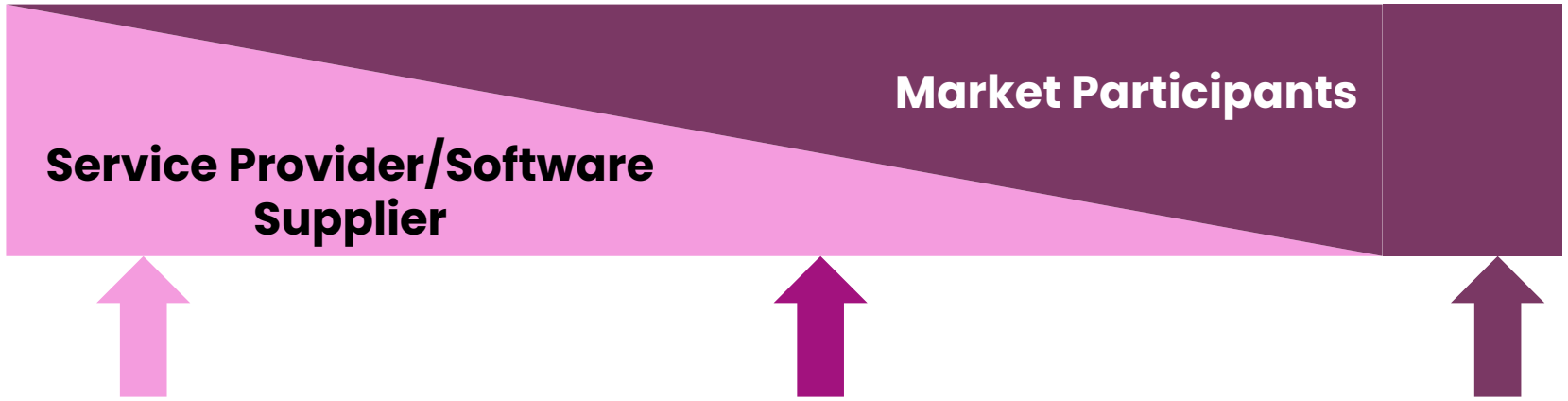
WAAPI providers will **not be migrated** however the system will be repointed to connect to OBP.

There will be a short outage to repoint the network connectivity. This will be towards the end of the transition.

What next?

- Further communication & engagement
  - Follow-up with organisations we are yet to hear from re: EDT/EDL contact details (Jun – Jul 25)
  - Drop-in sessions / meetings with technical teams for MPs & SPs re: testing & transition (Jul – Aug 25)
- Internal pilot and Shadowing between BM & OBP by Jul 25
- Market Participant Environment readiness by Aug 25
- Market Participant & Software Supplier testing (Aug – Oct 25) – more details on the next slide!

Type of Testing with NESO



Managed Service Provider
- Software testing (Type Testing inc. behavioural test)
- Connectivity Testing (NAT)
- E2E Business Process Testing for each BMU (BPIT)

Market Participant
- BMU Data inc. behavioural test

All tests for each hosting provider for select participants

Software Service Provider
- Software Testing (Type testing inc. behavioural test)

Market Participant
- Connectivity Testing (NAT)
- E2E Business Process Testing for each BMU(BPIT)
- BMU Data inc. behavioural test

Type Test for each software NAT and BPIT for each provider

Market Participant
- Software Testing (Type Testing inc. behavioural test)
- Connectivity Testing (NAT)
- E2E Business Process Testing for each BMU (BPIT)

All tests for each provider

EDT/EDL plan on a page

Tasks	2025									
	M	A	M	J	J	A	S	O	N	D
Milestones					OBP Software proven	MPT Environment available	OBP and BM Ready for transition		Phase 1 transition complete	
Build EDT/EDL Adapters										
Ready OBP Infrastructure and Network										
Software Validation in Dev/QA										
OBP/BM Transition testing & dress rehearsal										
Software Type Testing										
BPIT Testing										
NAT Testing										
Transition										

EDT/EDL Transition

Start of Transition

BM Release to start transition

Planned Outage to market

Phased Approach

Each week we will transition TA & CP in tranches

It will be Tuesday and Thursday

There will be a short outage for the TA & CP doing the transition

Transition Complete

All TA & CPs transitioned from BM to OBP for EDL/EDT communications.

OBP is designed and operated as a continuously available system therefore participants will benefit from reduced planned outages of EDT/EDL

Transition to take place within **6-week window between October '25 and December '25** to avoid registration delays & ensure continuity of operations.

New EDT/EDL connections or new BMUs will not be able to join the production systems during this period.

NBM Dynamic Response & Slow Reserve Webinar

Date: 31.07.25
Time: 11:00 – 12:30
Location: Microsoft Teams

Sign-up Link: *Technology Stakeholder Focus Group*

Previous sessions covered the general NBM migration but were focused on NBM Quick Reserve – you can watch the session **here** & access the slide content **here**.

This session will cover NBM Dynamic Response migration, and the new NBM Slow Reserve service – including timelines.

Scan me or use the link above to sign-up

NBM & OBP – Current Status

- **Quick Reserve** – Ongoing tracking for July Go Live.
- **Slow Reserve** – The EBR Article 18 industry consultation for Slow Reserve is currently live. NBM Slow Reserve is progressing in OBP with a target for September 2025 readiness.
- **Dynamic Response** – Building to migrate from separate BM and ASDP systems onto a single OBP platform.

Integration and Migration to OBP

- NBM API v4 has been updated for NESO branding, the new Reserve services, and applies for NBM Quick Reserve, Slow Reserve and Dynamic Response.
- Integration will be via the new NESO data centre

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Forecasting Progress Update

Richard Sykes, Product Manager

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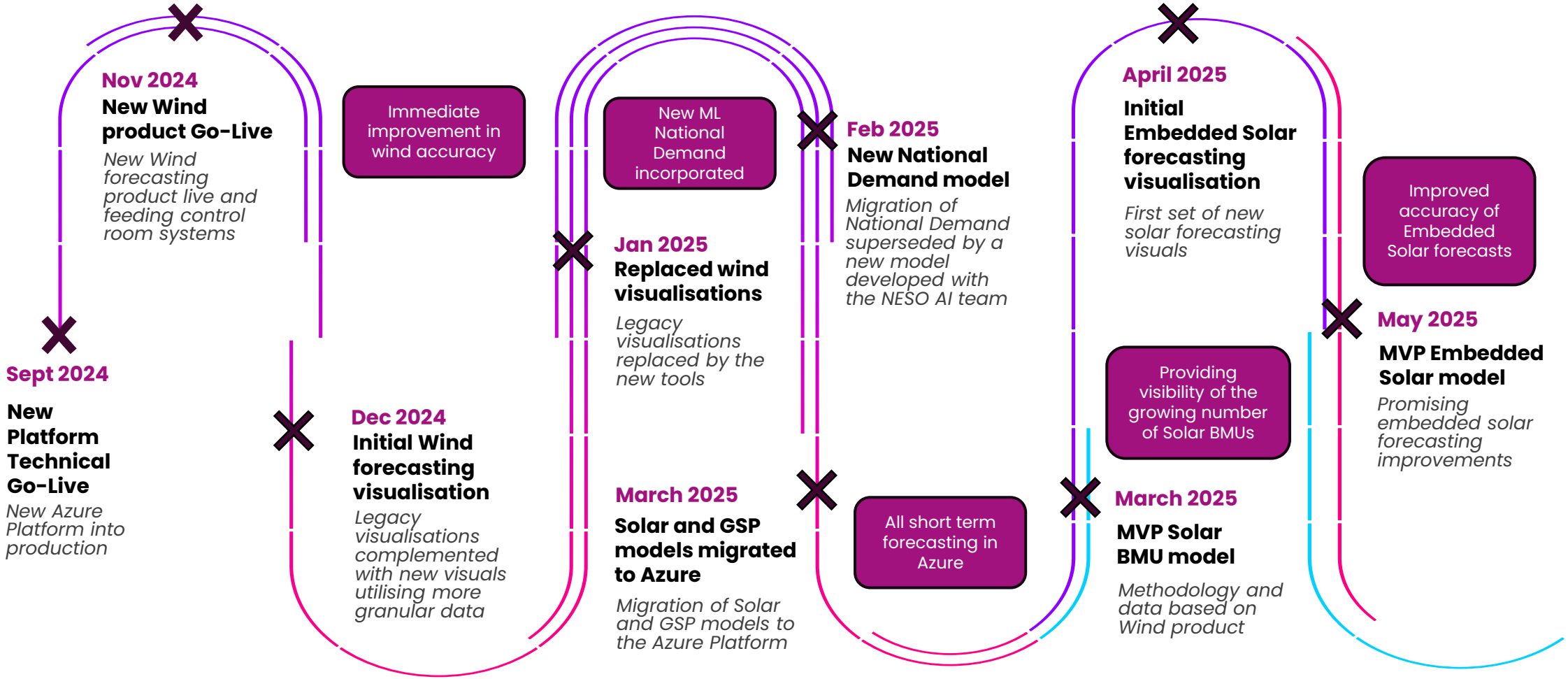
A Recent History of the Platform for Energy Forecasting (PEF)



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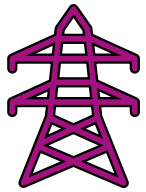
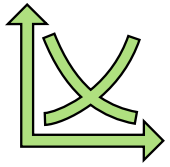
PEF to Deliver More During BP3 (FY25/26)



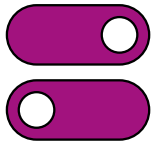
A focus on Reactive power forecasting supporting processes such as outage planning

+ Improve data for outage planning
+ Reducing balancing actions



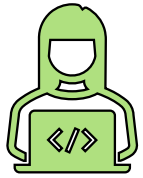
Redevelopment of legacy Demand Forecasting Tool

+ Reducing manual activity
+ Better visualisation
+ Reducing human error



Replacement or removal of legacy End-User Developed applications with Azure tools

+ Eliminate reliance on unsupported processes
+ Integration with PEF platform and data

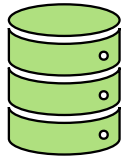


Enhanced control room situational awareness

+ Improved visualisations for better informed decisions

PowerBI and Azure reporting & analytic tools to support future improvements

+ Efficient analysis of forecasts and tools
+ Identifying future improvements through data



Incorporating additional datasets including market and consumer data

+ Increasing the accuracy by incorporating additional data points

Platform for Energy Forecasting (PEF) Roadmap

Q1 FY 25/26 (Apr 25-Jun 25)

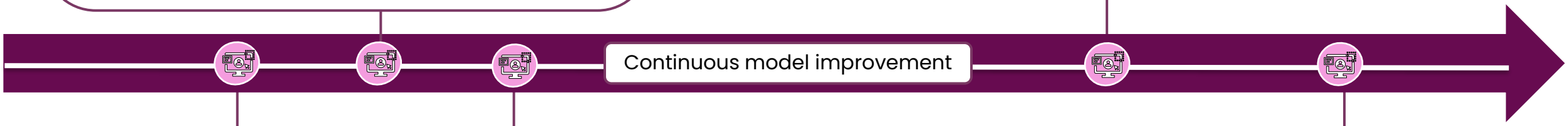
Key Capabilities:
- Visuals and tools for the control room [2]
- Solar BMU model and visualisations [1]
- Improved embedded Solar forecasts [1]
- Integrate Solar Nowcasting [1]
- **Renewable forecast control room situational awareness**

Key Enablers:
- Renewable generation forecasts decoupled from EFS [2]
- GSP model audit [1]
- **Offline Prototype Demand Forecasting capability**

Q3 FY 25/26 (Oct 25-Dec 25)

Key Capabilities:
- Azure produces long term forecasts (demand) [2]
- **Demand forecasting control room situational awareness**

Key Enablers:
- Integration with Network Access Planning tools for improved studies [2]
- **MVP Reactive Power Forecasts**



Q4 FY 24/25 (Jan 25-Mar 25)

Key Capabilities:
- ✓ Migration of Solar and GSP [2] products onto the new platform
- ✓ Migration of an enhanced National Demand model onto the new platform. [2]

Key Enablers:
- ✓ MVP Solar BMU model [1]

Q2 FY 25/26 (Jul 25-Sep 25)

Key Capabilities:
- Forecasting tools [2]
- Regional demand forecasts shared with Elexon as part of Electricity System Restoration Standards (ESRS)
- **MVP Demand Forecasting**

Key Enablers:
- PEF migrated to NESO Azure tenancy

Q4 FY 25/26 (Jan 26-March 26)

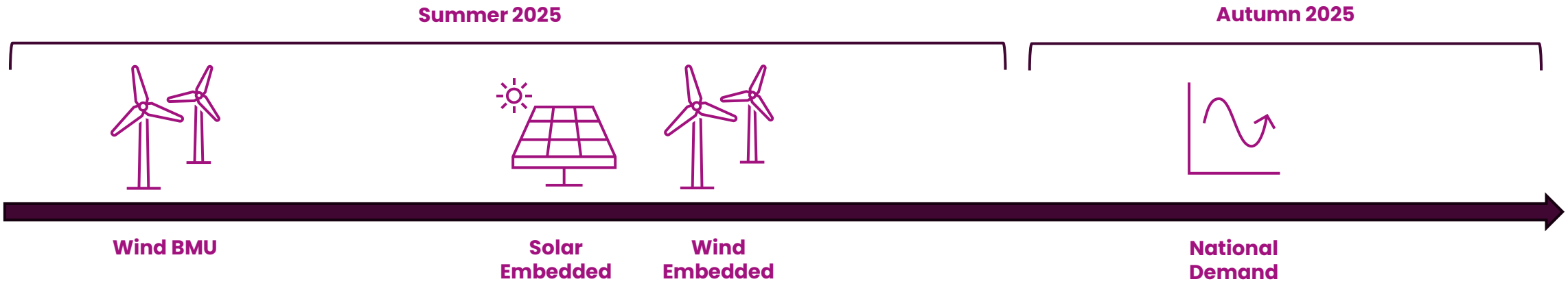
Key Capabilities:
- Advanced Analytics data integration [2]
- **Improved accuracy for Reactive power forecasting**
- **Redevelopment of Demand Forecasting Tools completed**
- **Replacement or removal of legacy End-User Developed applications (EUDAs) with Azure tools**
- **Enhanced control room situational awareness**
- **PowerBI and Azure reporting and analytic tools to support future improvements**
- **Incorporating additional datasets including market and consumer data**

Key Enablers:
- EFS system retirement strategy [2]

- [1] Delivered under "Continuous model improvement",
- [2] Work enabling EFS retirement,
- **Bold** – New BP3
- Complete

Our Decommissioning Progress Increases Data Quality

Bypassing legacy tools from the current process, instead sharing data directly from PEF, improving the quality consumed via Data Portal



Is there specific forecast data on data portal where an increase in frequency & granularity would be a game changer?

Scan this QR code to participate on Slido or search for Slido online and enter #BPJUNE25

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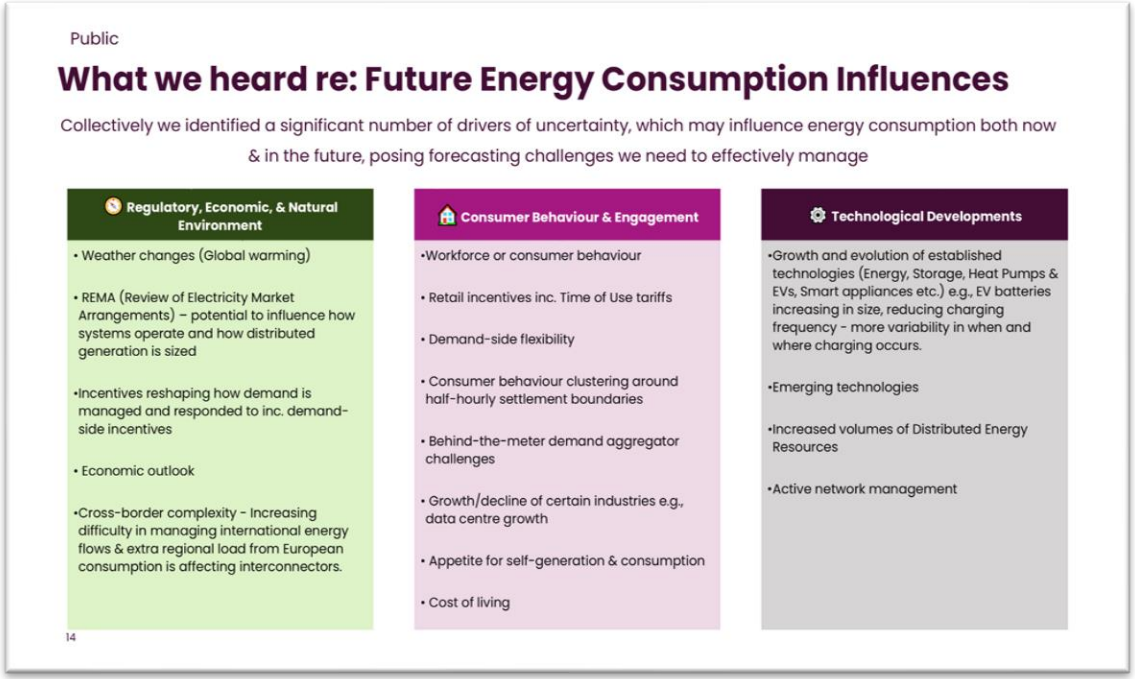
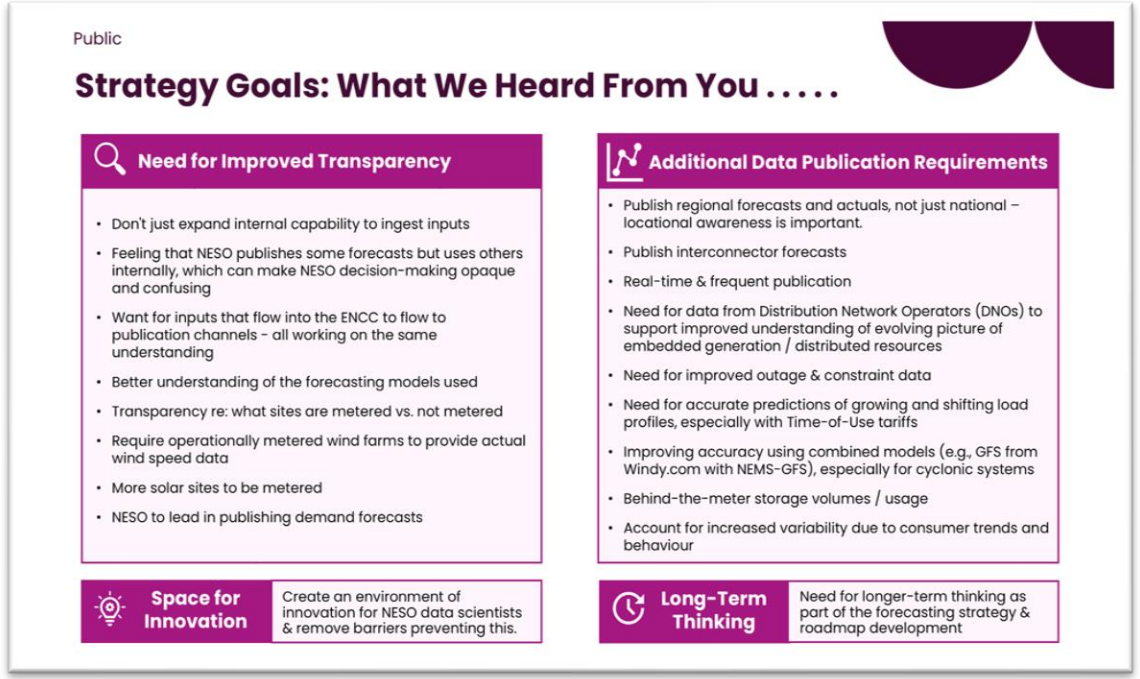
Development of NESO Forecasting Strategy & PEF Delivery Plan

- Two interactive stakeholder sessions held during May and June 2025
- Feedback on Forecasting needs and the strategy required beyond 2025





Recordings of the sessions, slide content, and Industry insights are available here.

Break

10:40 – 10:55

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Public

Breakout Sessions

- OBP demo – ***Thames Room***
- Innovation projects & the Reveal trials platform – ***Canterbury Room***
- Improving the management of constraints with OBP –***Watergate Room***

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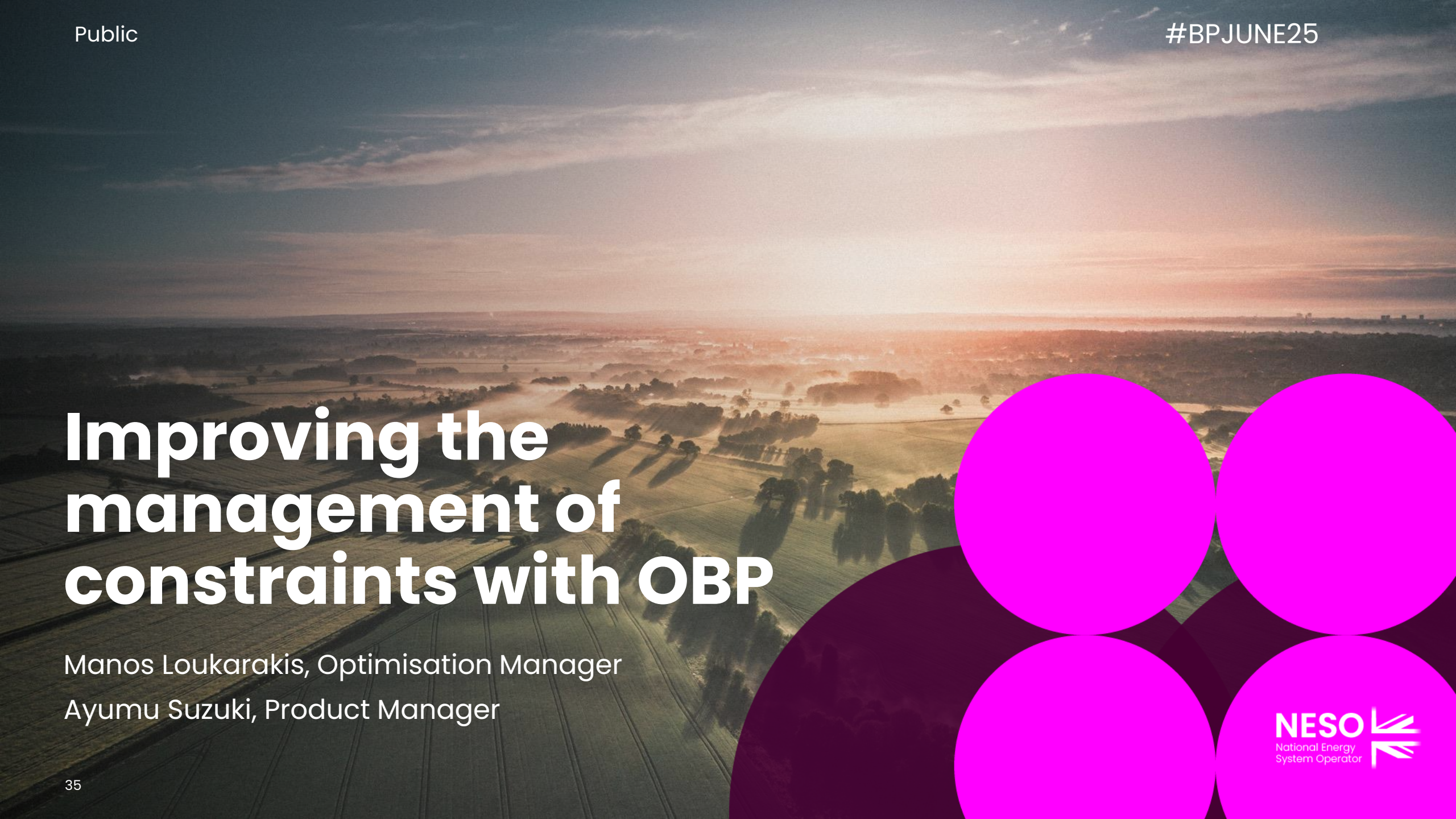

Improving the management of constraints with OBP

Manos Loukarakis, Optimisation Manager

Ayumu Suzuki, Product Manager

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NESO's Strategic Approach to Constraint Management

#BPJUNE25

Legend

- *IN PROGRESS*
- *EXISTING*
- *TOPIC FOR TODAY*

	Solutions		Other Solutions
	Market	**Technical**	
Short-term (now – 2027)	Work on **enabling access to our markets** for demand-side flexibility	**System changes through OBP** to better manage/optimise the use of assets behind a constraint	**P462 code mod** would remove distortion of support mechanisms from bids In BM to reduce consumer costs
	CCP outcome: continue to develop **Demand for Constraints**	Continue with **CMIS expansion, 300MW derogation, operational metering review**	**CMP 440 would reinstate locational signal for strategic demand,** incentivising them to site in constrained areas
	CCP outcome: Focus on existing **short-term CMM for non-BMUs** (e.g., locational/bi-directional DFS)	**Develop our battery storage strategy,** inc. reducing skip rates	
	Megawatt Dispatch enabling flexible Dx connections	**Outage optimisation,** including Transmission Acceleration	
		CCP outcome: Investigate technical options relating to Intertrip	
		CCP outcome: Boundary flow smoothing innovation project	
Medium-term (2028-2030)	**Clear route to market** for anything unable to access our core markets	**Regional Development Programmes**	**Reformed connections process** prioritising assets which help with operability
	BM improvements to allow more flexibility assets to participate in the BM		**SSEP and CSNP** to provide strategic direction for system infrastructure and needs
Long-term solutions (2030+)	**Wholesale market reform** to reduce the volume and costs of constraints	**Network build-out** to connect more remote generation with demand	

About Group Constraints

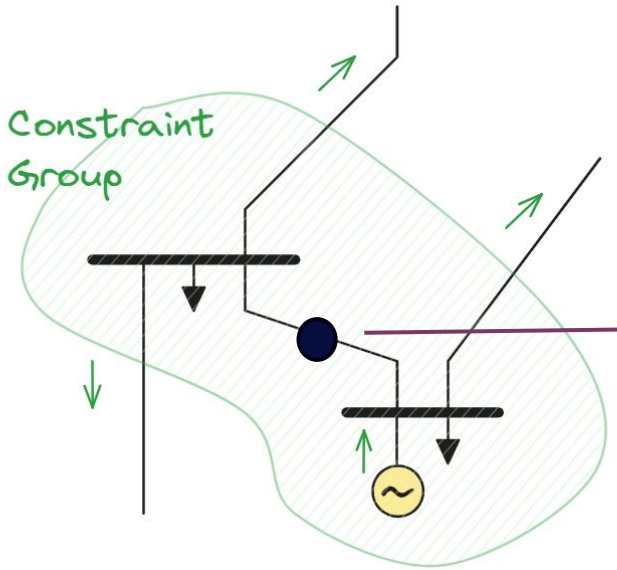
(1) Includes consideration of
… thermal network limits
… voltage stability
… transient stability

Group :: A part of the network, a collection of nodes and associated BMUs

Transfer :: Total power flow out across all circuits in the constraint group

Limit :: The maximum/minimum transfer allowed

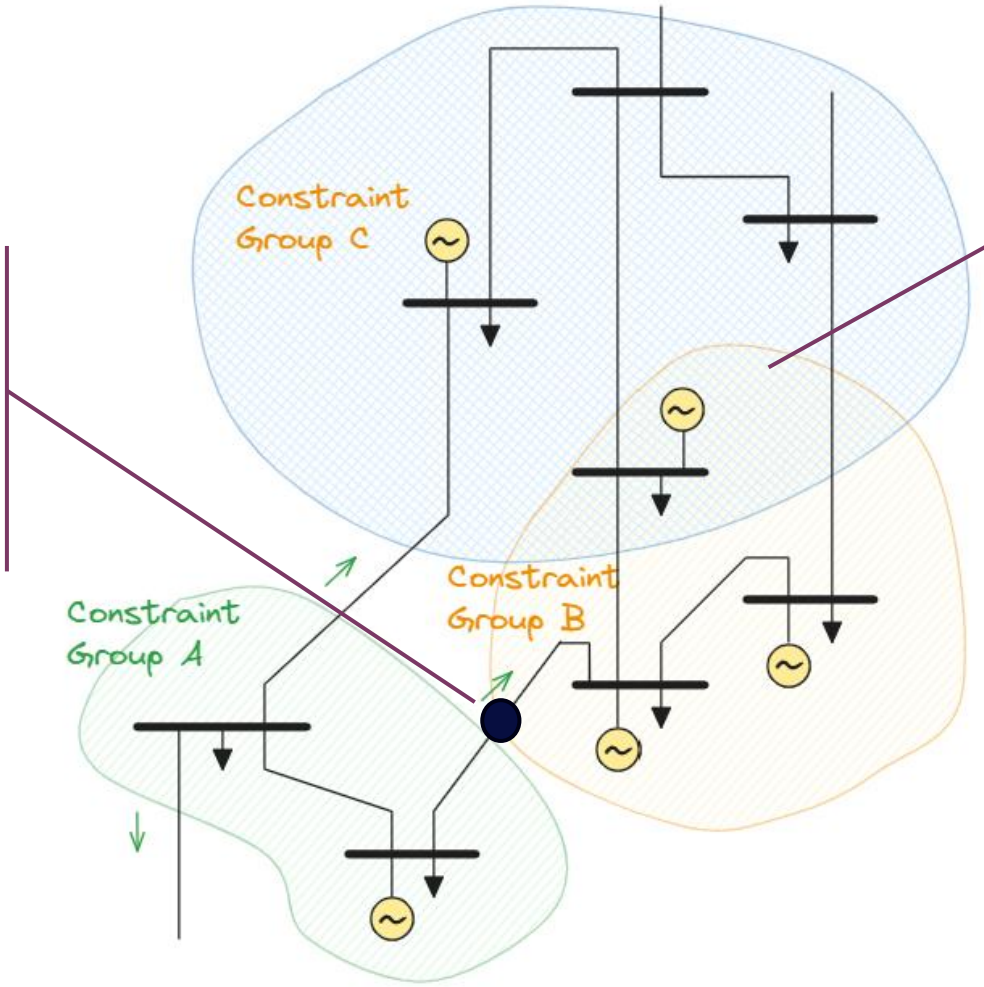
Group demand :: The sum of demand across all nodes / Grid Supply Points (GSPs) included in the group



(2) The limit does not necessarily match technical characteristics of any of the underlying network components – it is the total transfer observed when the network is sufficiently loaded for something to "break"

Complexities Around Constraints

(1) Constraint limits are conditional on underlying system state and closely coupled together – e.g., an import limit in one group can be an export limit for another



(2) Units can belong to more than one group constraint – this can complicate the solution

Constraints involve multiple processes

- derivation methodology
- resolving over different time-frames
- interactions between derivation and resolution processes

… and improvements may be possible across any of the above

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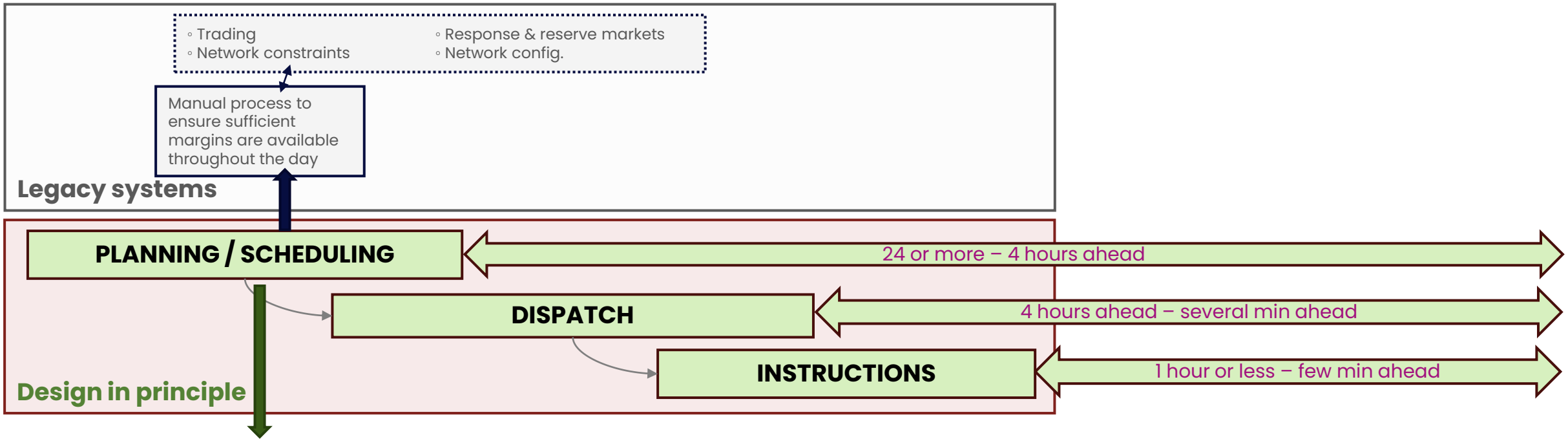
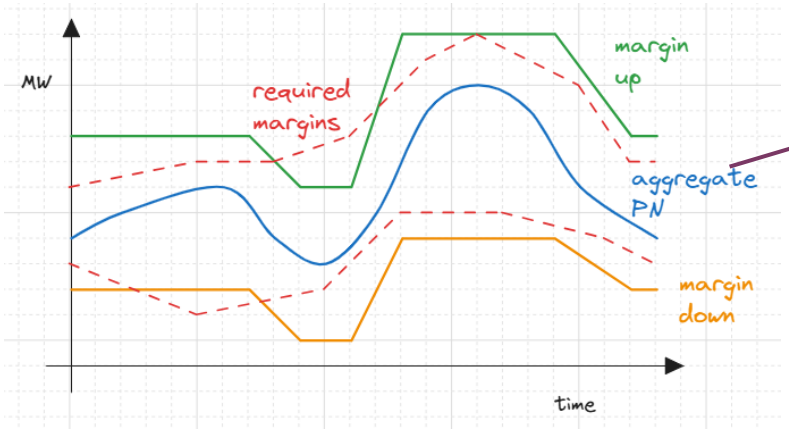
How Constraints Work - Scheduling



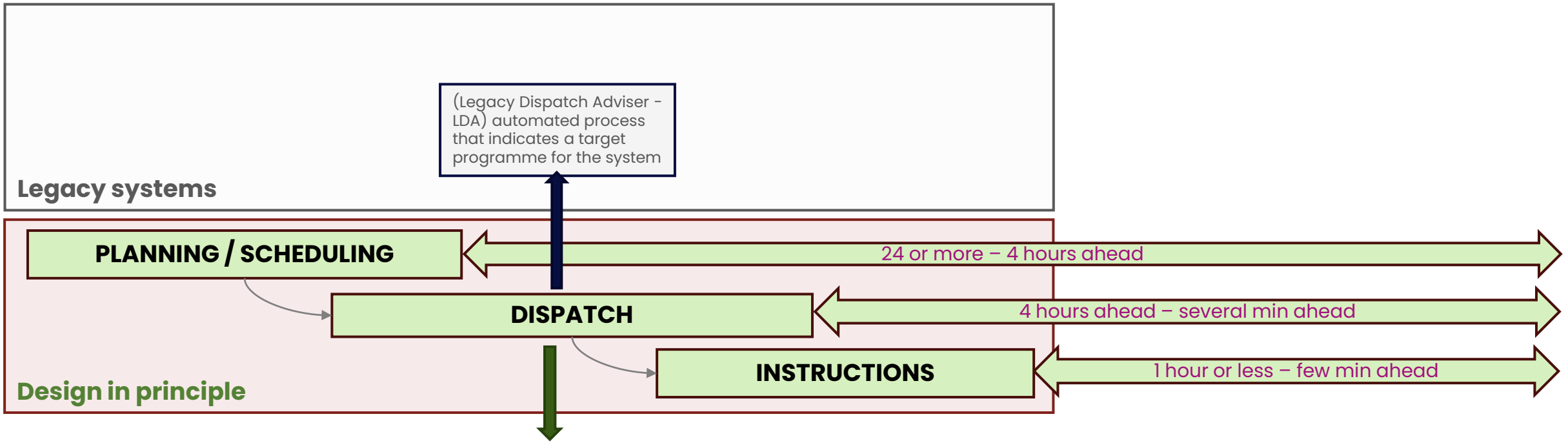


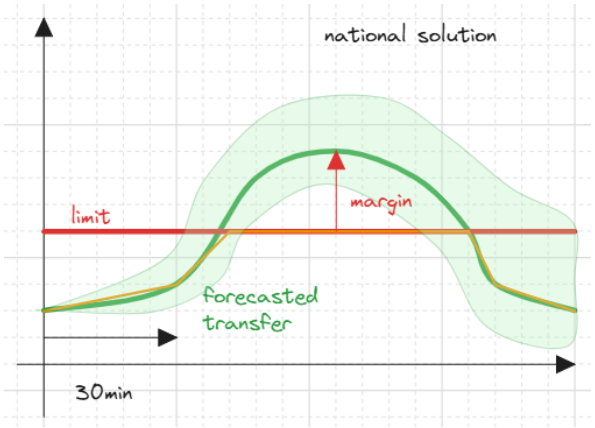
- Core part of the process -> margin analysis (at system and group constraint level)
- If issues with a constraint are identified a more detailed review of the constraint limit

… constraint calculation assumptions
… network reconfiguration
… inter-trips

► Planned events (sync/desyncs adjustments, potential trades)
► Contingency plans (including around group constraints)

How Constraints Work - Dispatch





- Given planned events, solve energy balancing subject to group constraints
- Solution identifies units which are moved because of constraints
- ▶Issues identified but no instructions directly sent from dispatch solution

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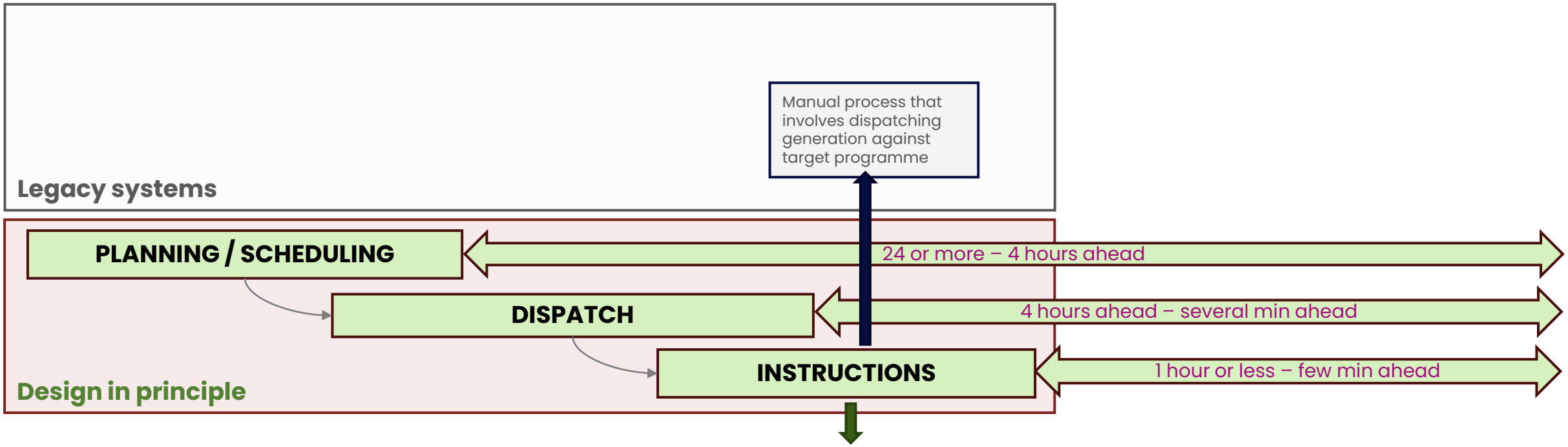
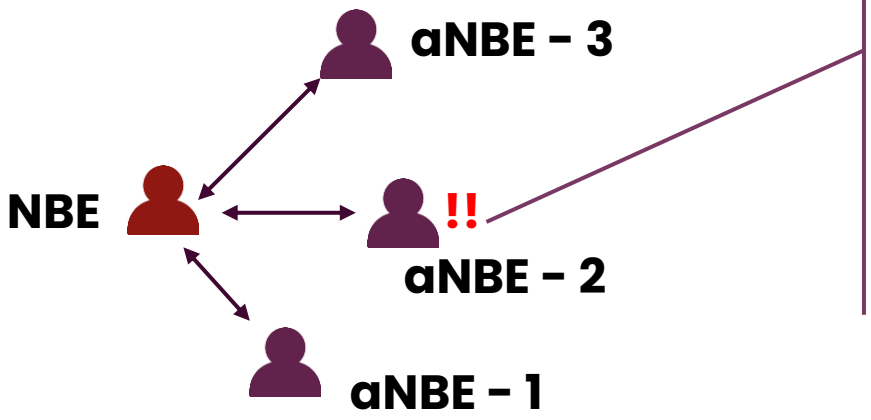
How Constraints Work - Instructions





- Each aNBE responsible for several group constraints but can dispatch only within specific ZONES
- Coordination between NBE and aNBE required to dispatch across different zones required
- Constraints are resolved first (and tagged as system actions), balancing closer to real time
- Control room engineers will check any unit before dispatching, if it breaches a constraint

Abbreviations:

- **aNBE:** Assistant National Balancing Engineer
- **NBE:** National Balancing Engineer

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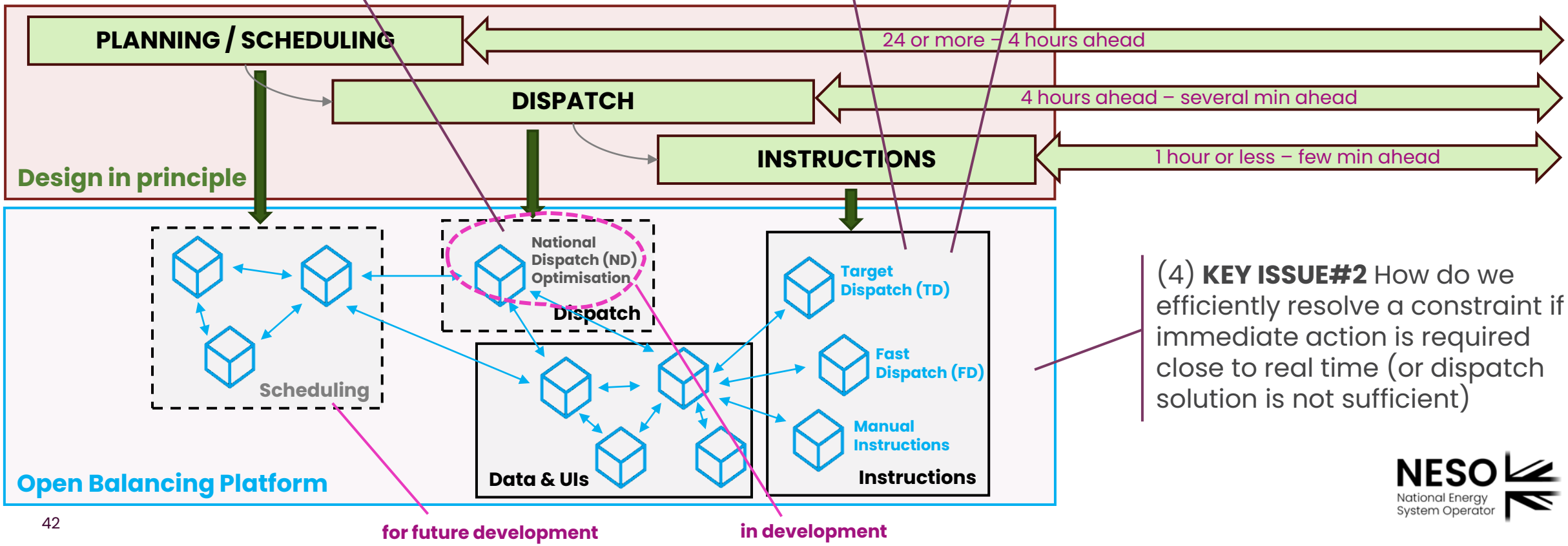
Constraint Management on OBP

(1) We are not looking to change the process up to dispatch just yet

(2) **KEY ISSUE#1** How we ensure when dispatching for energy balancing (especially in SMALL/BATTERY), that we don't breach a constraint

(3) A simple initial approach was to apply "restrictions" to unit movements if they were within a constraint – but we can do better

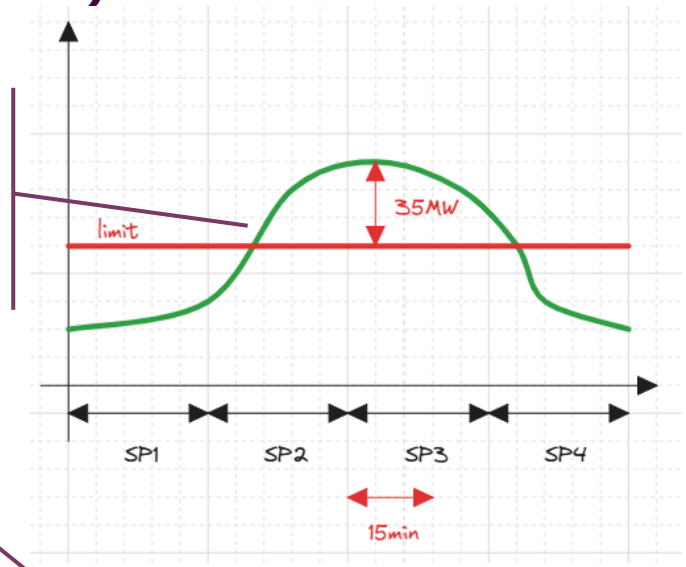


(4) **KEY ISSUE#2** How do we efficiently resolve a constraint if immediate action is required close to real time (or dispatch solution is not sufficient)

An Improved Restrictions Logic (ISSUE#1)

(ROADMAP: Constraint management)

(1) 15min intervals are defined (to strike a balance between volume of generated restrictions and accuracy of analysis)



(2) Units within a constraint are selected and ranked according to price

(3) Those with total cumulative Bid Offer Data (BOD) MW below the margin are freely re-dispatched

BMU	£/MWh	MW	Σ(MW)
#5	170	10	50
#4	140	10	40
#3	125	10	30
#2	120	10	20
#1	100	10	10

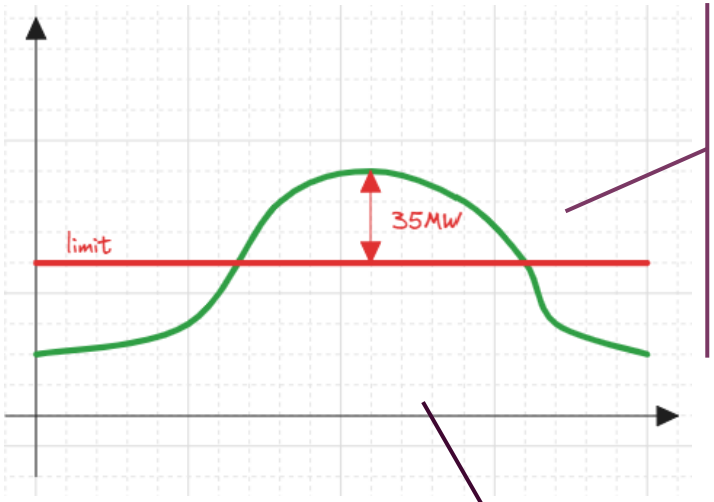
(4) The ranking is based on the lowest priced BOD for the unit at 15min intervals – manual intervention on restrictions may be occasionally needed

(5) Unit characteristics are not factored in – an unrestricted unit might not have been appropriate to use anyway due to e.g. its minimum up/down times

This initial approach
… enables getting closer to limits,
… reduces workload for control room engineers, allowing for more time to identify best possible solution for balancing.

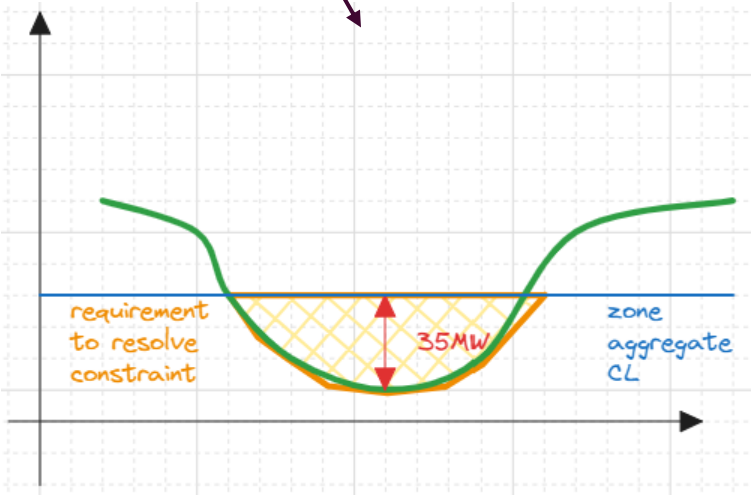
Resolving a Constraint

(ROADMAP: Optimisation within a constraint)



(1) How do we dispatch at least cost, to resolve a constraint?

This is about applying target/fast dispatch (FD/TD) for a collection of units within a constraint



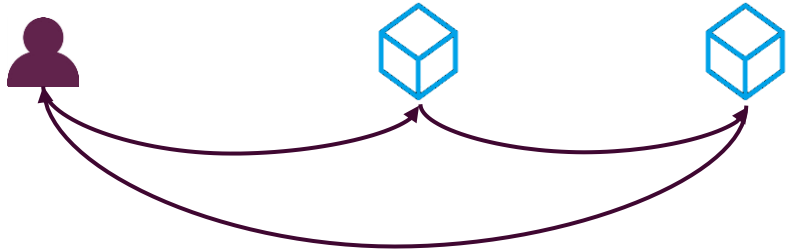
(2) **KEY CHALLENGES**

- Problem scale & performance
- Solving for wind
- Solving for large BMUs
- Solving for pumped storage

A. Set requirement against constraint limit/margin

B. Select set of BMUs involved in the constraint

C. FD/TD for solution



D. Process to dispatch according to area of responsibility

Enabling an automated approach can be expected to:

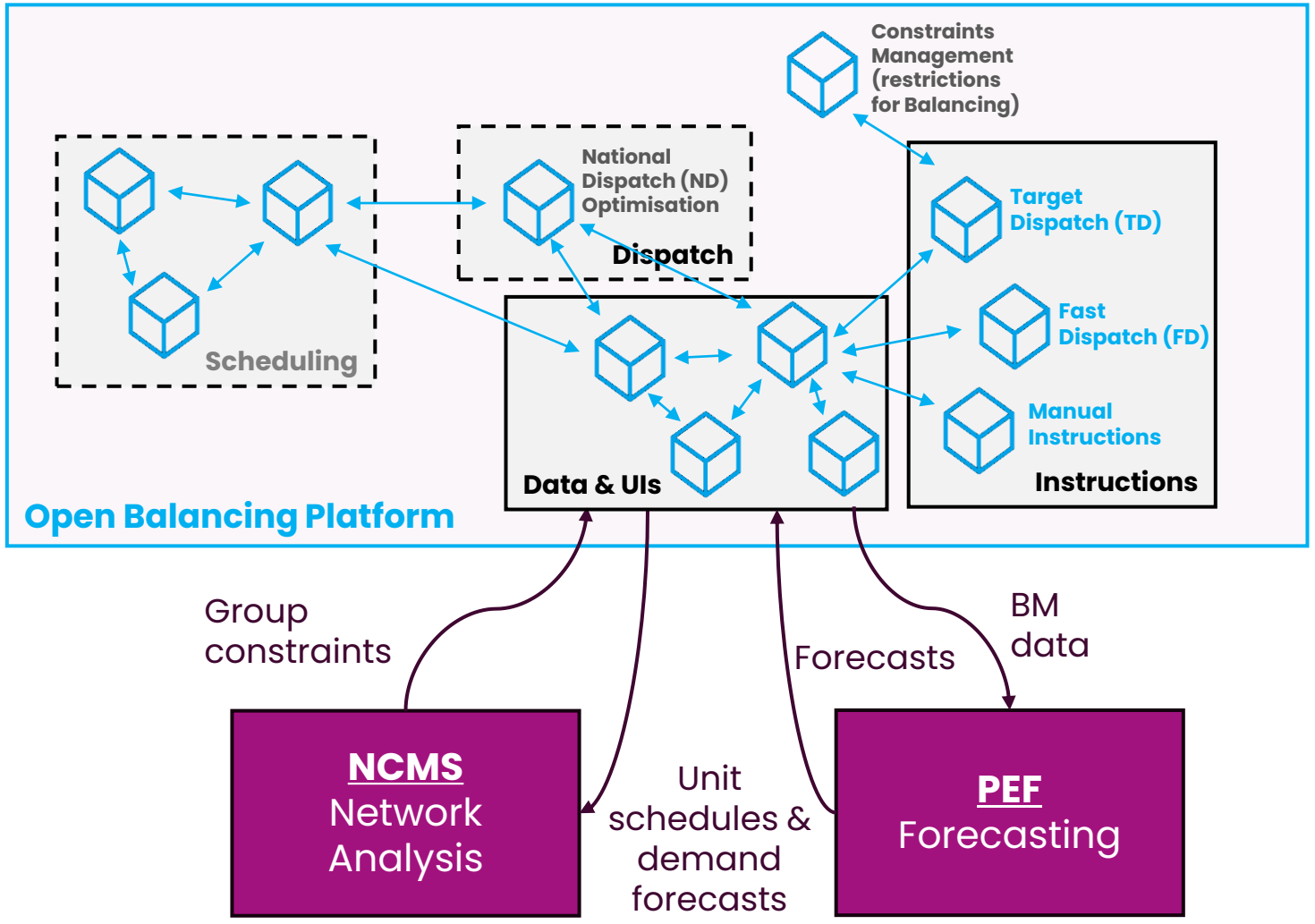
… reduce costs by utilising more effectively SMALL/BATTERY BMUs for resolving constraints
… while handling more complex unit characteristics,
… and reduce control room workload

Abbreviations:

- **FD:** Fast Dispatch
- **TD:** Target Dispatch

NCMS Interactions

(ROADMAP: Interface to NCMS for constraints)



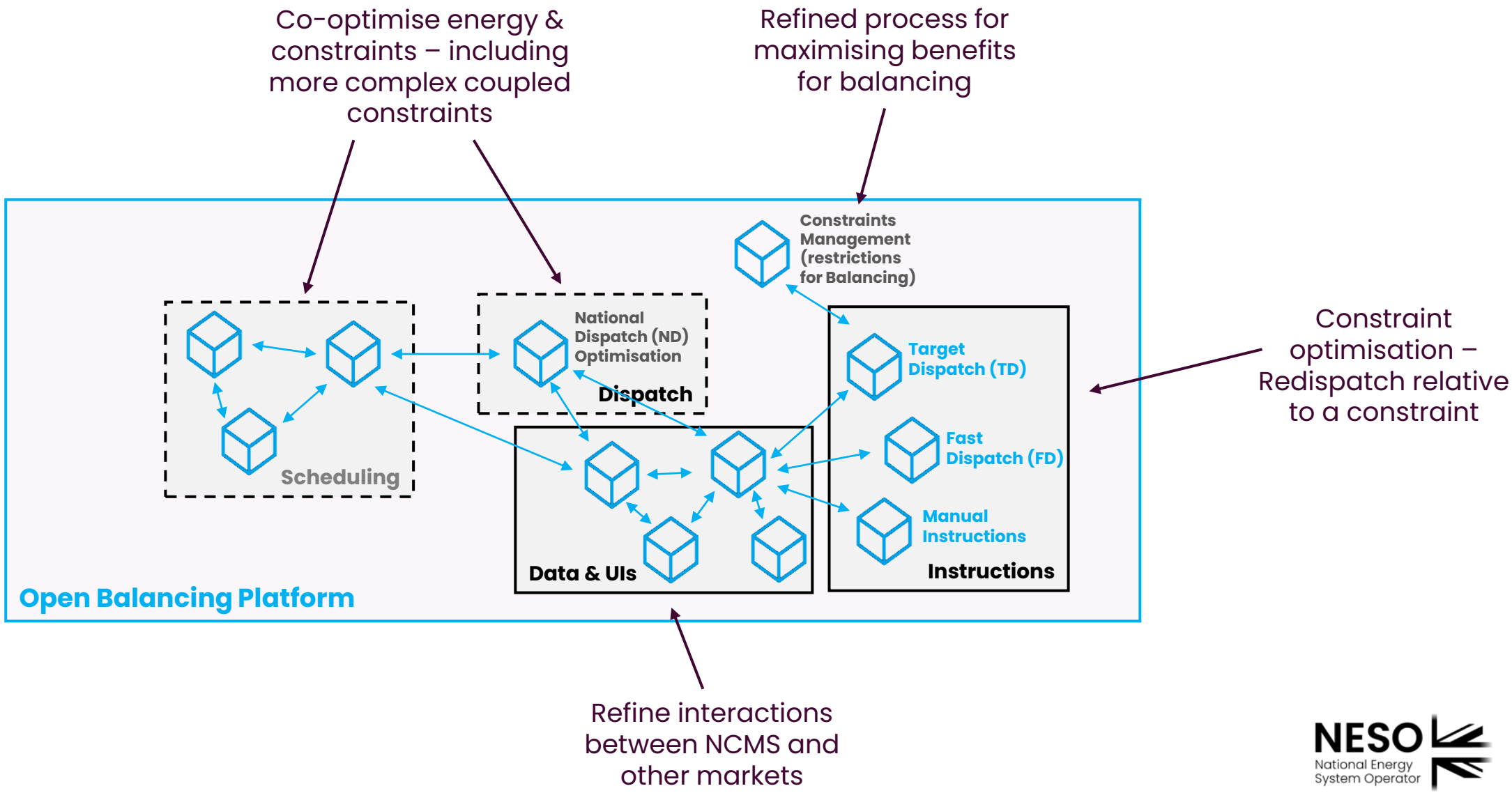
***NCMS (Network Constraint Management System)*:** A new platform for network analysis over time, providing improvements upon our current systems.

Upcoming plans

..1 Initially establish data exchange
..2 refine process around data exchange
..3 improve upon constraints modelling (e.g., using power flow sensitivities)

This integration will leverage capabilities on these new platforms to enable **further automation and dispatch closer to limits.**

In summary. . .


Co-optimise energy & constraints – including more complex coupled constraints
Refined process for maximising benefits for balancing
Constraints Management (restrictions for Balancing)
National Dispatch (ND) Optimisation
Dispatch
Target Dispatch (TD)
Fast Dispatch (FD)
Manual Instructions
Instructions
Scheduling
Data & UIs
Open Balancing Platform
Constraint optimisation – Redispatch relative to a constraint
Refine interactions between NCMS and other markets

Context: Network Services (Pathfinder) Schemes

	Constraints	Stability	Voltage
Helps provide…	Arming for intertrip, to manage constraints	Inertia and short-circuit level	Reactive power, to manage grid voltage
Existing contracts	B6 (Scotland) EC5 Interim (East Anglia)	Phases 1, 2 & 3	Voltage Pennines Voltage Mersey
New contracts	EC5 Enduring (East Anglia, go-live Jul 26)	Y-1 (go-live Oct 25)	Voltage 2026 (first unit go-live Oct 25)

Benefits: Network Services schemes have delivered approximately £324m in savings across BP2 (Apr 23 – Mar 25); for further details click here.

Future: New contracts in pipeline to enable economical & secure operations, and additional market opportunities.

For more information on Network Services Schemes click here

Enabling Network Services in OBP

(OBP ROADMAP: Constraints & Stability Pathfinder)

Deliverable includes the transition of existing functionality from BM systems to OBP, and additional enhancements.

	Contracts	Decision Making	Constraint limit for National Dispatch Optimiser (NDO)
AS-IS	Low volume, simple payment structure	Independent decision making for each problem	Single fixed MW
TO-BE (Oct – Dec 25 In OBP)	New payment structure (Stability Y-1) • Addition of new 'utilisation fee' - previously only availability fee	Stab. Y-1 & Constraint • Anticipated improvements in contract use • Awareness to support economical decision making	
ASPIRATIONAL	High volume, new contracts	New tools to support new contracts, with holistic approach	Dynamic, depending on network services actions taken

Innovation Projects & the Reveal Trials Platform

Ronan Jamieson, Operational Manager

Tom Watts, Senior Energy Balancing Specialist

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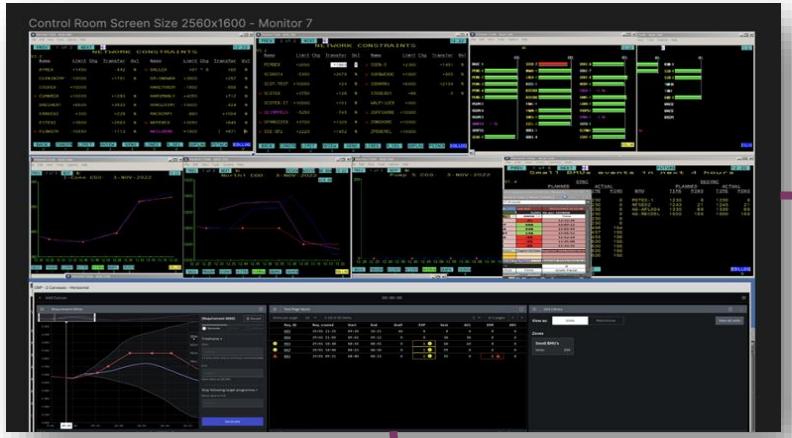
The Volta Programme

The Volta programme is focused on utilising machine learning (ML) and AI in the control room to:

Optimise forecasting & dispatch decisions, by leveraging cutting edge digital techniques

The aim is ultimately to reduce balancing mechanism costs & help achieve a net zero electricity grid.



4 Year programme

36 Defined projects / activities

- ✅ **Automated**
- ✅ **Integrated**
- ✅ **Probabilistic**

Further information on Volta Projects can be found ***here***.
Get involved with NESO innovation ***here***.

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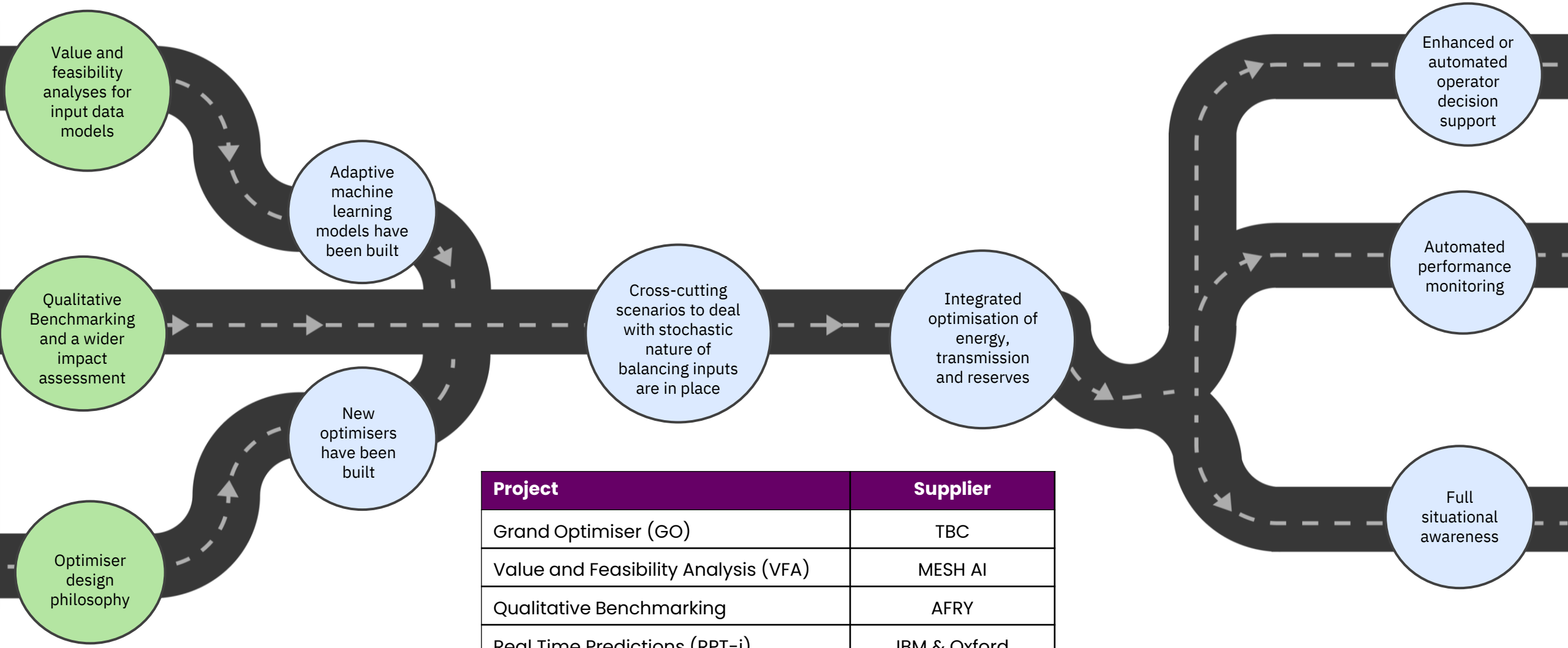
The VOLTA Roadmap



Project	Supplier
Grand Optimiser (GO)	TBC
Value and Feasibility Analysis (VFA)	MESH AI
Qualitative Benchmarking	AFRY
Real Time Predictions (RPT-i)	IBM & Oxford
Advanced Scheduling Advisor (ASA)	Faculty AI
Validation and Verification	Smiths Inst

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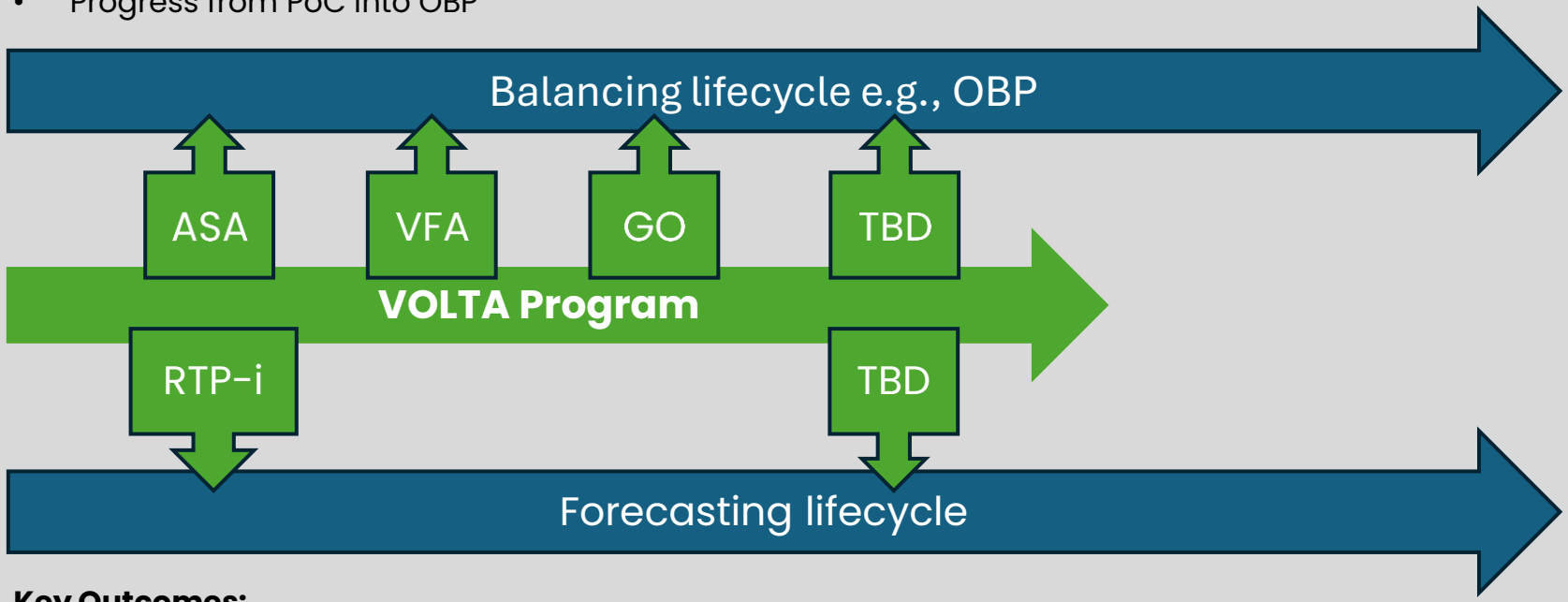
The Balancing Programme and VOLTA

Approach:

- Initial AI/ML exploration
- Create Proof of Concepts (PoC) to understand impacts, challenges, data requirements
- Progress from PoC into OBP



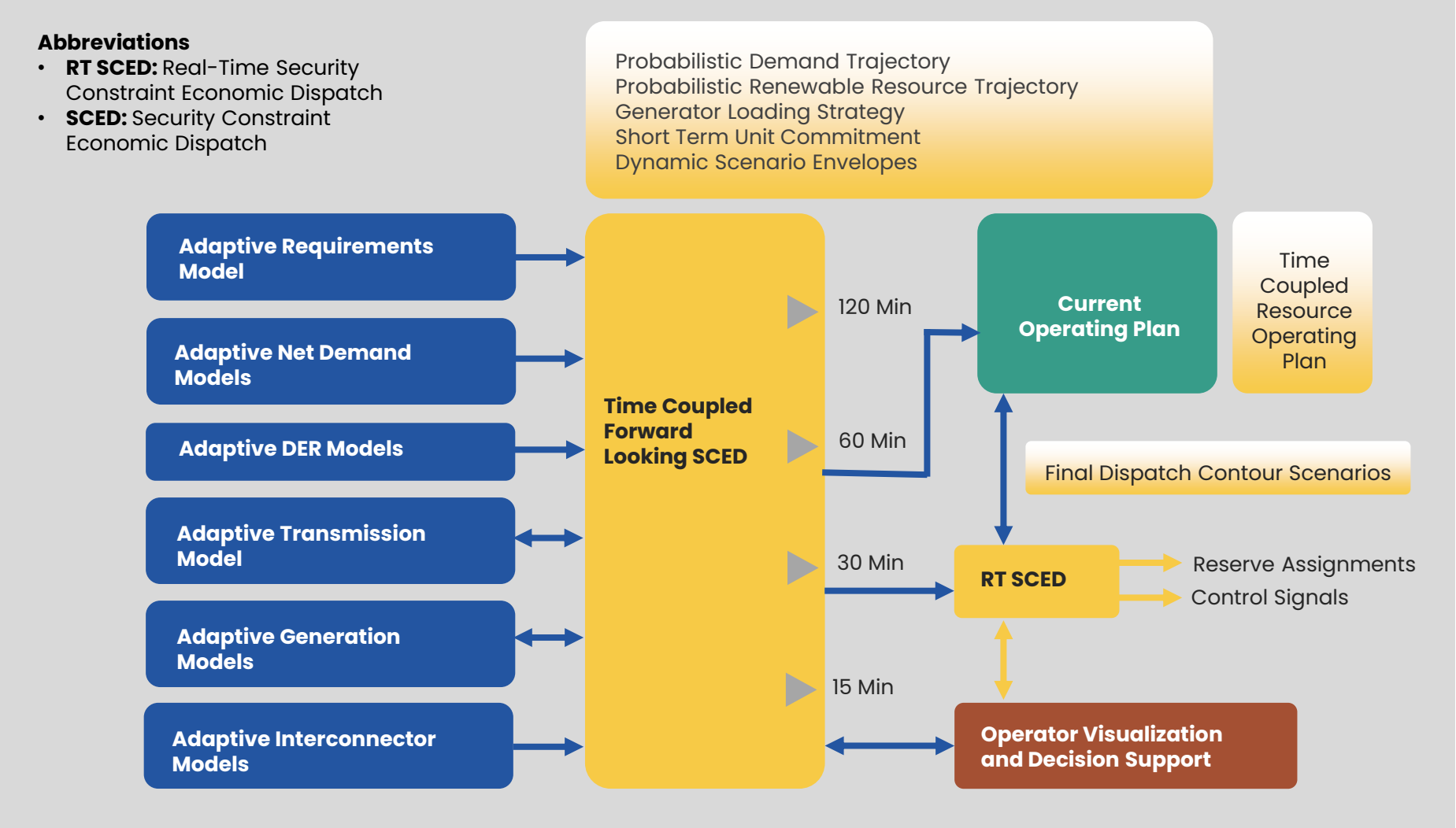
Current inflight projects

- **ASA:** Advanced Scheduler Advisor
- **VFA:** Value and Feasibility Analysis
- **GO:** Grand Optimiser
- **RTP-i:** Real Time Predictions - innovation

Key Outcomes:

- Early validation of AI/ML for system optimisation.
- Demonstrated AI-driven optimisation capability in operations.
- More economic & secure national dispatch via intelligent optimisers.

The Overall Vision for Volta - Recap



Volta: Model driven Strategy for Balancing Optimisation (MSBO) | National Energy System Operator

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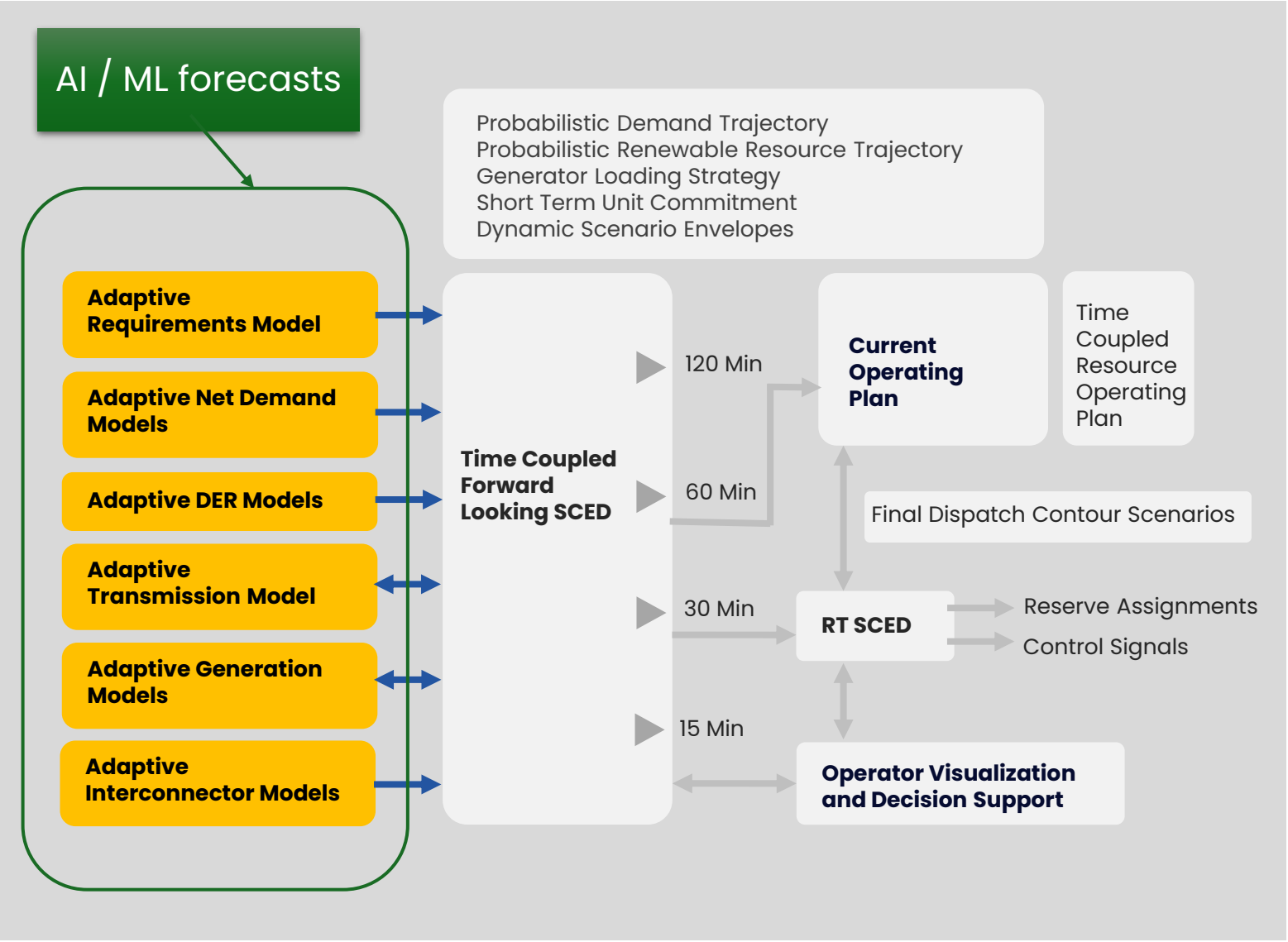
VFA: Value and Feasibility Analysis Project (In-flight)



Details	
Description	Project to assess the effectiveness, practicality, and benefits of implementing adaptive data models and deliver a POC
Progress	Design phased finished , developing POC
Expected End Date	August 2025

Abbreviations

- **RT SCED:** Real-Time Security Constraint Economic Dispatch
- **SCED:** Security Constraint Economic Dispatch

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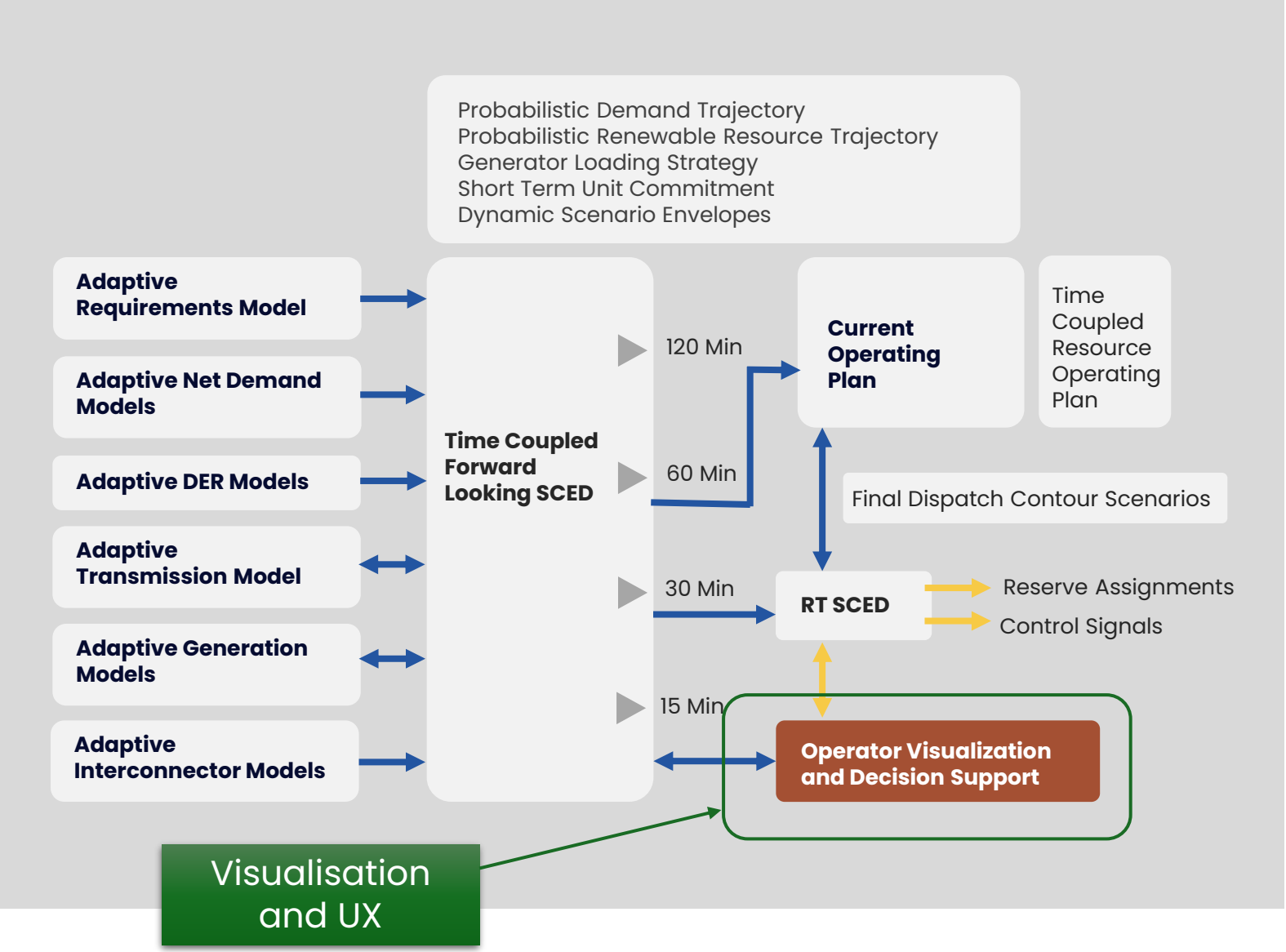
ASA: Advanced Scheduling Advisor (In-flight)



Details	
Description	Delivering a Proof-of-Concept tool for AI based margin analysis
Progress	Discovery finished , design phase
Expected End Date	December 2025

Abbreviations

- **RT SCED:** Real-Time Security Constraint Economic Dispatch
- **SCED:** Security Constraint Economic Dispatch

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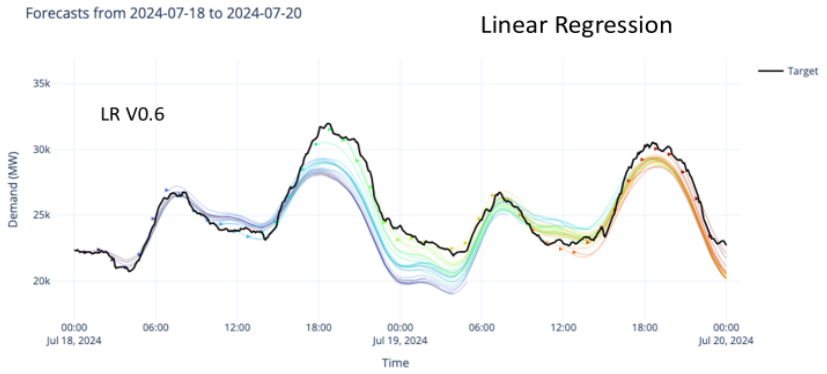
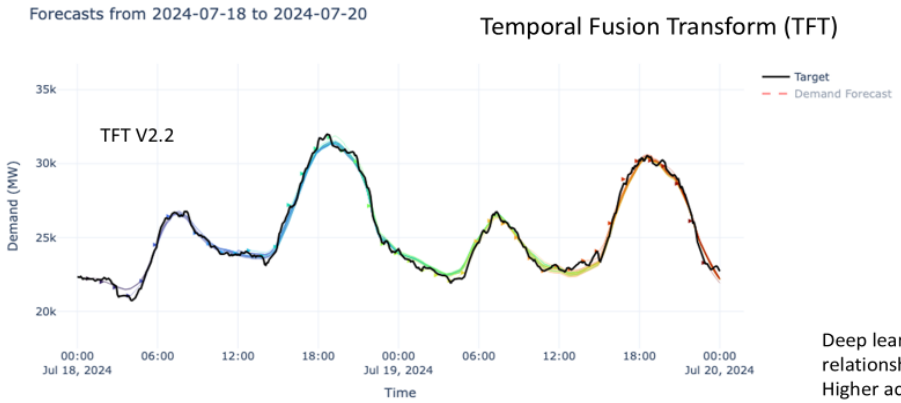
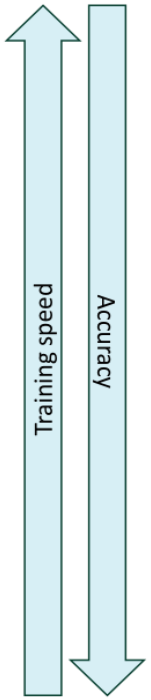
RTP-i: Real Time Prediction (In-flight)

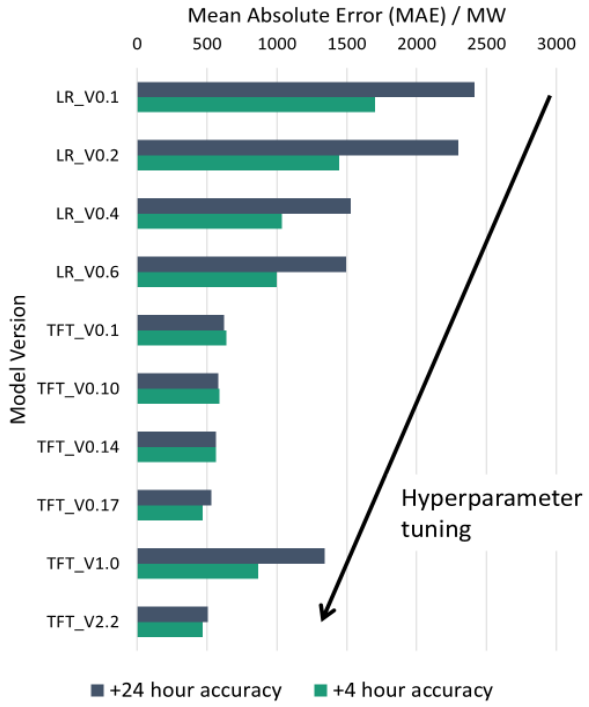




Simple models such as Linear Regression are fast to train allowing us to quickly iterate and learn feature importance

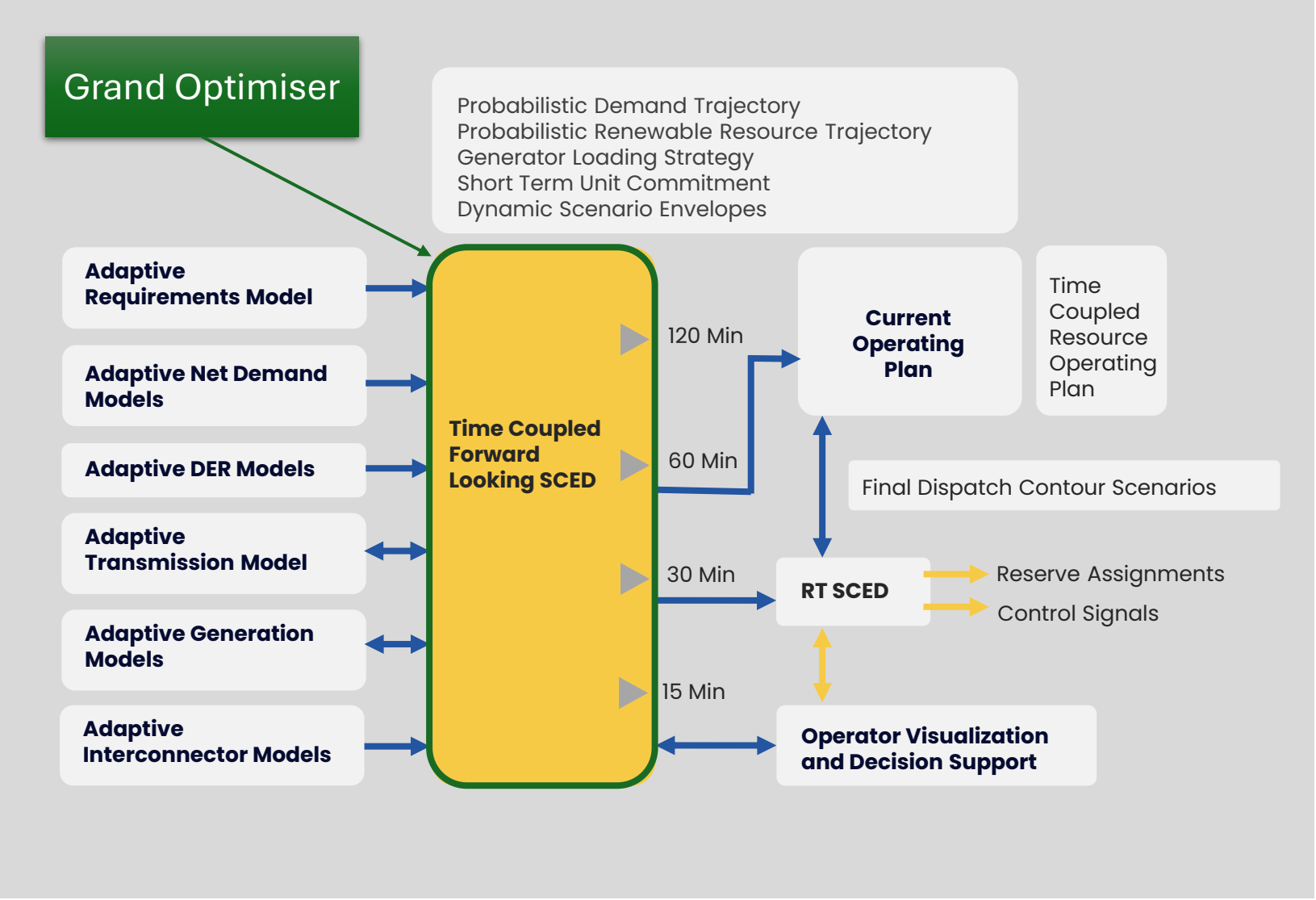


Deep learning models can learn complex relationships between many covariates. Higher accuracy but the tuning process takes longer.



Details	
Description	Improving in-flight RTP project with next generation algorithms
Progress	Second demo delivered, finalising the method
Expected End Date	January 2026

GO: Grand Optimiser (Discovery)



Details	
Description	Design the end to end of optimisation process for scheduling & dispatching
Progress	Contracting in progress
Expected Start Date	July 2025

Abbreviations

- **RT SCED:** Real-Time Security Constraint Economic Dispatch
- **SCED:** Security Constraint Economic Dispatch

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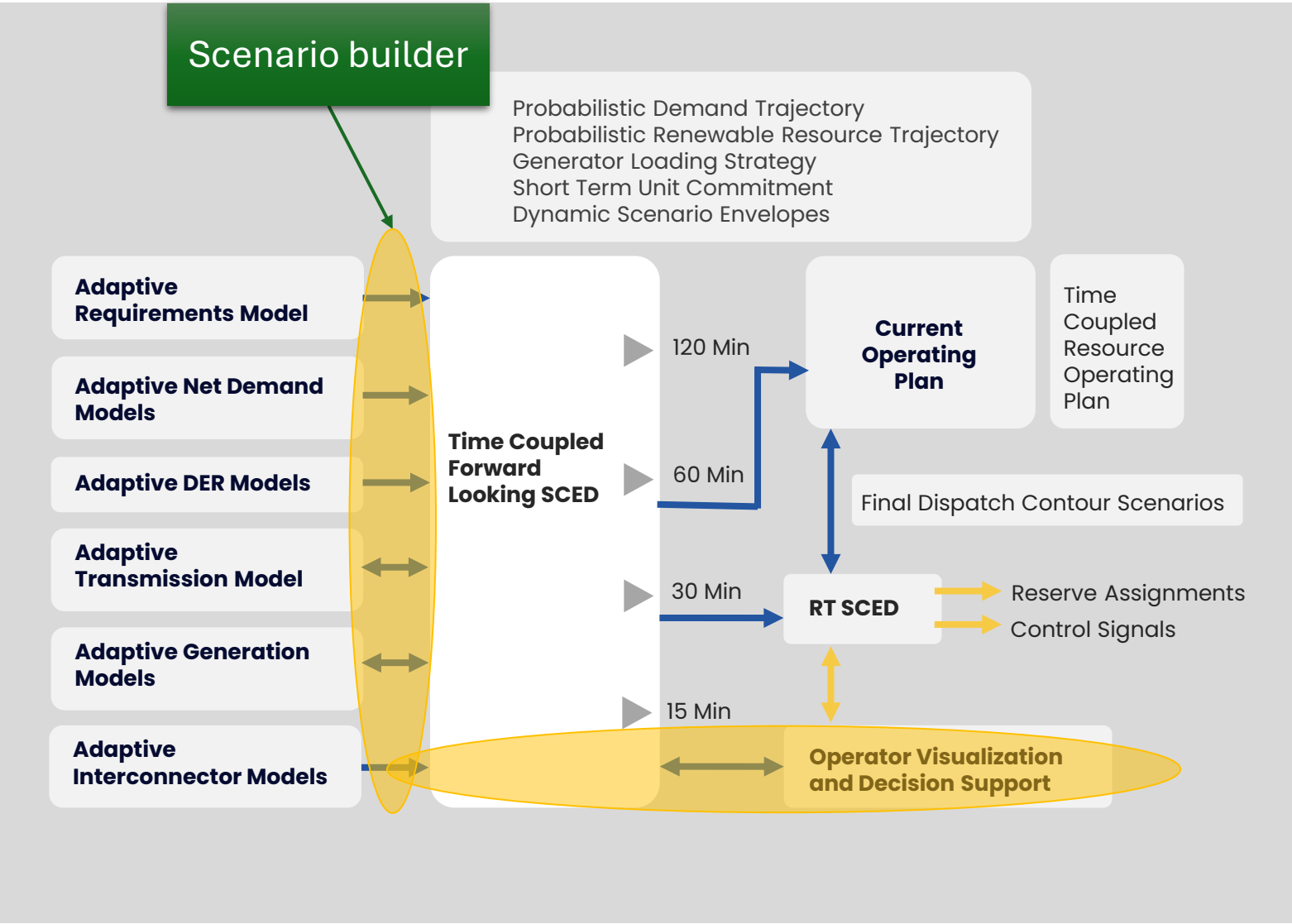
Future Target Areas - Adaptative Scenario Building



Details	
Description	Moving from a single set of inputs approach to multiple probabilistic inputs leading to a range of potential solutions
Progress	N/A
Expected Start Date	2026

Abbreviations

- **RT SCED:** Real-Time Security Constraint Economic Dispatch
- **SCED:** Security Constraint Economic Dispatch

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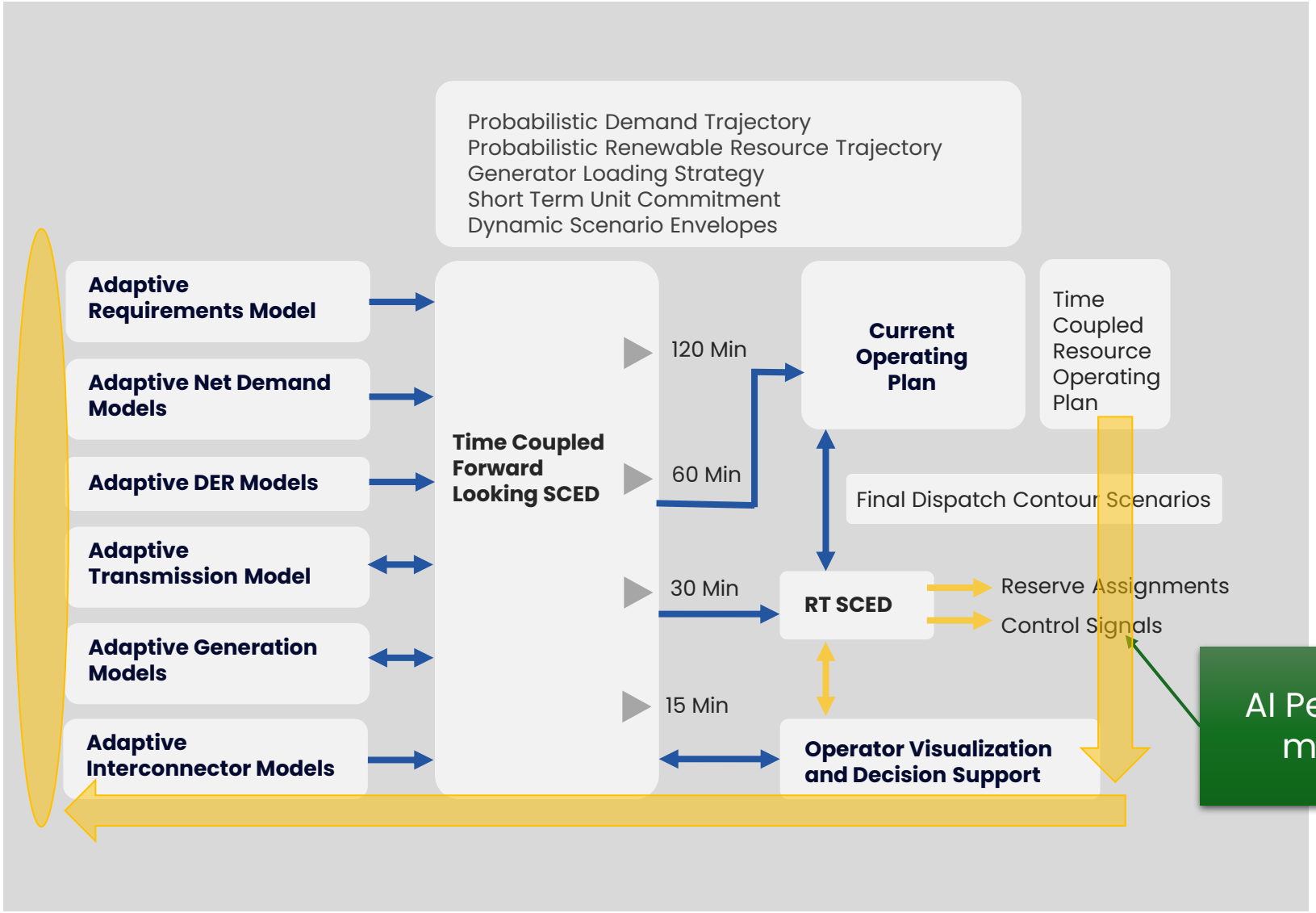
Future Target Areas - Reporting, Transparency & Monitoring



Details	
Description	Providing AI support across the end-to-end balancing process, that will assist in improving transparency, data sharing and market monitoring
Progress	N/A
Expected Start Date	2026

Abbreviations

- **RT SCED:** Real-Time Security Constraint Economic Dispatch
- **SCED:** Security Constraint Economic Dispatch

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Tom Watts

Senior Energy Balancing Specialist

ReVeal
A one-stop-shop for NESO trialling activities

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The Challenges

How to keep pace with technology developments across the energy landscape, to enable optimised system operation & market management.

Limited opportunities to trial new services & capabilities due to **lengthy approval processes** required for testing in secure environments.

Testing new ideas whilst operating **core operational infrastructure in secure environments.**

What is Reveal?

It is an Azure-hosted, internet-facing test environment that replicates balancing capabilities, including signalling functionality (EDL/EDT)

It is fully ringfenced and separate from Critical National Infrastructure

REVEAL will provide the tools to make trialling of new capabilities easier and faster for NESO and the wider industry

Where Does Reveal Sit?

NESO / Reveal

OBP-aligned user interfaces

Digital Ringfence outside of CNI

Secure Data Transfer

Submission & Control

EDL | EDT | WAAPI

Operational Metering

MQTT | IEC104 | iHost

Other Standards & Protocols

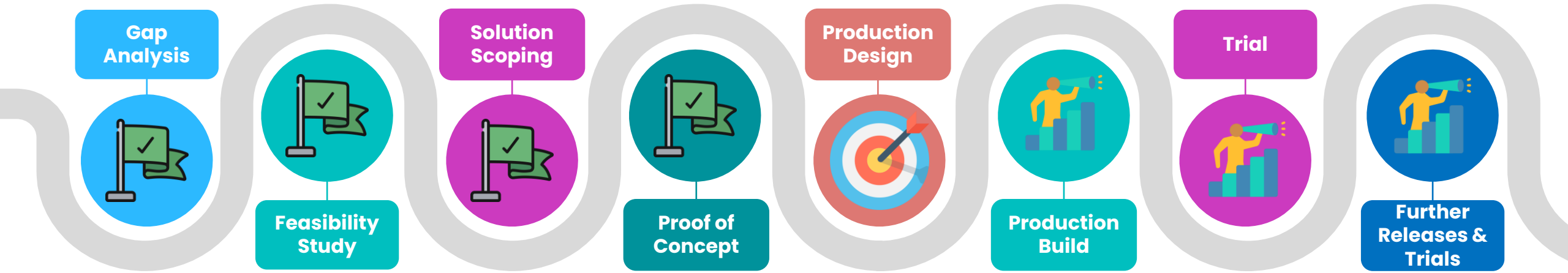
OpenADR3 | ASDP APIs | ?

Customer Assets & Technologies

History of Reveal

We are requesting your input into our Design work in June '25

Extensive market engagement across NESO and Industry



Validation REVEAL was providing solutions for business needs

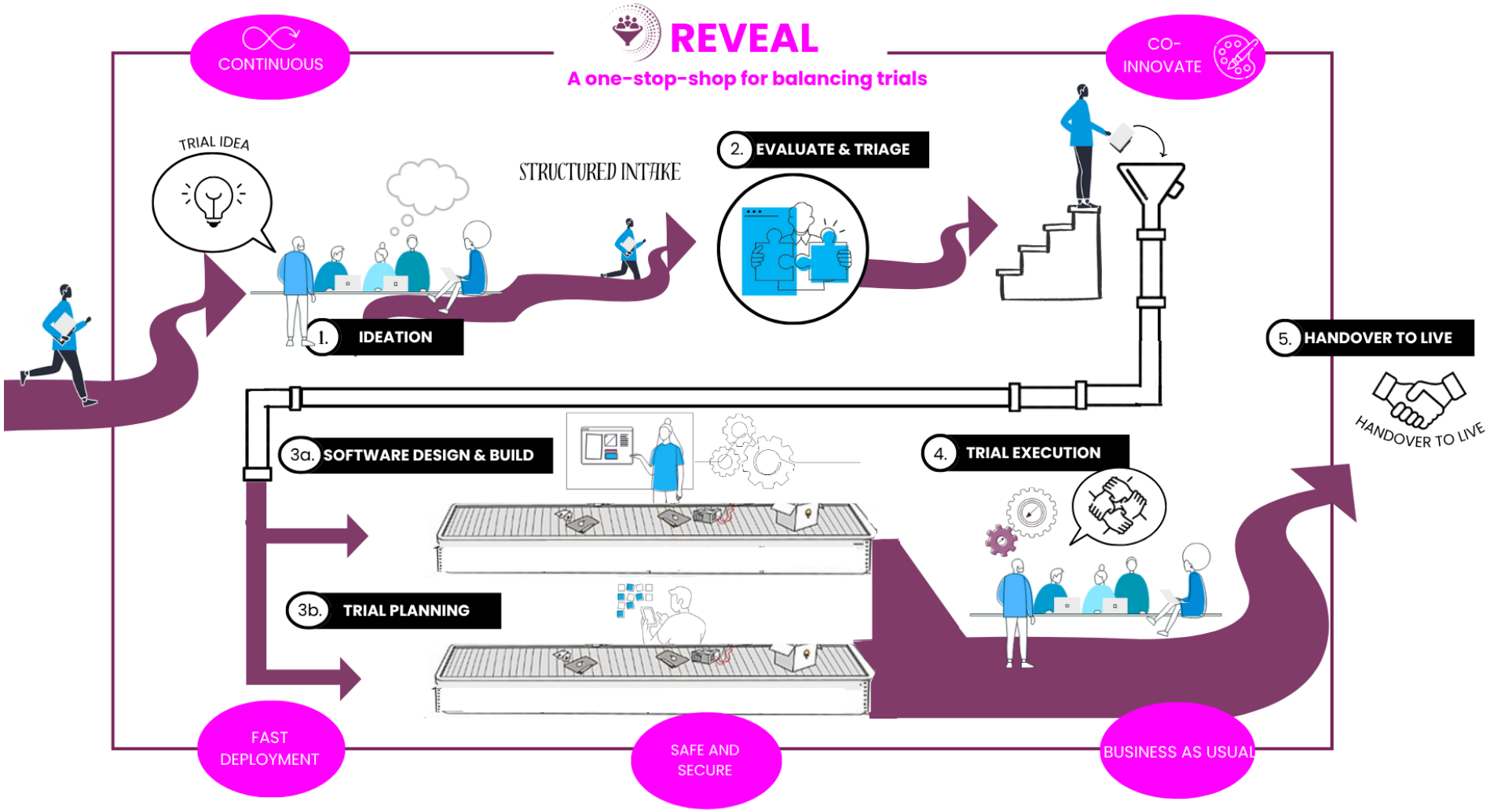
Integrated POC with Kraken to prove EDL, EDT and MQTT capability

Build and release a production version of the REVEAL Live Trial Environment, run a trial, and deliver further iterations to support future capability validation

Our Vision

‘A one-stop shop for NESO trial activities,
driving innovation and operational excellence for
NESO and industry’

Continuous Delivery Against Our Vision



ReVeaT
A one-stop-shop for NESO trialling activities

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Signalling & Communications Trials

A signalling or communications trial can be executed to **validate different communication paths, data standards, or new protocols** between the Control Room and Service Providers / Unit Operators.

TIDE Visibility
(Transformation to Integrate Distributed Energy)

Low Earth Orbit Satellites

ReVeal
A one-stop-shop for NESO trialling activities

Tools Trials

A tools trial can be implemented to enable the **development and testing of new technologies, products, and market services.**

GCC0166+ State of Charge

Onboarding Sandbox

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Tell us your Ideas

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We Want to Hear From You . . .

Q&A

Q&A to cover any questions about Reveal and the capabilities

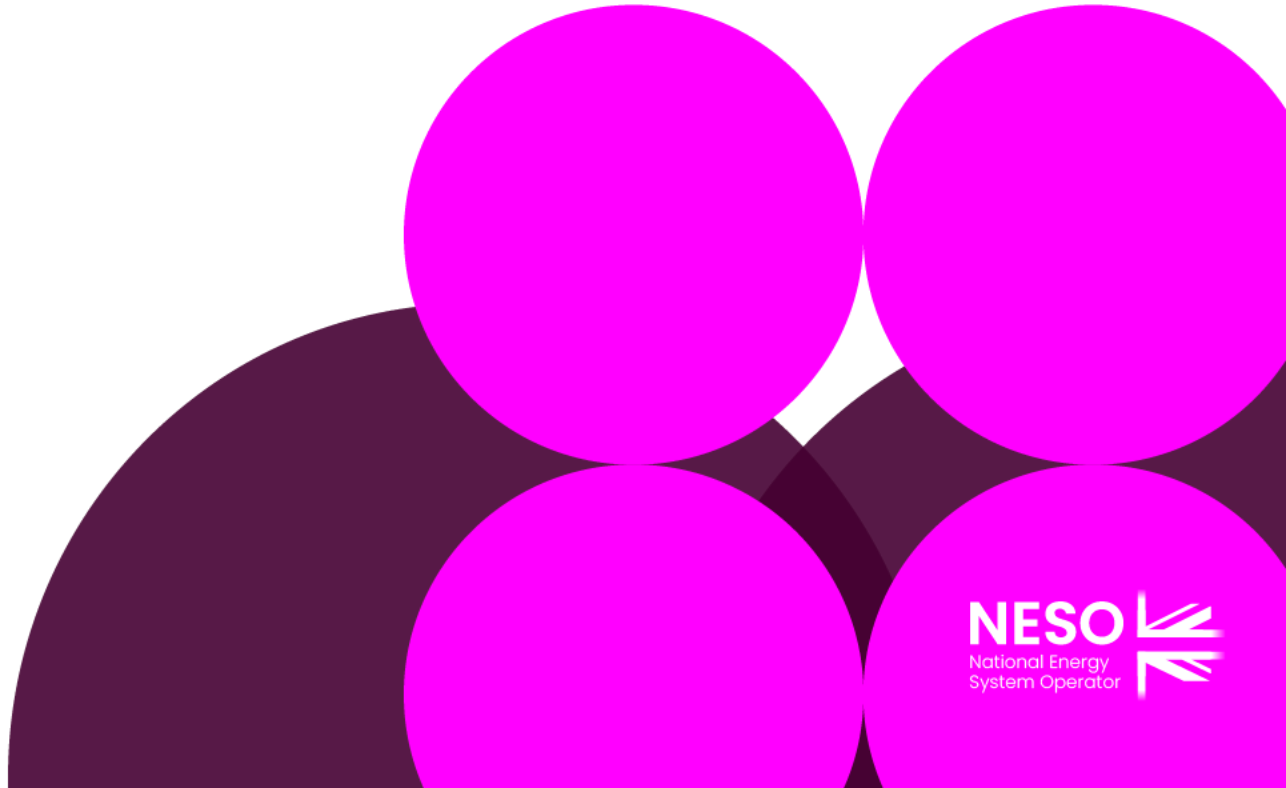
Tell us your ideas

Capture your problem statements and potential solutions on the forms provided

Post them in the ‘Cool Stuff’ box

Thank you for your input!

- Your ideas will be fed into the design of REVEAL
- Make sure you sign up to the distribution list for updates



A Day in the Life of a Control Room Engineer

Alex Carter, Control Room Operational Manager

Colin Webb, Operational Manager

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Managing the System

Network Access Planning (NAP) Team

Carryout network analysis using the offline transmission analysis tool (OLTA) in a time frame from 8+ year ahead to 24 hour ahead – produce outage plan.

Trading Team

Energy Market, sufficient margins

Energy Forecasting Team

National Demand
Solar, wind, GSP demand

Systems:
- Energy Forecasting System (EFS)
- Platform for Energy Forecasting (PEF)

Handover of outage notes

Handover of Transmission System Operating Plan (TSOP)

Strategy Team

Plan for security of the system based on Security & Quality of Supply Standard (SQSS), from 24 hours to 4 hours ahead of time.

Scheduling, System Operating Plan, Margin Analysis, Data Processing and Profiling

System: Scheduling Platform in Controlled Environment (SPICE)

Handover of System Operating Plan (SOP)

Real Time Operation

Transmission Team

- Monitoring & managing System flows, outages, faults, and voltages following SQSS to ensure Security of the System.

Energy Team

- Monitoring & managing System Frequency following SQSS, and Transmission Constraints.
- Demand Prediction, Dispatch Advice, Energy Balancing i.e., Issuing Instructions (BM & Non-BM), Ancillary Service Management.

Systems:
- System Operation in Real-Time (SORT)
- Versatile Graphical Instruction Logger (VERGIL)
- Contingency Logging System (CLOGS)
- Open Balancing Platform (OBP)
- Ancillary Services Dispatch Platform (ASDP)

Control Room Teams

Power System Manager (PSM)

Brendan Lyons

Strategy Team

- Operational Strategy Manager (OSM)
- Control Technical Assistant (CTA)
- Assistant National Scheduling Engineer (aNSE)
- National Scheduling Engineer (NSE)
- Transmission Analysis Engineer- Scotland (TAEs)
- Transmission Analysis Engineer- E&W (TAEe&w)
- Day Ahead Congestion Forecasting Engineer (DACF)

Energy Team

Alex Carter

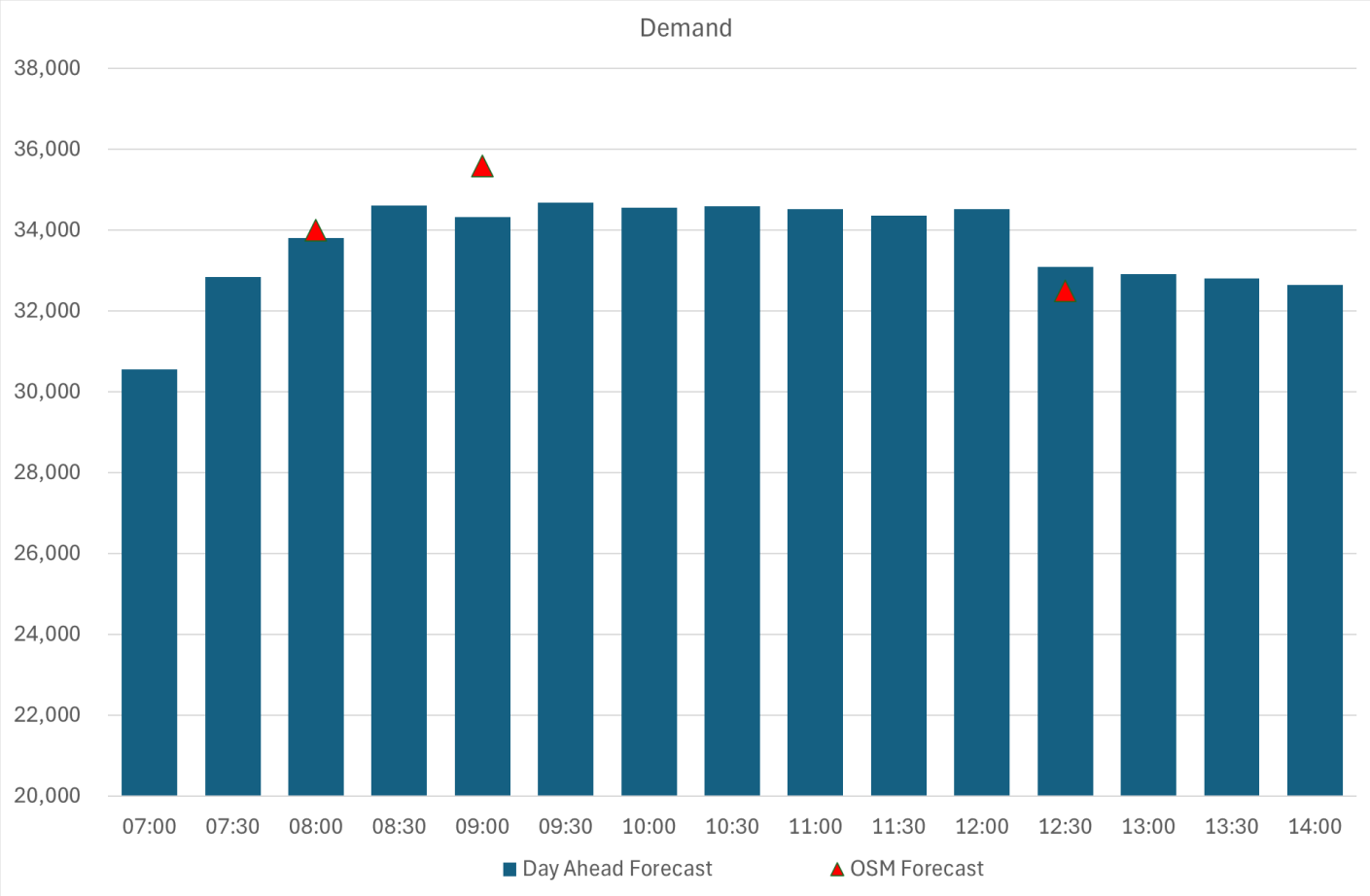
- Operational Energy Manager (OEM)
- National Balancing Engineer (NBE)
- Assistant National Balancing Engineer South (aNBE)
- Assistant National Balancing Engineer North (aNBE)
- Assistant National Balancing Engineer – Battery (additional post added)

Transmission Team

- Transmission Security Manager (TSM)
- Transmission Security Engineer- Scotland North(TSESc-n)
- Transmission Security Engineer- Scotland South(TSESc-s)
- Assistant Transmission Security Engineer – E&W North (aTSEe&wn)
- Transmission Security Engineer- E&W North(TSEe&wn)
- Transmission Security Engineer- E&W South(TSEe&ws)
- Assistant Transmission Security Engineer – E&W South (aTSEe&ws)

Friday 14th March 2025 Morning Shift

From the perspective of the Energy Team



Spring Morning – Weather Forecast

Morning peak

Cold and frosty start in the southeast

Cloudy but chilly elsewhere, with showers from the North Sea, potentially heavy and falling as snow over hills. Bright spells between showers.

Milder later in the day with a shift in wind direction from northerly to south - southeasterly, bringing milder air from the continent.

Highs around 10°C

Up to 7GW PV forecast

Abbreviations:

- **OSM:** Operational Strategy Manager

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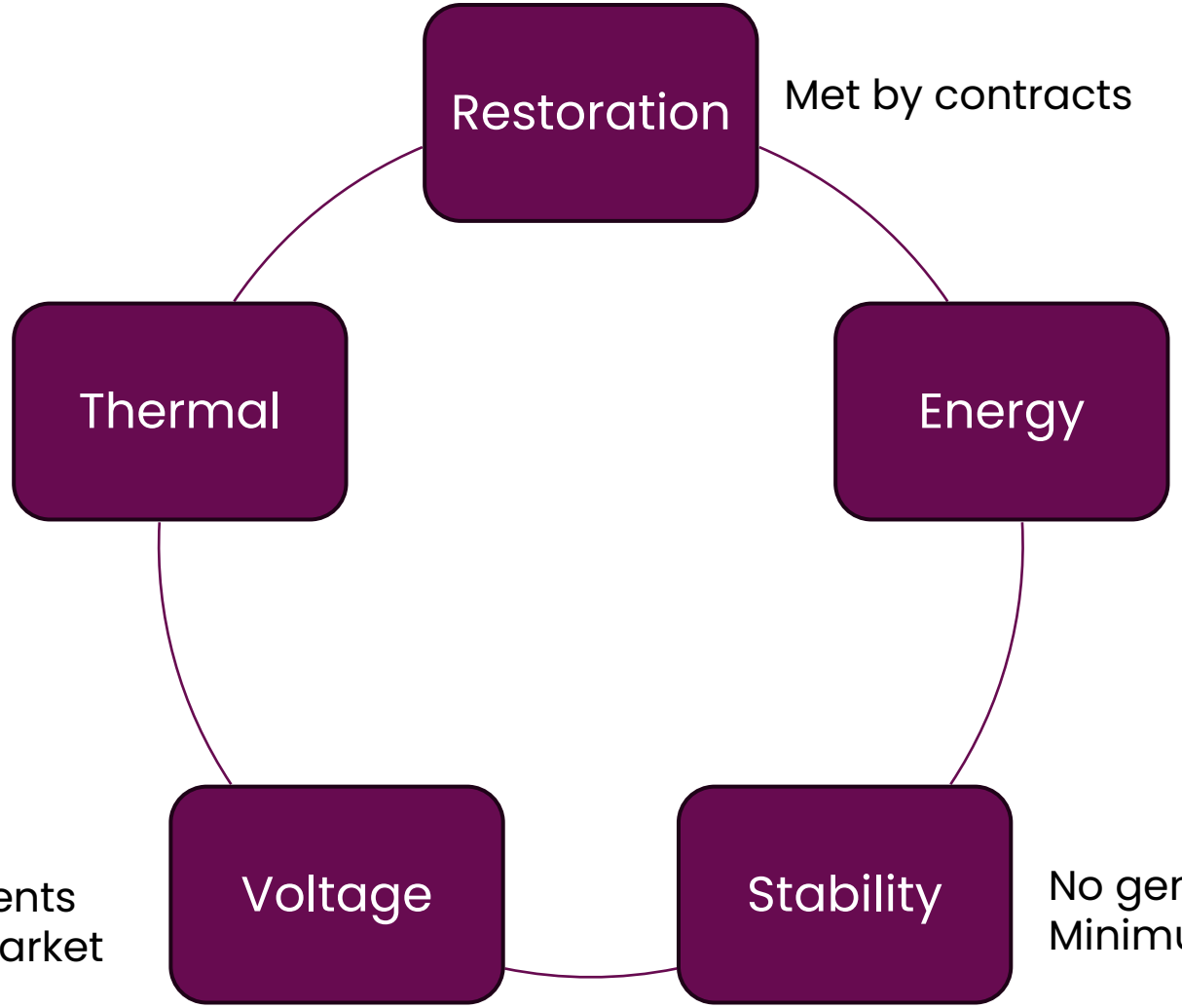
System Security

Abbreviations:
STOR: Short Term Operating Reserve
DC: Dynamic Containment
DM: Dynamic Moderation
DR: Dynamic Regulation



Met by contracts

Mid Scotland constraint active (B4 / SSE-SP2)

Reserve
Need 1684MW positive
Balancing Reserve 450MW, additional needed
2853MW negative met by market
STOR requirement mainly met by contracts, 131MW additional needed

Response
DC/DR/DM contracted, 167MW additionally needed
1883MW generation loss covered
1450MW demand loss covered

Voltage requirements met by market

No generator stability constraints
Minimum inertia met by market

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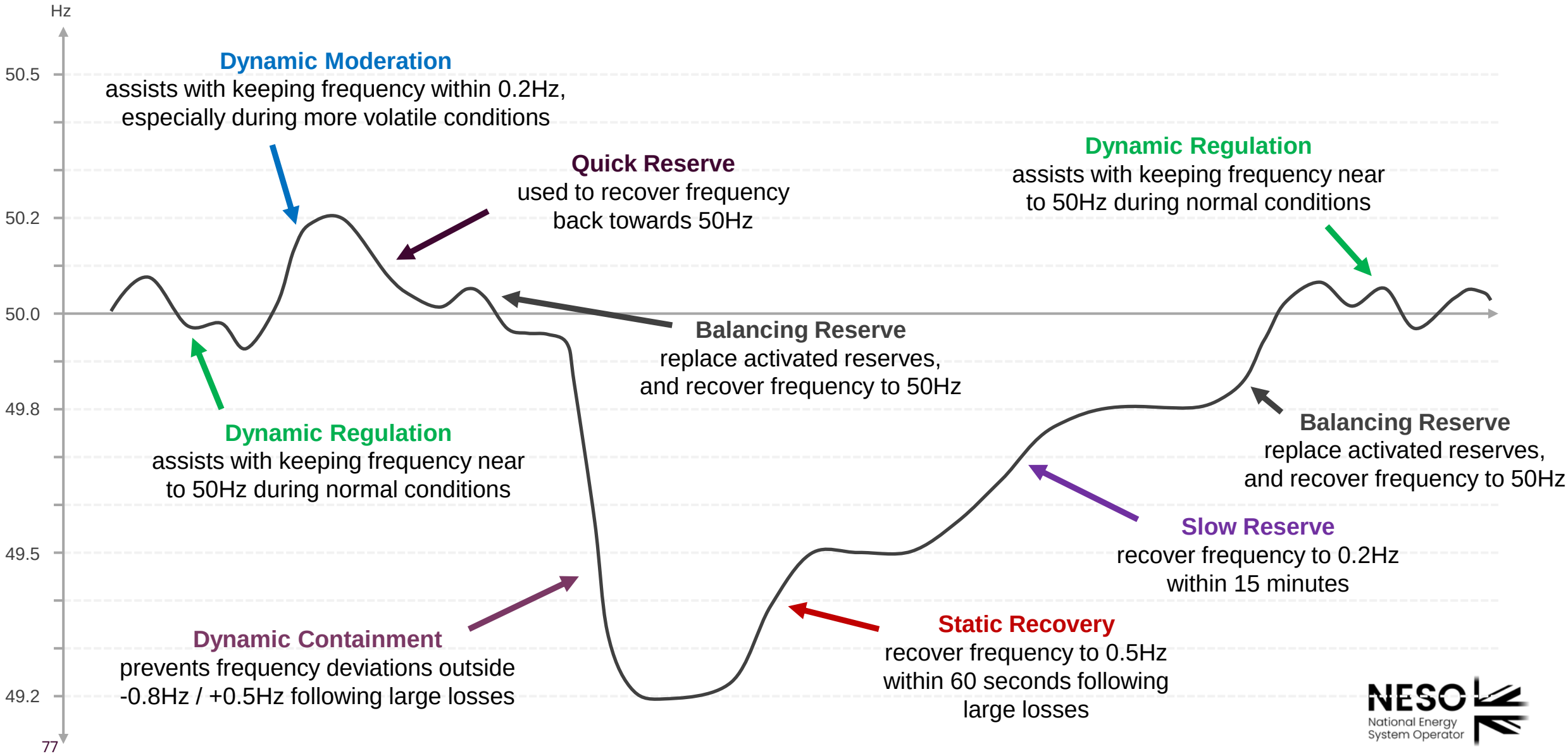
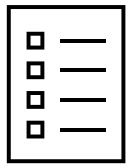
Reserve and Response Services



System Operating Plan Morning Peak (2A @ 09:15)

2A Final Plan @ 05:28

- 35.6 GW peak demand
- 3.0 GW wind
- 4.8 GW interconnector import
- <0.1 GW batteries (PN)
- 0 GW Small BMUs

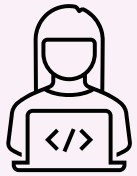


Risk Management

- Demand uncertainty
- Cold morning could mean higher demand
- Clear skies could mean higher PV
- Therefore, flexible options

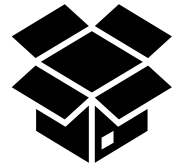
NESO Actions

- Connah's Quay 2 05:59-11:59 (0.3 GW)
- Interconnector trades (1.3 GW)
- Batteries (0.5 GW)
- Small BMUS (0.5 GW)
- Pumped Storage (1.2GW)
- Spalding Expansion, 20 minutes to full load (0.2 GW)



NESO Contingency Actions

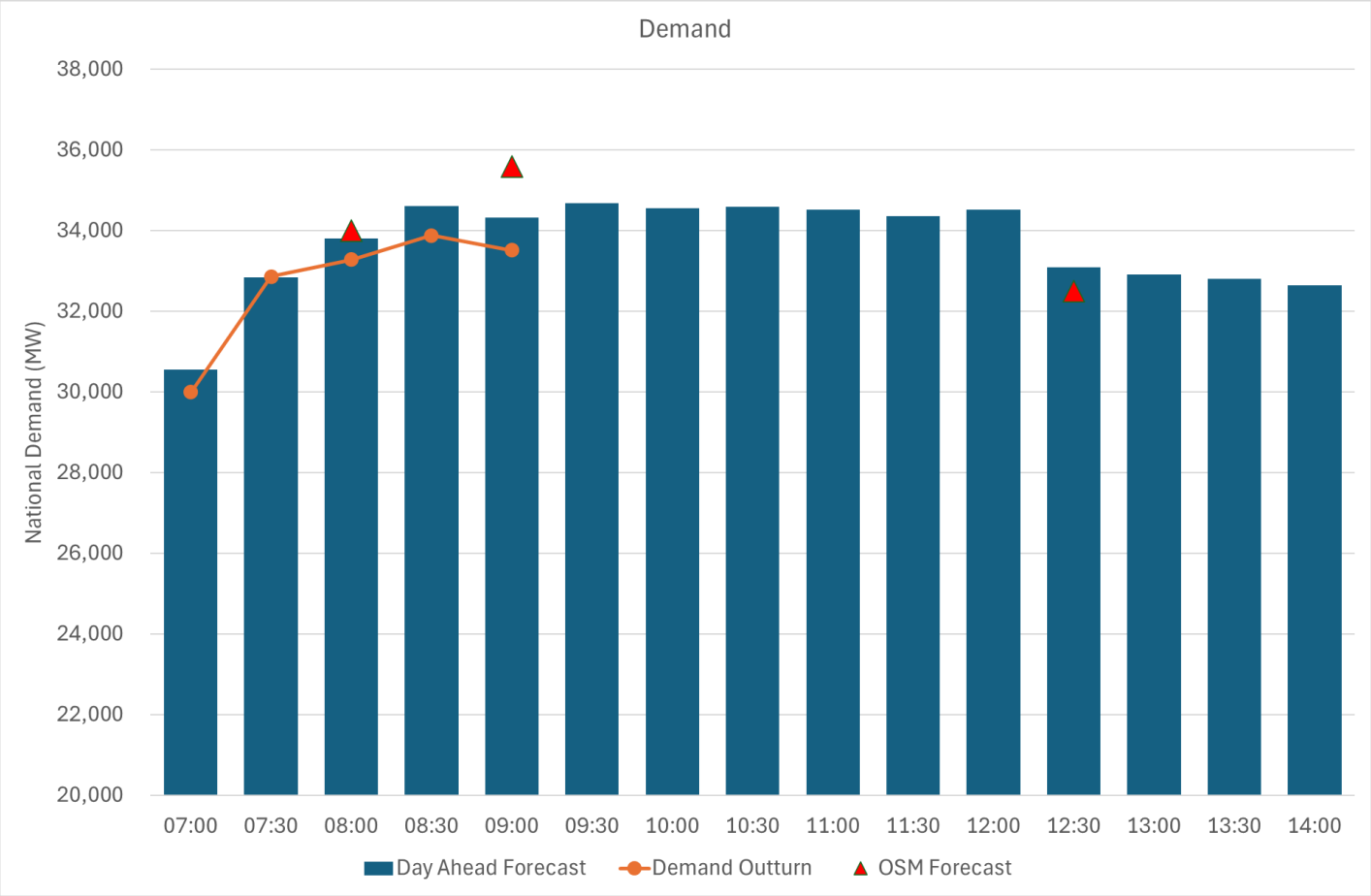
- Small BMUs
- Additional CCGTs or advances from afternoon PNs
- Potentially more batteries depending on state of charge



Abbreviation: CCGT: Combined Cycle Gas Turbine

Friday 14th March 2025 Morning Shift

Approaching the morning peak



Towards forecast peak at 09:15

Demand starting to out turn below the forecast

Batteries, pumped storage and thermal units used to manage energy imbalance

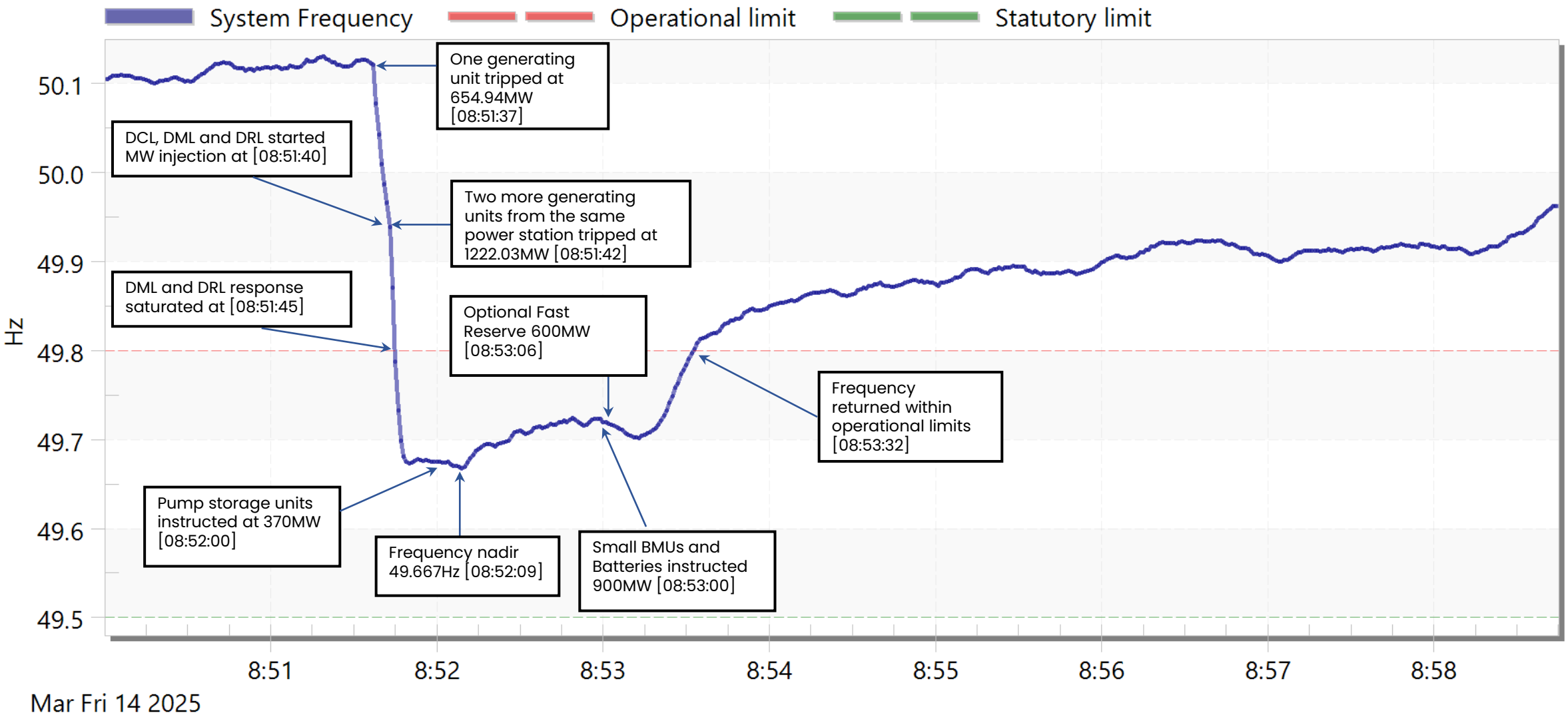
Some wind being bid down to manage Mid Scotland constraint

Not all pumped storage identified in SOP instructed

Spalding Expansion not run

At 08:50 frequency near 50.1 Hz as demand continues to outturn lower than forecast

Frequency Behaviour



System Conditions Before the Event

Date and time	Friday, 14th March 2025 at 08:51:37
National Demand	34.85GW
System frequency	50.12Hz
Inertia	276.4GVA.s
Contracted Response Services	Dynamic Containment – Low (DC-L): 1153MW Dynamic Regulation – Low (DR-L): 480MW Dynamic Moderation – Low (DM-L): 147MW Static Firm Frequency Response (sFFR): 185MW MFR: Primary (P): 56 MW Secondary (S): 71 MW High (H): 177 MW
Weather	3.05GW transmission-connected wind 832MW estimated embedded wind 4.12GW estimated embedded solar

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Event Overview

- At 08:51 hrs on 14th March 2025 a significant loss of infeed of around 1,877MW occurred due to the trip of three generating units.
- This event was well contained. The lowest frequency reached was 49.667Hz.
- Frequency returned above operational limits within 3min and to 50Hz in 12min.
- OBP 58 instructions, 843 MW
- SORT 12 instructions, 500 MW
- VERGIL 6 instructions 740 MW
- No demand or generation interrupted.
- This was the largest event since the August 2019 where ~1.9GW loss led to frequency falling to 48.8Hz and 1.1 million customers disconnected.
- Before the current Frequency Risk and Control Report (FRCR) policy, dynamic response products, and OBP were introduced.

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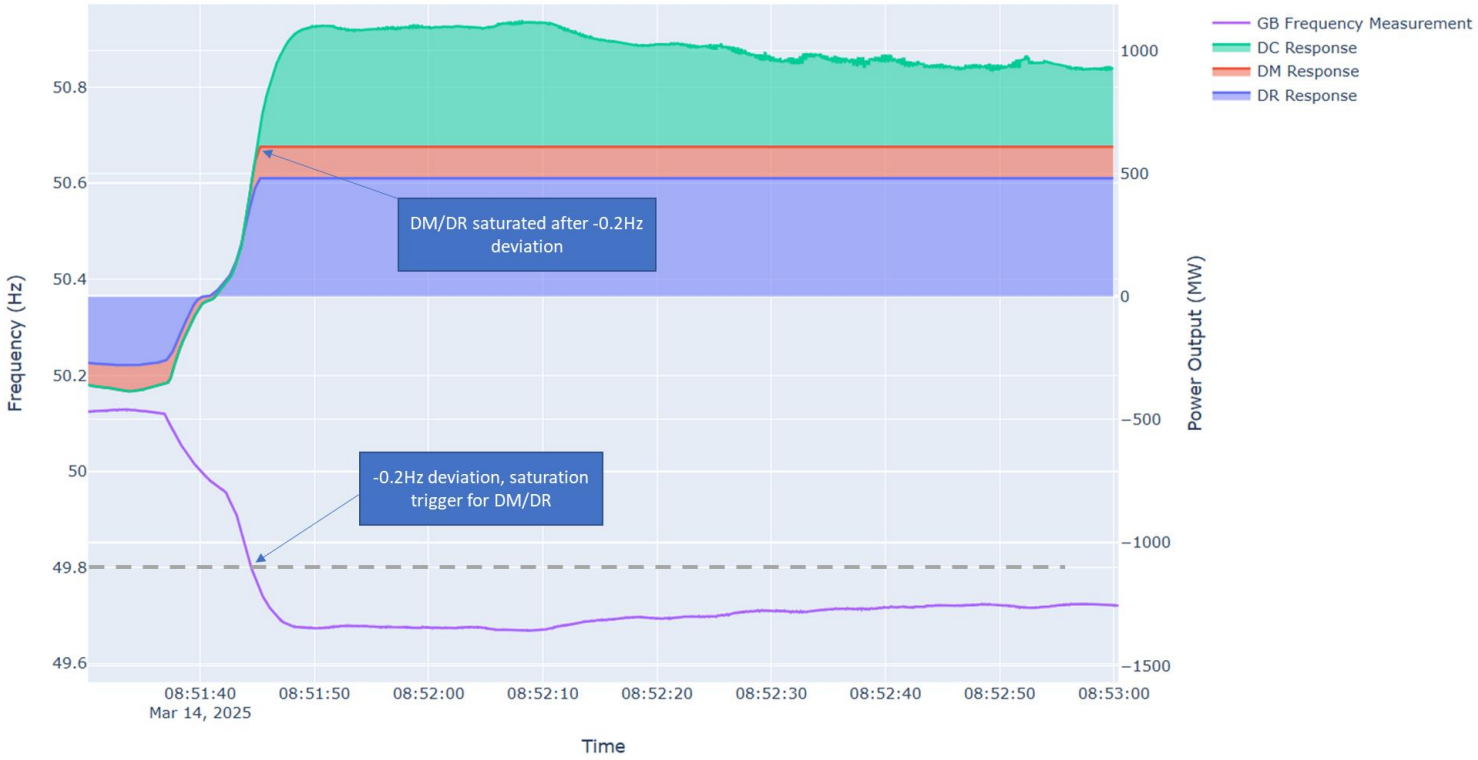
Response Service Performance

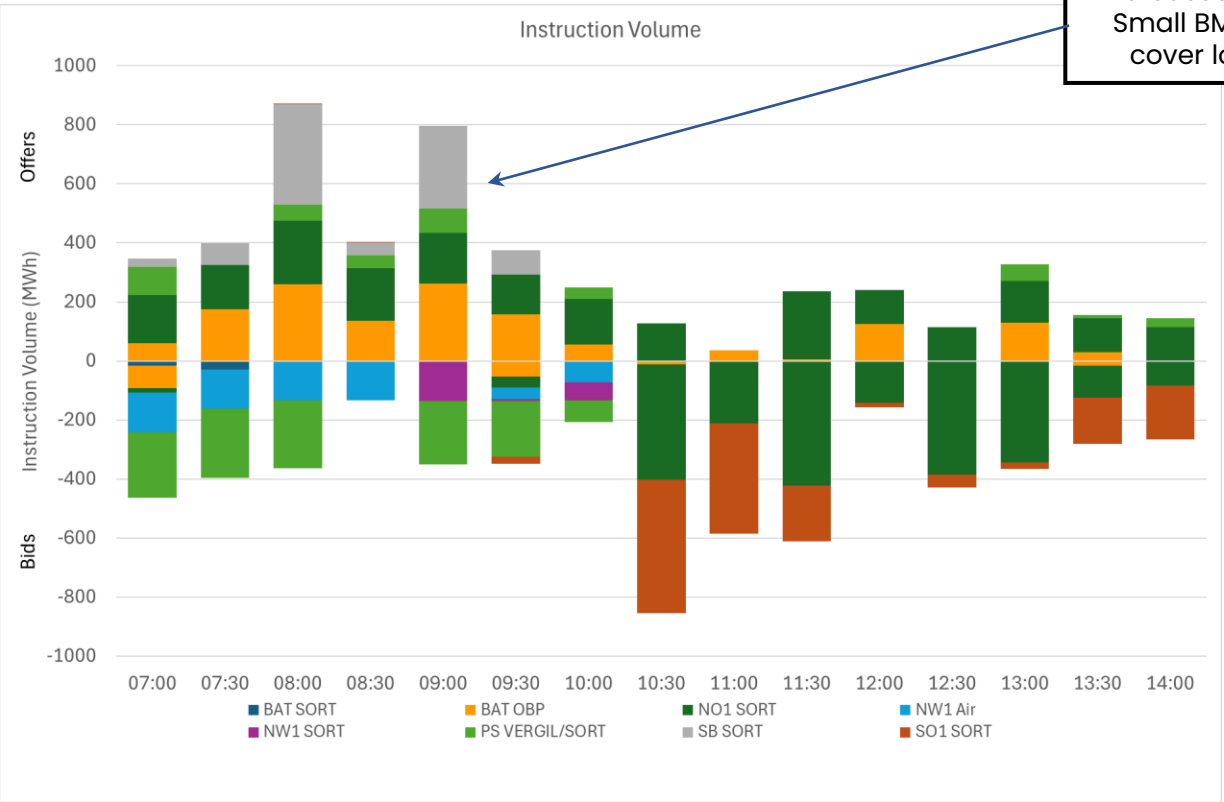
- System behaved as expected during the event.
- Based on current available performance monitoring data, Dynamic Response Services, i.e. DC, DR and DM, responded to the event as expected containing frequency from deviating further.
- Total contracted LF volume at the time of the event was 1780 MW. The average performance score in the settlement period relevant to the event is above 90% indicating a good performance of dynamic services.

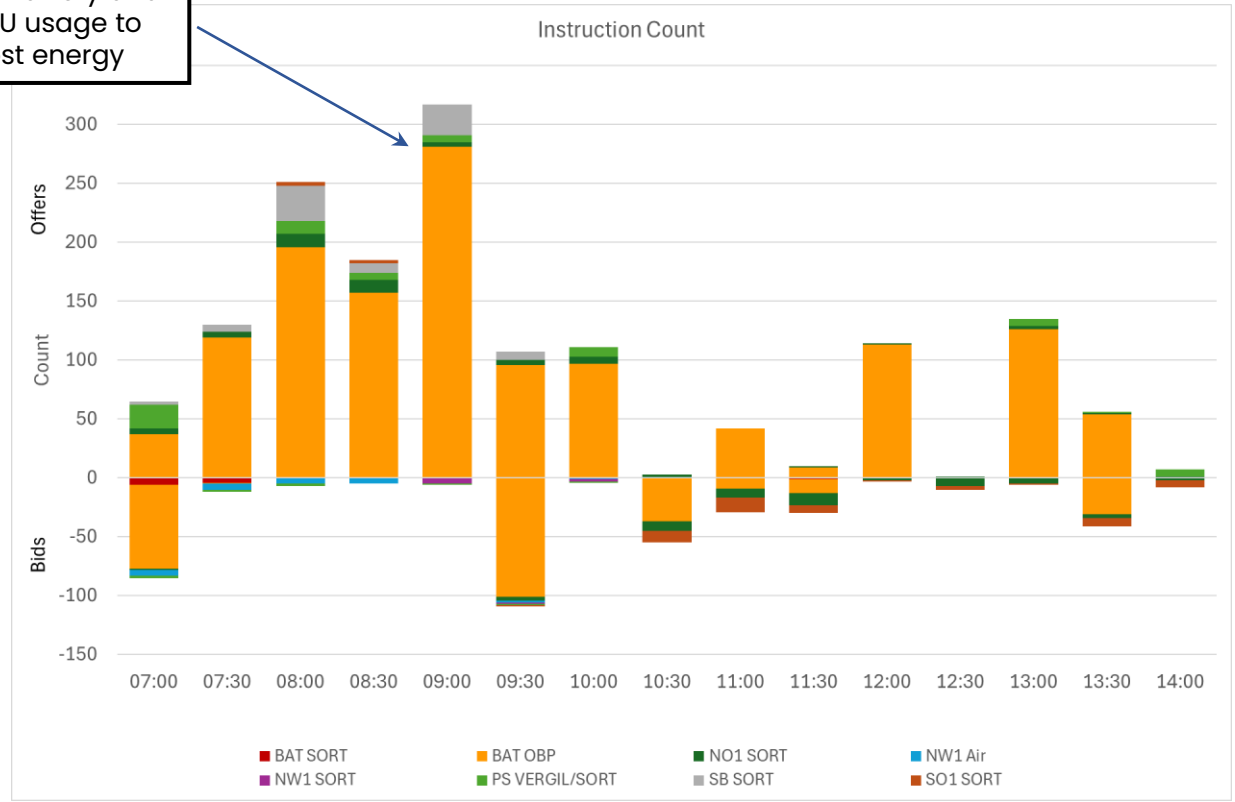


Service	Available volume (MW)	Contracted volume (MW)	Shortfall (MW)	Notes
DC-L	1077	1153	78	Shortfall were due to declared unavailability and no data submission when analysing
DM-L	128	147	19	
DR-L	480	480	0	
Total	**1683**	**1780**	**97**	

Instruction Volumes & Counts

Increased Battery and Small BMU usage to cover lost energy

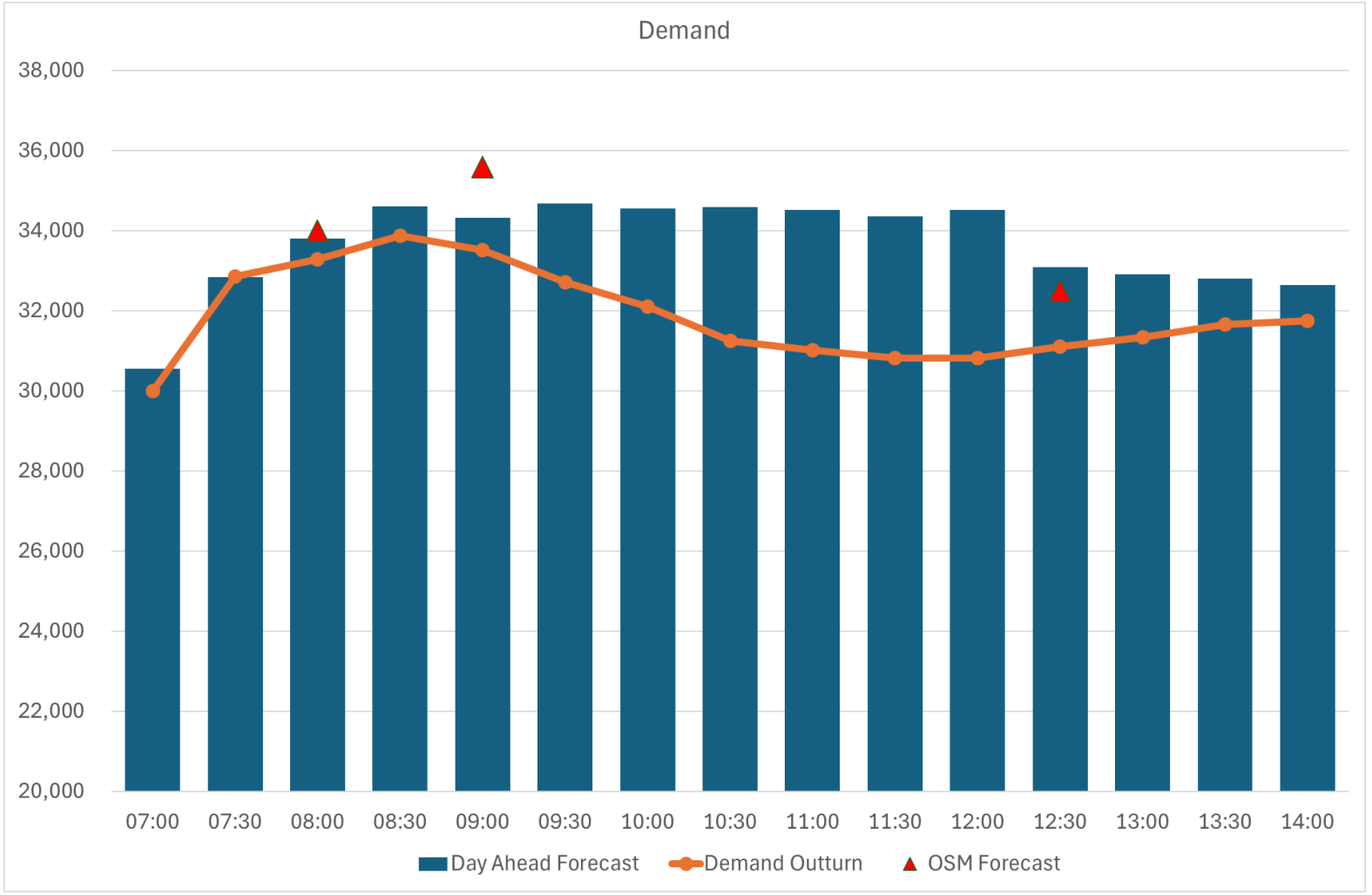




OBP used to manage batteries throughout the shift

- Fast Dispatch for frequency control e.g., following the large loss
- Target Dispatch for instructions 5-15 minutes ahead

Remainder of the Shift



- Demand continued to outturn below the forecast
- Suspected higher PV outturn than forecast
- Lower demand outturn, overall decaying demand and market position meant no replacement units were needed
- No more wind bids were needed after 10:11
- Tripped units returned at 12:00, 12:30 and 13:00

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Thank you

Any questions?

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Break

14:55 – 15:10

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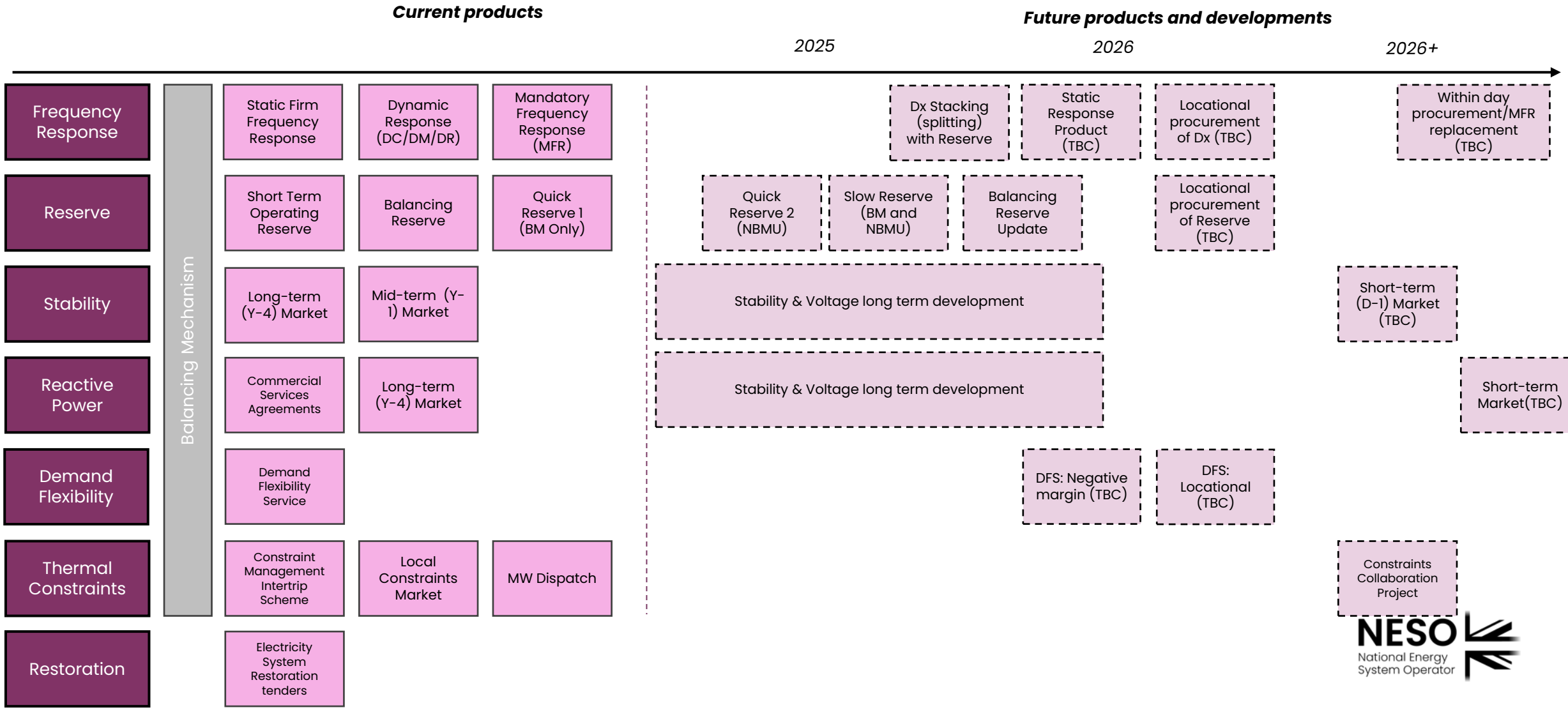
Market Services Update

Jon Wisdom, Head of Market Change Delivery

NESO
National Energy System Operator

Market and Ancillary Services – Overview and Roadmap

To operate a safe and secure power system, NESO procure a suite of ancillary services through designated markets and via Bid Offer Acceptances (BOAs) in the Balancing Mechanism.



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Balancing Services – Dynamic Response Current Service Design Status

	Needs case	Options assessment	Service design	Formal Consultation	Go Live
	**Engagement**				
Instructible Dynamic Response			★		
Static Response Reform		★			
Locational procurement		★			
30 Minute Service Window	★				
Stacking Response/Reserve	★				

Balancing Services – Instructible Dynamic Response

The draft Service Design was issued to industry in March 2025

Key considerations in the service design for instructible Dynamic Response:

Limits and Prices	Capability curves	Instructions and stacking	Performance Monitoring
Declare offerings for each service	Determine maximum available response	Instructions are open-ended	Performance targets aggregated
Commitments become firm at deadline	Adapt to other instructions, variable baselines	Splitting with day-ahead response	Transparency data published

Following industry feedback in a number of areas, but particularly in terms of submission deadlines and the design of payments. We are looking to evolve the service design further - we hope to update industry again later in June.

Balancing Services – Locational procurement of Response and Reserve

Drivers for Locational Procurement

- Constraints in the transmission network
- Constraints in the distribution networks
- Impact on stability / inertia

Locational Procurement Webinar
Wed, 9 Jul 2025 15:00 - 16:00 (UTC+00:00)

Provider Considerations

- Minimise business process disruption
- Unit Aggregation

Bidding and Dispatch Considerations

- Partial unit acceptance
- Fractional bids

Order and Pricing Considerations

- Clearing price definition
- Gaming risks

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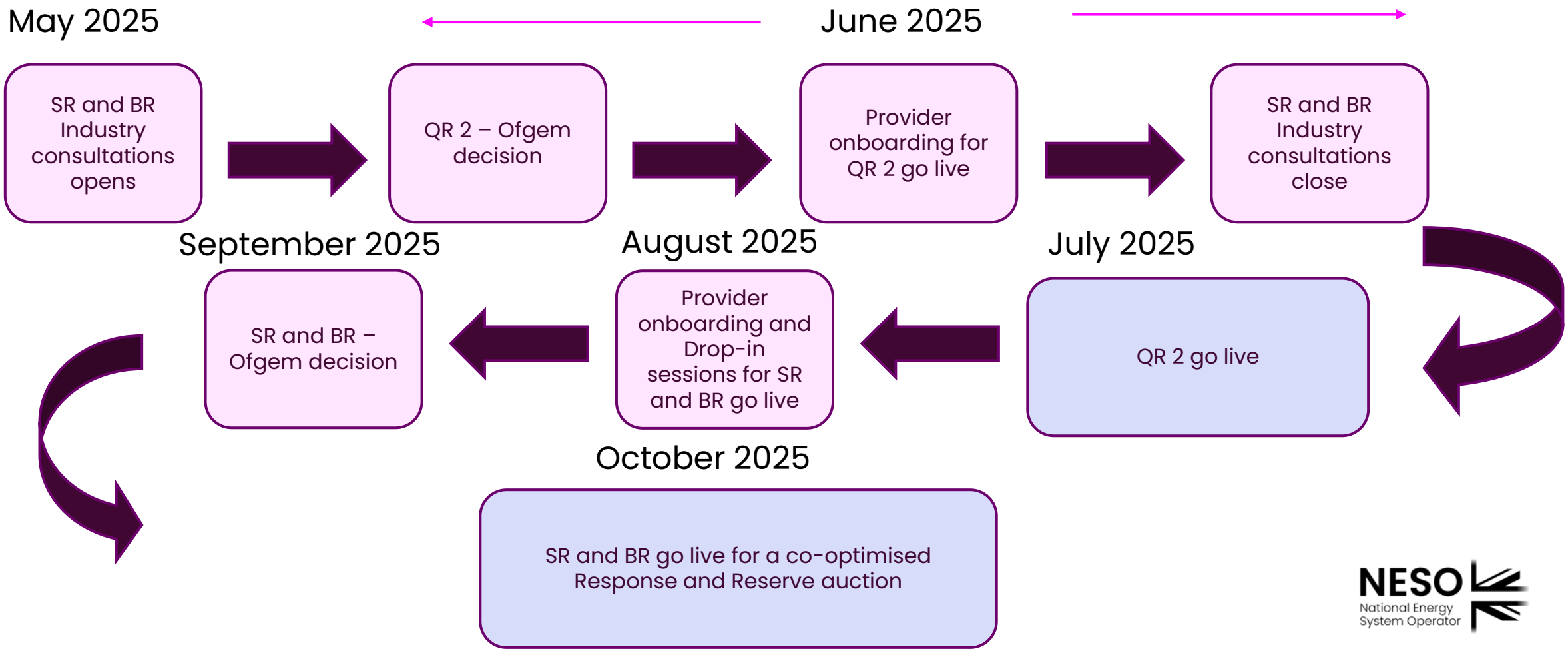
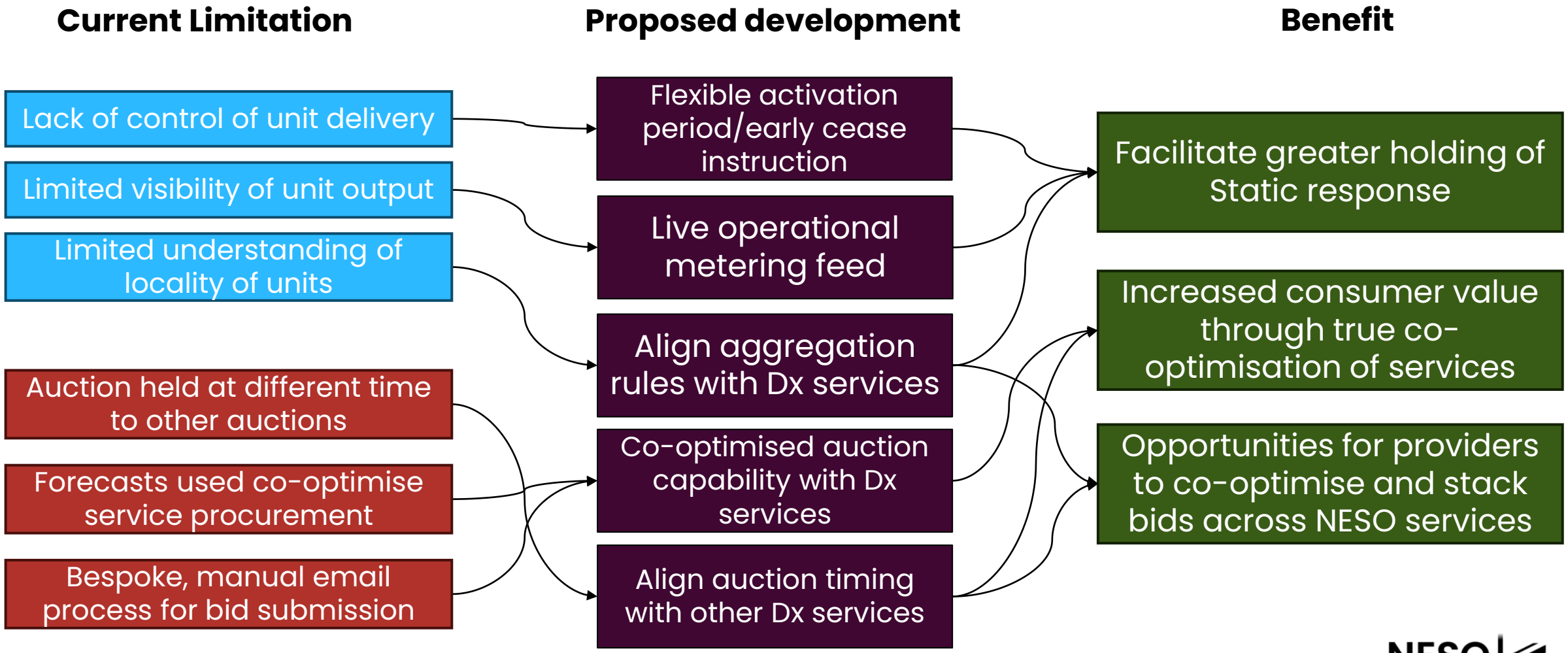
Reserve Reform timeline

Quick Reserve – Phase 2 (QR 2) / Slow Reserve (SR) / Balancing Reserve (BR)



Balancing Services – Static Response Reform



Beyond 2025

Neil Morgans, Principal Product Manager

NESO
National Energy System Operator

Beyond 2025: Roadmap Progress Update

Our Goal

A Strategic Roadmap for Future Balancing

Our Progress So Far

>250 Industry Stakeholders Engaged

>70 Capability Survey Responses

> 70 Balancing Programme Relationship Management Meetings

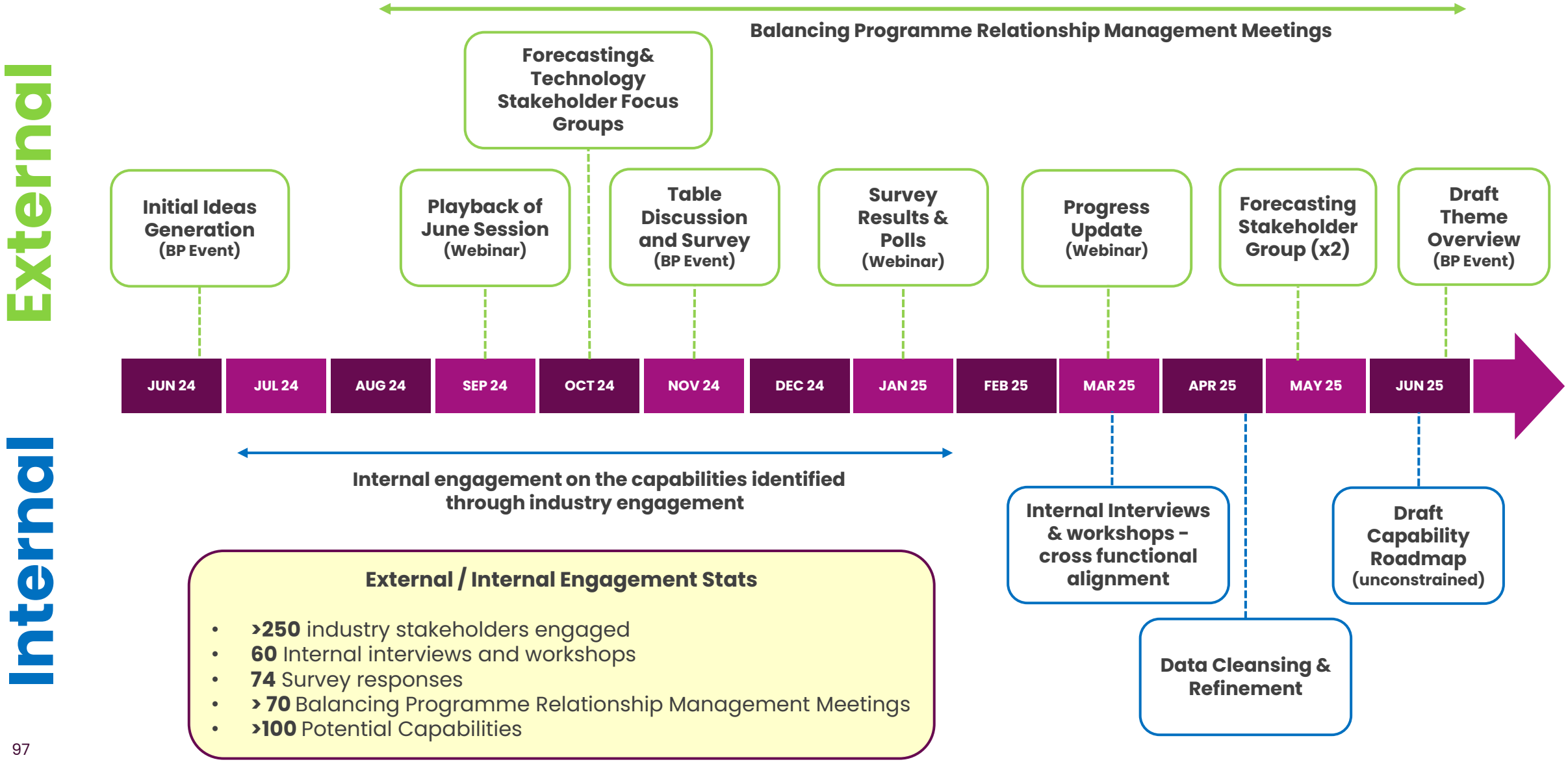
>60 Internal Interviews and Workshops

>100 Potential Capabilities Identified

Our Purpose Today

Sharing High-Level Themes and Outcomes

Building the Roadmap: Journey So Far



FY27 Foundational Capabilities & Early Strategic Wins

Future Energy Services

Key Developments:

- Market service enhancements integrated to balancing platform
- New inertia, voltage, fault level support sources integrated (OBP).

Key Outcomes:

- **Greater engagement** from wider participants, unlocking new flexibility.
- **Enhanced grid resilience** (stability, power quality, fault levels).

Enhanced Dispatch

Key Developments:

- Enhanced short-term constraint data integrated into OBP
- Initial AI exploration (Volta: scheduling, optimisation Proof of Concepts).

Key Outcomes:

- **Lower skip rates**, more precise, cost-effective real-time balancing & improved constraint management
- **Early validation of AI** for system optimisation.

Whole System & Flex

Key Developments:

- OBP scheduling & dispatch fully integrated (legacy systems retired)

Key Outcomes:

- **Streamlined balancing system,** greater flexibility, reduced operational complexity.
- Readiness for **future integration and expansion.**

Data & Transparency

Key Developments:

- Completion of core data systems integration within OBP, enabling increased interaction volume and enhanced flexibility in how data is accessed, shared, and consumed.
- Enhanced data & models on PEF

Key Outcomes:

- **Improved transparency**, interoperability, tailored data offerings.
- **Lower balancing costs** with richer & more accurate modelling

Please note: This is an indicative unconstrained high-level view of capabilities and not a delivery commitment. This also excludes REMA capabilities.

FY28
Expanding Flexibility & Coordination

Future Energy Services

Key Developments:
- OBP expands for diverse small-scale/demand-side flexibility
- Markets enabled for stacked/sequential, intraday services

Key Outcomes:
- **Increased utilisation** of distributed flexibility.
- New market revenue opportunities, **more efficient system balancing.**

Enhanced Dispatch

Key Developments:
- OBP enables non-integer dispatch
- Volta AI optimisation progresses beyond PoC

Key Outcomes:
- Demonstrated **AI-driven optimisation capability** in operations.
- **More precise & real-time balancing** via improved forecasting and automated dispatch

Whole System & Flex

Key Developments:
- Initial Primacy Rules integration into OBP

Key Outcomes:
- **Improved TSO-DSO coordination** and whole system decision-making.
- **Improved optimisation accuracy**, unlocking smaller-scale flexibility.

Data & Transparency

Key Developments:
- Enhanced price visibility across ancillary services
- Centralised operational data storage
- Improved DER visibility & enhanced renewable forecasting

Key Outcomes:
- More **transparent pricing and robust audit processes**.
- **Greater data integrity** for market monitoring.

Please note: This is an indicative unconstrained high-level view of capabilities and not a delivery commitment. This also excludes REMA capabilities.

FY29 Embedding Intelligence & System Optimisation

Future Energy Services

Key Developments:

- Operational data available to new Restoration Decision Support Tool
- Local procurement of response/reserve services enabled

Key Outcomes:

- **Enhanced restoration decision-making**, faster system recovery.
- **Improved balancing efficiency**, reduced reliance on costly national actions.

Enhanced Dispatch

Key Developments:

- AI-enabled optimisers deployed in OBP
- Advanced network modelling (incl. DNO data) into OBP

Key Outcomes:

- **More economic & secure national dispatch** via intelligent optimisers.
- **Reduced constraint costs**, improved coordinated system optimisation.

Whole System & Flex

Key Developments:

- Advanced network modelling enhances control room decision-making
- TIDE project enhances availability/quality of DER data.

Key Outcomes:

- **Improved operational decision quality** from richer network insights.
- **More accurate DER forecasts**, supporting improved system planning.

Data & Transparency

Key Developments:

- Control room decision rationale capture standardised

Key Outcomes:

- Improved accountability, knowledge sharing, & auditability.

 Please note: This is an indicative unconstrained high-level view of capabilities and not a delivery commitment. This also excludes REMA capabilities.

FY30/31 Delivering a Scalable & Future-Ready System

Future Energy Services

Key Developments:

- Optimised DC flow management capabilities (OBP)
- Full integration of TIDE project outcomes into OBP (DER/CER participation)

Key Outcomes:

- **Enhanced DC network capacity utilisation & efficiency.**
- **Maximises value of distributed/consumer flexibility.**

Enhanced Dispatch

Key Developments:

- AI-driven Control Room visualisation tools enhanced
- OBP optimisation engine upgraded (advanced solvers)

Key Outcomes:

- More **intuitive grid insights** for operators.
- **Faster, effective decision-making** in complex conditions.

Whole System & Flex

Key Developments:

- OBP scaled for up to 10,000 BMUs
- Advanced AI models for forecasting distributed/consumer flex

Key Outcomes:

- **Full OBP scalability for market growth**, future-proofs operations

Data & Transparency

Key Developments:

- Full tracking for operator decision timelines (OBP)
- Advanced AI models improve consumer flex forecasting

Key Outcomes:

- **Enhances transparency, accountability, & post-event review.**
- **Improved operational planning** via reliable flex forecasts.

Please note: This is an indicative unconstrained high-level view of capabilities and not a delivery commitment. This also excludes REMA capabilities.

Building the Roadmap: Next Steps

External

Internal

Ofgem final decision on enduring framework

Publication of draft business plan

Draft Theme Overview (BP Event)

Update on Business Plan (Webinar)

Review Roadmap (BP Event)

JUN 25 | JUL 25 | AUG 25 | SEP 25 | OCT 25 | NOV 25

Sizing, Dependency Analysis, narrative and Benefits

Draft Capability Roadmap (unconstrained)

NESO National Energy System Operator

Public

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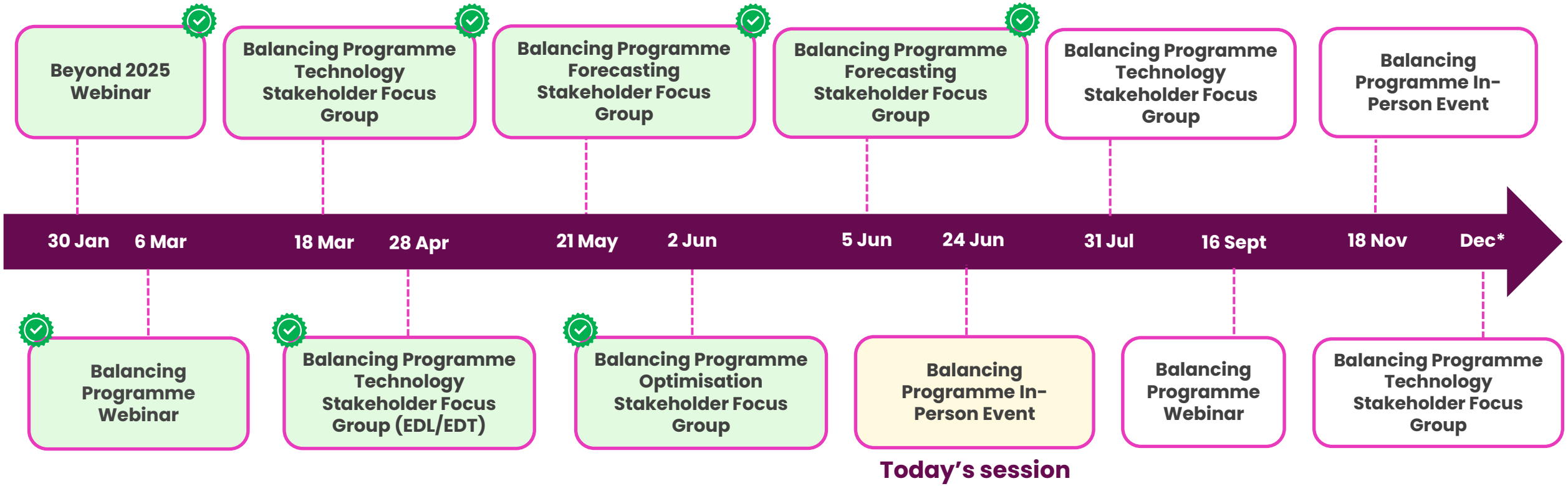
Q&A

NESO
National Energy System Operator

2025 External Engagement Timeline



Balancing Programme **relationship management meetings** throughout 2025 & **external NESO newsletters 'Energising Progress'** with Balancing Programme content issued regularly, providing updates between online & in-person events.

Next Steps

We welcome your feedback & questions – please get in contact with us at **box.balancingprogramme@neso.energy**

Slides from today's session will be published on our website.

Subscribe to our new NESO newsletter 'Energising Progress' **here** - please select **Future of Balancing Services inc. Balancing Programme** to keep up to date.

Sign-up to our Stakeholder Focus Groups for Optimisation, Technology, & Forecasting - **Balancing Programme Stakeholder Focus Groups.**

If you are interested in a regular meeting with a representative from the Programme and would like more information, please get in contact using the email address above.

NESO
National Energy System Operator

Balancing Programme September 2025 Webinar

Date: 16 September 2025

Time: 11:00 – 12:30pm

Location: Microsoft Teams

We will share the latest on our Balancing and Forecasting capabilities planned for delivery into the Control Room and provide an update on progress to shape our capabilities beyond 2025 using Industry input.

A more detailed agenda will be shared closer to the webinar

To sign up to the event, click **here** or scan the QR code below

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Balancing Programme Event

24 June 2025

Thank you – have a safe journey onward

NESO
National Energy System Operator