Dispatch Transparency Event

2 June 2023
Dispatch Transparency Event
Cathy Fraser
Systems, Support and Insight Manager
Q & A – Sli.do code #ESODispatch

Please visit www.sli.do and enter the code #ESODispatch to ask questions throughout the event.

We ask that you enter your full name or organisation in Sli.do so that we can follow up directly for any specific questions.

Please note that given the time available and the facilities within the webinar format we will be prioritising questions on the content shared during the session.

We will answer as many questions as possible in the Q&A at the end of the session. We may have to take some questions away in order to consult our expert colleagues. We are intending to publish the Q & A from this event on our website alongside those from the weekly Operational Transparency Forum. If you would prefer your question is not published please make this clear in Sli.do

If there are questions or expectations which go beyond the immediate scope of this event we will endeavour to refer the questioner to the appropriate team or expert within the ESO, or provide contact details for an external organisation where needed.
The objective today is to provide a deep dive into how we currently make dispatch decisions including what skips are, how we share our decision making, and to share our plans for the future of dispatch

Welcome and introduction

Cathy Fraser

09:30 – 09:40

How the ESO currently dispatch

Will Ramsay

09:40 – 10:10

The future of dispatch

Bernie Dolan

10:10 – 10:25

Current ESO Dispatch Transparency methodology

Will Ramsay

10:25 – 10:40

Comfort break

All

10:40 – 10:50

Q&A

Cathy Fraser & Alex Knight

10:50 – 11:30
Question

Please answer the question which will appear on your screen:

On a scale from 0 to 10 how well do you feel you understand how the ESO dispatches?
What is a “skip rate”? 

- A skip is a BOA (Bid Offer Acceptance) instruction sent by the ESO Control Room to increase or decrease the output of a generator but **at a price that was higher than an alternative option**. The ESO “skipped” an option that appears to be more economic.
- Skip Rate generally refers to **the number of times a skip occurs** in a given period such as a day.

Why worry about skips?

- The ESO has a licence condition to operate efficiently and economically and a target to reduce the balancing cost as much as possible.
- There are genuine skips where alternative instructions could have been sent for a lower cost. However, most actions that appear to be skips in data analysis are taken for operational reasons and are not preventable.
- The ESO strives for zero preventable skips.
How the ESO dispatches
Will Ramsay
Operational Manager
ESO Dispatch Overview

- Overview of scheduling process
- Risk management in dispatch process
- Example of most common source of uncertainty in dispatch timescales
Demand profile

The balancing process starts with the demand forecast
Greater confidence in the forecast leads to more efficient planning and dispatch
Scheduling – Energy and margin

**Expected Maximum**
Total maximum output for scheduled BMUs, after adjustments

**Expected Operating Level**
Total scheduled BMU PNs and additional BMUs at SEL, after adjustments

**Expected Minimum**
Total minimum output for scheduled BMUs, after adjustments

- **Positive Reserve Requirement**: ≥
- **Demand**: ≈
- **Negative Reserve Requirement**: ≤
Scheduling – Energy and margin
Scheduling – Energy and margin

Day A
Market short vs demand forecast and additional positive margin required
Target – lowest energy price
Schedule Gen 1

Day B
Market satisfying demand forecast but additional positive margin required
Target – lowest committed cost
Schedule Gen 2

Gen 1
£120/MWh

Gen 2
£150/MWh

Demand
Positive Reserve Requirement
Negative Reserve Requirement

Energy shortfall
Margin shortfall

Schedule Gen 1

Schedule Gen 2
Scheduling – Energy and margin

Day A
Market short vs demand forecast and additional positive margin required
Target – lowest energy price
Schedule Gen 1

Day B
Market satisfying demand forecast but additional positive margin required
Target – lowest committed cost
Schedule Gen 2
Scheduling – Energy and margin

Generally short – additional energy required

Significant variation on ramp – additional margin required

Demand & reserve requirement

Demand & reserve requirement

Market notifications

Reserve requirement

Market imbalance

Generally short – additional energy required

Demand
Operational Roles in the Control Room

Simplified overview of roles and responsibilities over time

- **Strategy Team**
  - T-24h+

- **Energy Team**
  - T-8h
  - T-4h

- **Transmission Team**
  - T-1h
  - RT

- **Planning and trading**
  - Operational Strategy Manager
  - Energy Strategy Engineer
  - Energy Optimisation Engineer

- **Generation optimisation and dispatch**
  - Operational Energy Manager
  - National Balancing Engineer
  - Zonal Balancing Engineer (x2)

- **Network security and optimisation**
  - Transmission Analysis Engineer (x2)
  - Transmission Security Manager
  - Transmission Security Engineer (x6)
Operational Roles in the Control Room

Simplified overview of roles and responsibilities over time

Strategy Team

Energy Team

T-24h+ T-8h T-4h T-1h RT

Operational Strategy Manager
Energy Strategy Engineer
Energy Optimisation Engineer

Operational Energy Manager
National Balancing Engineer
Zonal Balancing Engineer (x2)

Plan handover

Strategy Timescales
Energy Timescales

Scheduling
Dispatch

Planning and trading
Generation optimisation and dispatch
Planning horizons

24 hours
Planning horizons overlap and interact
Dispatch – Risk Management
Energy Balancing

SORT Zones
- North
- N Wind
- South
- S Wind
- IC
- PS
- STOR
- Small BMUs

Zone

CCL

BOA

Zone Prog

Nat Prog

Pred

National

Outturn

Pred

Nat Prog

Σ
As conditions change in real-time, the National Balancing Engineer will revise the programmes in each zone.

The Zonal Balancing Engineers send BOAs to reach programme, but must leave flexibility to adapt to programme changes without having to unwind previous instructions.

Meanwhile, they must also maintain constraints, response requirements, reserve allocation, monitor generation and market changes, take operational calls…
Sources of Uncertainty

Wind generation output, especially in ‘variable’ and ‘cut-out’ conditions

Active generators outside the balancing mechanism, which do not provide the ESO with any visibility or control
Energy Balancing

Zone programme – instruction from National Balancing Engineer to Zonal Balancing Engineer (ZBE)

Capped Committed Level (CCL) = FPN + BOAs, capped by MEL

ZBE sends BOAs so that CCL matches zone programme
Energy Balancing

No BOAs required in wind zone so CCL remains equal to FPN

Wind programme updated to match real-time metering +/- projected change

Conventional programme updated to compensate

BOAs issued on conventional units to meet new programme, with the risk of having to unwind prior instructions
Energy Balancing

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Energy Balancing

Wind Zone

No BOAs required in wind zone so CCL remains equal to FPN

Wind programme updated to match real-time metering +/- projected change

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Future of Dispatch
Bernie Dolan
Principal Product Manager
Balancing Transformation

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Balancing Programme Engagement event

• On the 15th June the Balancing Programme will be hosting their next engagement event in London.
• As part of our ongoing commitment to keep you, our stakeholders, informed of our progress to transform our balancing capabilities and continue to ensure our roadmap for the future has your input and meets your needs.
• The details of the event are below:

  **Date:** 15th June  
  **Time:** 09:00 – 16:30  
  **Venue:** Hilton London Paddington, 146 Praed St, London, W2 1EE

Registration is now closed but if you have any questions please get in touch by email to:  
[.box.balancingprogramme@nationalgrideso.com](mailto:.box.balancingprogramme@nationalgrideso.com)
Skips - Root Cause

<table>
<thead>
<tr>
<th>Reason Group</th>
<th>Caused by:</th>
<th>Improve:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Time to make decisions</td>
<td>User Experience / Manual workarounds</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Complexity of decisions</td>
<td>Situational awareness</td>
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<tr>
<td>Incomplete</td>
<td>Efficiency of dispatch process</td>
<td>Better dispatch advice</td>
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<tr>
<td>Zonal Management</td>
<td>Legacy processes</td>
<td>Dispatch mechanism</td>
</tr>
<tr>
<td>Reason not auto assigned</td>
<td>Accuracy of participant's data</td>
<td>Capture required data</td>
</tr>
<tr>
<td></td>
<td>Unavailability of contextual information</td>
<td>Processes and policies</td>
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</tbody>
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Skip Rates – Approach to System Changes

- Automating & simplifying time consuming, manual processes
- Improving Situational Awareness
- Improving dispatch advice
- Process Improvements
- These changes give users additional time and improved information to facilitate merit order dispatch

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Current system improvements to address skip rates

**Release 0 - Winter 21**
- Flex Flag: Enabling dispatch advice to make better use of small BMUs
- Power Available: Changes to dispatch advice to prevent unnecessary Wind pullbacks

**R1 - Spring 22**
- Automatic Instruction Repeater (AIR)
- Reducing manual work for dispatch engineer

**R2 - Winter 22**
- Situational Awareness: Visibility of BOAS per constraint
- New screens to enable quick dispatch of bi-directional units

**R3 – Spring 23**
- Battery Zone
- Find cheapest battery units & instruct to the edge of each price band
- View forecast profile separate from dispatch advice

**R4 – Winter 23**
- Quick nav from price stack to BOA instruction
- Reduction of ‘Nuisance’ Alarms
- Visibility of metering overrides
- ‘Auto fill’ metered wind
- Reducing clicks needed to accept programme

**OBP Release 1 – Winter 23**
- Bulk dispatch
- Enhanced user experience
- Better economic decisions, reduced workload in control room

Previous releases

Future releases
Skip Rates - Benefits delivered

- 12,000 hours per year of control room time is being saved as a result of removed workarounds releasing time to make better decisions.

- 80% reduction in Zonal Balancing Engineer workload during busy times due to implementation of Automatic Instruction Repeater (AIR).

- 40% estimated performance improvement of EDL and EDT as a result of system improvements so no need to phone control points.

- Improved situational awareness and user experience achieved by various incremental usability changes across systems.

- Changes to metering visibility due to overrides resulting in better quality of data and improved situational awareness.
Progress Update on OBP – Release 1.0

• Following the principles of Scaled Agile the new Open Balancing Platform is being developed using Program Increments (PIs)
• We have now completed PI7 (in April) and are now into PI8
• During PI10 we will make our first production release (Dec 2023)

GOAL

A Zonal Balancing Engineer will be able to bulk dispatch fast acting units (“Small BMU” zone) without breaking constraints

Benefits

Reduction in skip rates, better economic decisions, reduced workload in the control room
Our new system makes no distinction between BMUs and non-BMUs – all information is viewed together. Control engineers will not have to look in disparate systems for the information they need.

Our intention is to co-optimise all services in one place. Different services will be “harmonised”, then optimised together, then “de-harmonised” for different instruction types.

We want to increase transparency and so a key feature of new optimisation tools is to make certain the tool gives reasons for decisions which can be shared.
OBP - After Bulk Dispatch

OBP will allow services to be dispatched from one tool. This reduction in workload will allow the control room time to execute decisions.

Services will be configurable. We intend to implement this as a business rules engine – essentially, we have a “super contract” with different attributes that can be turned on and off. We have already implemented a “service X” to test this. The aim is to reduce the time to get services established and eliminate the need for manual process in initial deployment.

BM/NBM combined dispatch

All assets can be part of all services from start.
OBP - After Bulk Dispatch

OBP will cater for a larger number of units
The new design moves away from the use of tables etc and presents information in a superior visual fashion
Our current systems are based on the paradigm of units at GSPs – OBP is not

We will deliver training facilities to help improve the quality of decisions we make
Replaying “difficult days” will help to further improve dispatch decisions
It would also be helpful to allow external parties to come and use these facilities so they can better understand the challenges

Increased number of units /aggregation

Training Simulators
ESO Dispatch Transparency Methodology

Will Ramsay

Operational Manager
Filter Bid-Offer Acceptances

Reasons for accepting a bid or offer that appears not to be in merit at the time:

1. **System management**
   - Thermal, voltage or stability constraints
   - Maintain minimum system inertia

2. **Frequency response**
   - Repositioning BMU to provide frequency response

3. **Unit commitment**
   - To access to a BMU at another time, it needs to be/remain synchronised

4. **Frequency control**
   - Fast, short burst of energy required to manage a frequency variation
Filter Bid-Offer Data

Reasons for not accepting a bid or offer that appears to be in merit at the time:

1. System management
   Bid/offer would oppose system-flagged offer/bid in same region

2. Frequency response
   BMU armed for frequency response

3. No available volume
   Volume in the stack may not be accessible (MEL, SEL, MIL, deemed bids)

4. Unit commitment
   The requirement at the time of the instruction may not be compatible with the dynamic parameters of potential alternatives
Risk management

Ex-post analysis of actions will struggle to identify risk management actions, which tend to relate to units’ dynamic parameters and unit commitment.

1. Avoiding sterilising options
   - Unit ‘A’ (£110/MWh) is not strictly required right now
   - Allowing unit ‘A’ to desync will make it unavailable for its MZT
   - There might be a requirement for Unit ‘A’ and Unit ‘B’ soon
   - If the need for A+B does not materialise, Unit ‘B’ (£100/MWh) is not instructed
   - Unit ‘A’ is subsequently allowed to desynchronise

2. Managing flexibility
   - In some circumstances, slow/expensive actions may need to be committed early, so that flexible capacity is not exhausted when it is needed
   - This works both ways, in most circumstances, slow and expensive actions will be avoided if possible
Data quality examples (1)

1. SEL > MEL
2. Generating without a physical notification
3. PN inconsistent with dynamic run-up and run-down rates
Data quality examples (1)

Error stacking leads to large energy shortfalls/surpluses, frequency volatility and results in the need for corrective balancing actions.
Data quality examples (2)
Data quality examples (2)

<table>
<thead>
<tr>
<th>Pair</th>
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<th>Bid</th>
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<tbody>
<tr>
<td>+1</td>
<td>£100</td>
<td>£85</td>
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<tr>
<td>-1</td>
<td>£90</td>
<td>£80</td>
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Data quality examples (2)

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Pair: SP20

<table>
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Pair: SP22

FPN

Advance sync

Delayed desync

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Data quality examples (2)

Offer prices for SP21 make **Advance Sync** and **Delayed Desync** options unviable, despite attractive prices in the adjacent settlement periods.

There is no need to use high prices to prevent offer acceptances above MEL.
Settlement period boundaries
Settlement period boundaries
Settlement period boundaries

VWA Price $\leq 110\,\text{MWh}$

$< 115\,\text{MWh}$
Comfort Break
Q&A
Audience Q&A Session

① Start presenting to display the audience questions on this slide.
What happens next?

- We will publish material and Q&A from today on our website and advise you and the OTF where to find them.

- If you answer “yes” to question 4 on the next slide, we will send you a survey request asking for your feedback on today’s event and providing an opportunity to comment on the ESO approach to Dispatch Transparency and give us your suggestions for the changes you would like to see.

- We will use your responses to help inform our continuing efforts to increase transparency and understanding of our dispatch decisions.
Our request of you from today

We need your help to improve what we are doing on Dispatch Transparency, please answer the four questions which will appear on your screen:

1. Now you have attended this event, how well do you feel you understand how the ESO dispatches?

2. On a scale of 0 to 10 how likely are you to recommend future ESO Dispatch Transparency events to your colleagues?

3. Why?

4. Are you willing to complete a more detailed post-event survey asking for your feedback on today’s event and providing an opportunity to comment on the ESO approach to Dispatch Transparency and suggestions for the changes you would like to see?
Thank you for joining us