September Reserve Webinar

23 September 2024

ESO

Monthly Reserve webinars

We will be running a series of monthly webinars to update progress across the ESO services of Balancing, Quick and Slow Reserve.

We hope to use these sessions to keep stakeholders informed of progress, give an update on expected timelines and the opportunity for a deep dive into certain topics. We will update on expected topics through our usual channels.

We would welcome any feedback and questions during the session using the Q&A function, to contact the team directly or for suggestion on topics to cover in future webinars please contact us at box.futureofbalancingservices@nationalgrideso.com

To sign up for our weekly quick reserve drop-in sessions, starting this Thursday 26 Sept covering onboarding requirements, sandbox and mock auctions see the events tab here

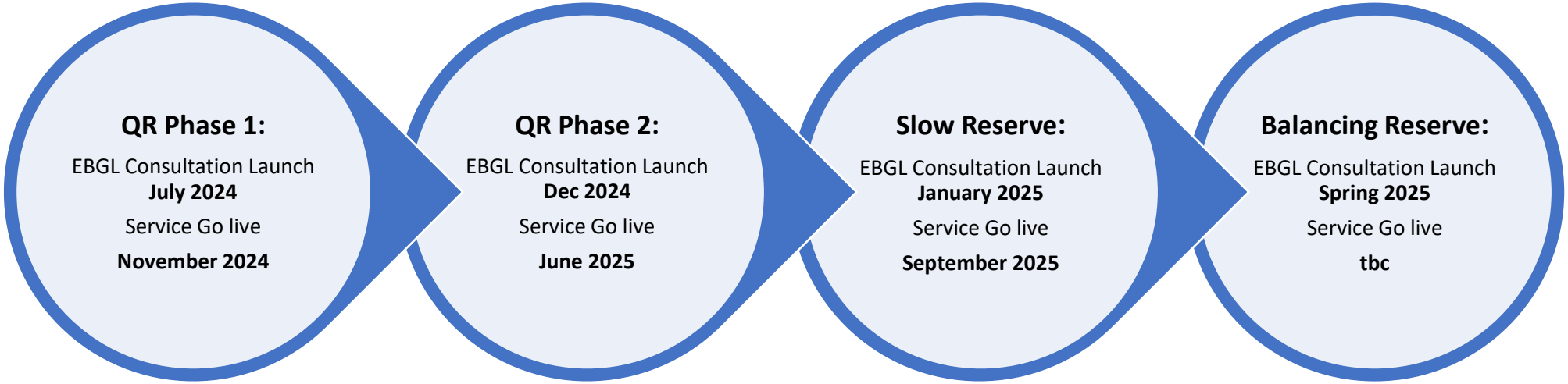
For upcoming Reserve webinars sign up in the events tab here

Agenda

- **Quick And Slow Reserve**
  - **Updates and proposed service designs**

- **Balancing Reserve**
  - **Timeline for implementation of Incremental Volume Cost (IVC)**
  - **How is the IVC calculated including examples**
  - **Dispatch Flexibility review methodology**
  - **Service stacking**

Reserve EBR Consultation Plan



Informal consultations on Quick and Slow Reserve Designs across October

Industry engagement ongoing on the new OBP interface - replacement for ASDP/PAS

Quick Reserve – Proposed Technical & Procurement Service Design (Phase 2)

Technical Design Element	Quick Reserve Proposal
Direction	Positive and Negative
Minimum Contract Size	1 MW
Time to full delivery	Up to 1 minute from instruction
Minimum Activation Period	Up to 5 minutes
Maximum Recovery Period	Up to 3 minutes
Energy Requirement	Unit must be able to deliver the full contracted capacity per Service Window
Operational Metering	1 Hz
Dispatch mechanism	BOAs via EDL/EDT or wider access equivalent or **OBP NBM platform dispatch instruction** and control/system telephony as alternative dispatch solution during contracted windows
Notice to Start Ramping	0 minutes
Ramp rates	No maximum ramp up or ramp down rates. Minimum ramp-up and ramp-down rate to be in line with Time to Full Delivery.
Performance Metering	**1Hz**
Performance Monitoring	Time to Full Delivery, Availability and Utilisation - Penalties for over (>120%) & under (95%) delivery
Baselining	**Physical Notifications or equivalent 24 hours in advance for all providers** final at 60 mins ahead of Settlement Period. Both zero and non-zero baselines
Aggregation	Allowed, per GSP group
Operational data	BM units as per current BM operations **NBM units to submit BM-like operational data**
Passing through zero	Allowed
Ramp rates for baselines	Aligned with Dynamic Response markets

Procurement Design Element	Quick Reserve Proposal
Service Window	**30-minute (Settlement Period) blocks**
Maximum Bid Size	300 MW
Frequency of Procurement	Daily – Firm procurement Within day – optional procurement
Locationality	National
Auction Platform	EAC
Auction Timing	**Results by D-1 14:00**
Stacking & Splitting	Same MW cannot be sold twice. Splitting allowed between **Response and opposite Reserve services**. Stacking with CM, BM, stability and voltage services.
Bid Sizing	Above or equal 1MW
Linking of bids	Yes, by Service Window and Product (Positive QR and Negative QR only)
Bid Curtailment Rules	User defined
Payment Structure	Firm: Availability + Utilisation Optional: Utilisation only
Payment Mechanism	Availability: Pay-as-Clear Utilisation: Pay-as-Bid through BOAs **or OBP dispatch mechanism**

Slow Reserve – Proposed Technical & Procurement Service Design

Technical Design Element	Slow Reserve Proposal
Direction	Positive and Negative
Minimum Contract Size	1 MW
Time to full delivery	Up to 15 minutes from instruction
Minimum Activation Period	Up to 30 minutes
Maximum Recovery Period	Up to 30 minutes
Energy Requirements	Unit must be able to deliver the full contracted capacity per Service Window
Operational Metering	**0.0667Hz / once per 15s**
Dispatch mechanism	BOAs via EDL/EDT or wider access equivalent or **OBP NBM platform dispatch instruction** and control/system telephony as alternative dispatch solution during contracted windows
Notice to Start Ramping	Up to 14 minutes
Time to accept instruction	Up to 2 minutes
Ramp rates	Max ramp rates ≤100% contracted capacity/minute. For max instantaneous ramp rates, unit cannot deliver >50% contracted capacity in any 30s ramping period. Min ramp-up and ramp-down rate to be in line with Time to Full Delivery, incl. notice to start ramping
Performance Metering	**0.0667Hz / once per 15s**
Performance Monitoring	Time to Full Delivery, Availability, Ramp rates, Utilisation - Penalties for over (>120%) & under (95%) delivery
Baselining	**Physical Notifications or equivalent 24 hours in advance for all providers** final at 60 mins ahead of Settlement Period. Both zero and non-zero baselines
Aggregation	Allowed, per GSP group
Operational data	BM units as per current BM operations **NBM units to submit BM-like operational data**
Passing through zero	Allowed
Ramp rates for baselines	Aligned with Dynamic Response markets

Procurement Design Element	Slow Reserve Proposal
Service Windows	**Minimum 2 hours at 30-minute granularity**
Maximum Bid Size	N/A
Frequency of Procurement	Daily – Firm procurement Within day – optional procurement
Locationality	National
Auction Platform	EAC
Auction Timing	**Results by D-1 14:00**
Stacking & Splitting	Same MW cannot be sold twice. Splitting allowed between Response and opposite Reserve services. Stacking with CM, BM, stability and voltage services.
Bid Sizing	Above or equal 1MW
Linking of bids	Yes, by Service Window and Product (Positive SR and Negative SR only)
Bid Curtailment Rules	User defined
Payment Structure	Firm: Availability + Utilisation Optional: Utilisation only
Payment Mechanism	Availability: Pay-as-Clear Utilisation: Pay-as-Bid through BOAs **or OBP dispatch mechanism**

Incremental Volume Cost (IVC): Overview

During the ESO's weekly Operational Transparency Forum (OTF) on 14 August we presented our intentions to begin levying the Incremental Volume Cost (IVC) to change the behaviour of contracted BR units to ensure that our control room engineers can rely on them at the same level as they rely on other units within their scheduling processes today. We are optimistic that these changes will improve the failure rate on BR contracts substantially – we have already seen a lot of improvement since Month 1 of BR as contract holders get used to the market and the new ways of operating and bidding in their assets.

The IVC will be:

1. Applied automatically via updates to our settlements tool.

2. Use a new concept of "Commercial Unavailability" which will be determined based on rules that use the contracted BR volume and MEL, MIL, SEL, SIL and PA data where applicable.

3. Be calculated using a dataset published on the ELEXON website and follow a set of rules to identify a subset of actions which are relevant for the IVC calculation according to the BR contracts

Note: The IVC in the BR contracts acts as a **cap** on liabilities and therefore the IVC that we are using in our automated approach is less than or equal to the IVC cap.

Getting this right will enable us to increase the volumes of BR we aim to procure through the market to fill more of our reserve requirement and deliver greater value for the end consumer.

Useful links:
OTF presentation on BR – find the slides and webinar recording from the 14 August and 22 May OTFs.
BR service terms
BR guidance document
ELEXON detailed system prices dataset

Commercial Unavailability - PBR

Performance Monitoring of Availability (EoD code "AVAIL")

A contracted unit should be able to demonstrate 100% of contracted Positive Balancing Reserve (headroom) or Negative Balancing Reserve (footroom). Failure to demonstrate the contracted availability will trigger an Event of Default (EoD). When a reserve unit triggers an EoD, it will forfeit Availability Payment for all the relevant Committed Windows.

Where a unit fails the availability check we will determine whether the unit was *Technically Unavailable* or *Commercially Unavailable*.

Where the unit fails the availability check **and** is Commercially Unavailable then the Incremental Volume Cost penalty will be applied.

Positive Balancing Reserve

For a generator (or a unit with only positive output)

Where MEL – FPN < Contracted Quantity and;

MEL – SEL < Contracted Quantity → *Technical Unavailability;*

MEL – SEL ≥ Contracted Quantity → *Commercial Unavailability*

For a supplier (or a unit with only negative output):

Where SIL – FPN < Contracted Quantity and;

SIL – MIL < Contracted Quantity → *Technical Unavailability;*

SIL – MIL ≥ Contracted Quantity → *Commercial Unavailability*

For a "through-zero" unit:

Where MEL – FPN < Contracted Quantity and;

MEL – MIL < Contracted Quantity → *Technical Unavailability;*

MEL – MIL ≥ Contracted Quantity → *Commercial Unavailability*

For a Power Park Module powered by an Intermittent Power Source:

Where PA – FPN < Contracted Quantity and;

PA – SEL < Contracted Quantity → *Technical Unavailability;*

PA – SEL ≥ Contracted Quantity → *Commercial Unavailability*

Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, SIL – Stable Import Limit, PA – Power Available.

Commercial Unavailability - NBR

Performance Monitoring of Availability (EoD code "AVAIL")

A contracted unit should be able to demonstrate 100% of contracted Positive Balancing Reserve (headroom) or Negative Balancing Reserve (footroom). Failure to demonstrate the contracted availability will trigger an Event of Default (EoD). When a reserve unit triggers an EoD, it will forfeit Availability Payment for all the relevant Committed Windows.

Where a unit fails the availability check we will determine whether the unit was *Technically Unavailable* or *Commercially Unavailable*.

Where the unit fails the availability check **and** is Commercially Unavailable then the Incremental Volume Cost penalty will be applied.

Negative Balancing Reserve

For a generator (or a unit with only positive output):

Where FPN – SEL < Contracted Quantity and;

MEL – SEL < Contracted Quantity → *Technical Unavailability;*

MEL – SEL ≥ Contracted Quantity → *Commercial Unavailability*

For a supplier (or a unit with only negative output):

Where FPN – MIL < Contracted Quantity and;

SIL – MIL < Contracted Quantity → *Technical Unavailability;*

SIL – MIL ≥ Contracted Quantity → *Commercial Unavailability*

For a "through-zero" unit:

Where FPN – MIL < Contracted Quantity and;

MEL – MIL < Contracted Quantity → *Technical Unavailability;*

MEL – MIL ≥ Contracted Quantity → *Commercial Unavailability*

For a Power Park Module powered by an Intermittent Power Source:

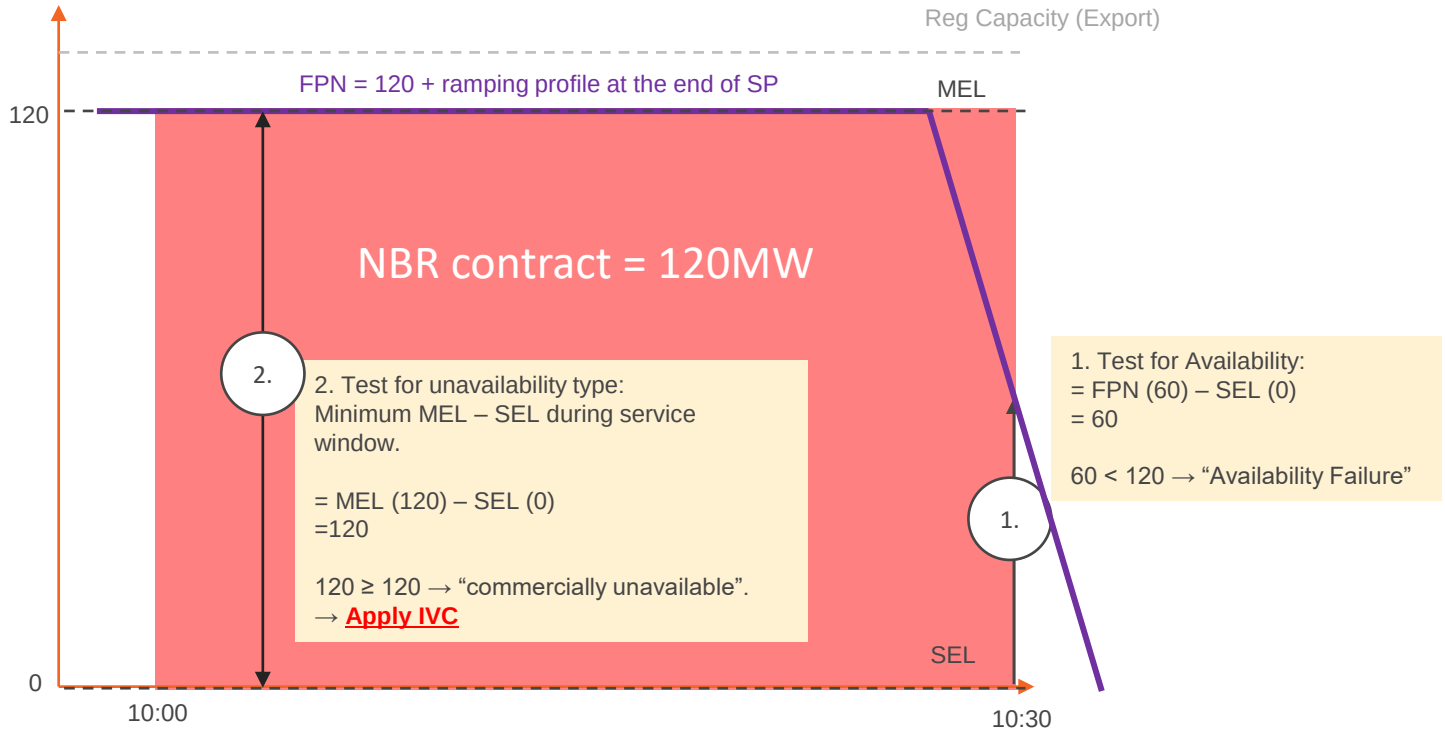
Where FPN – SEL < Contracted Quantity and;

PA – SEL < Contracted Quantity → *Technical Unavailability;*

PA – SEL ≥ Contracted Quantity → *Commercial Unavailability*

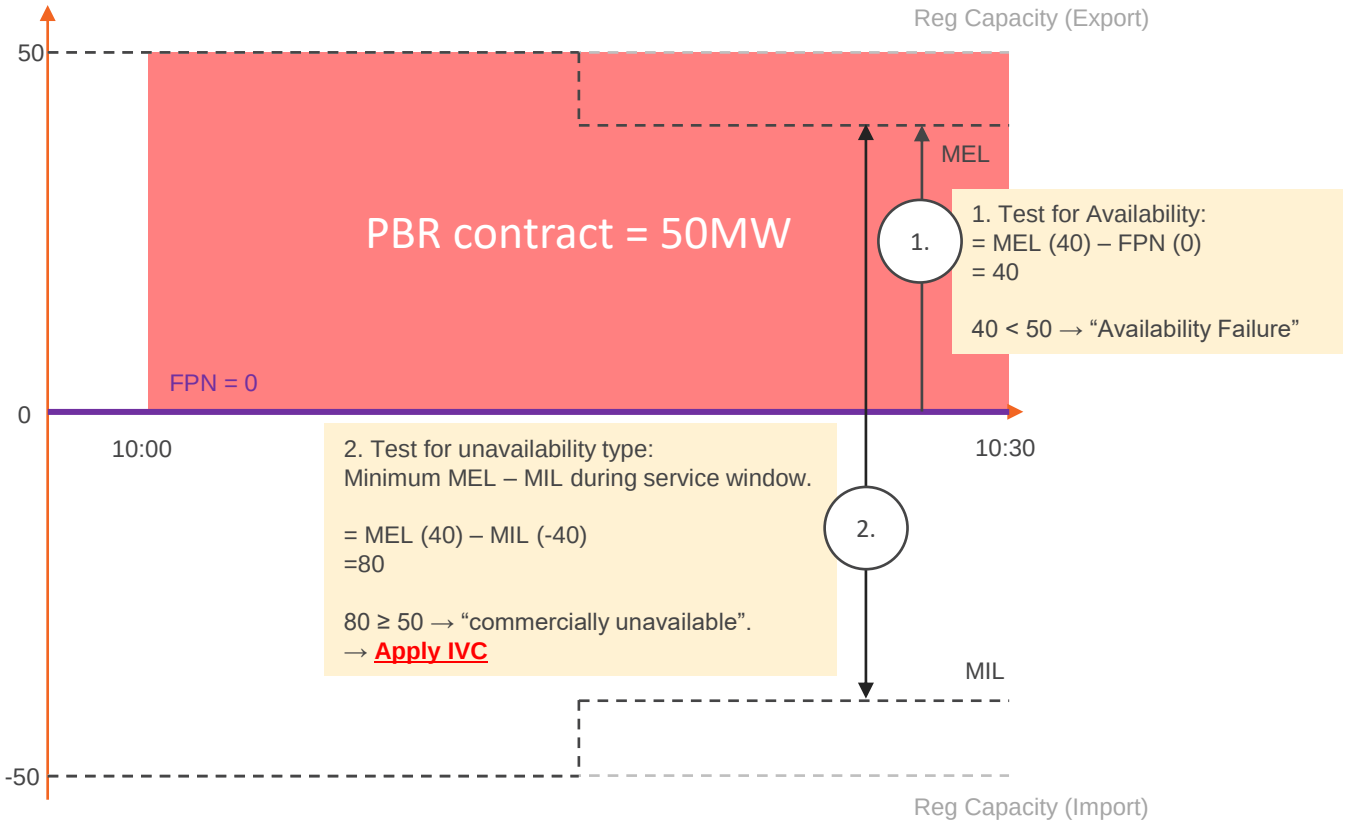
Dynamic Parameter definitions:
FPN – Final Physical Notification, MEL – Maximum Export Limit, SEL – Stable Export Limit, MIL – Maximum Import Limit, SIL – Stable Import Limit, PA – Power Available.

IVC edge cases: Late or early ramping impedes the reserve capacity



- In this situation, the Incremental Volume Cost penalty will apply.
- Providers should make sure that they submit a FPN profile where the full contracted BR capacity is available for all minutes of the service window.
- Ramp to the right position before the start of the service window and ramp away starting immediately on the SP boundary and not before.

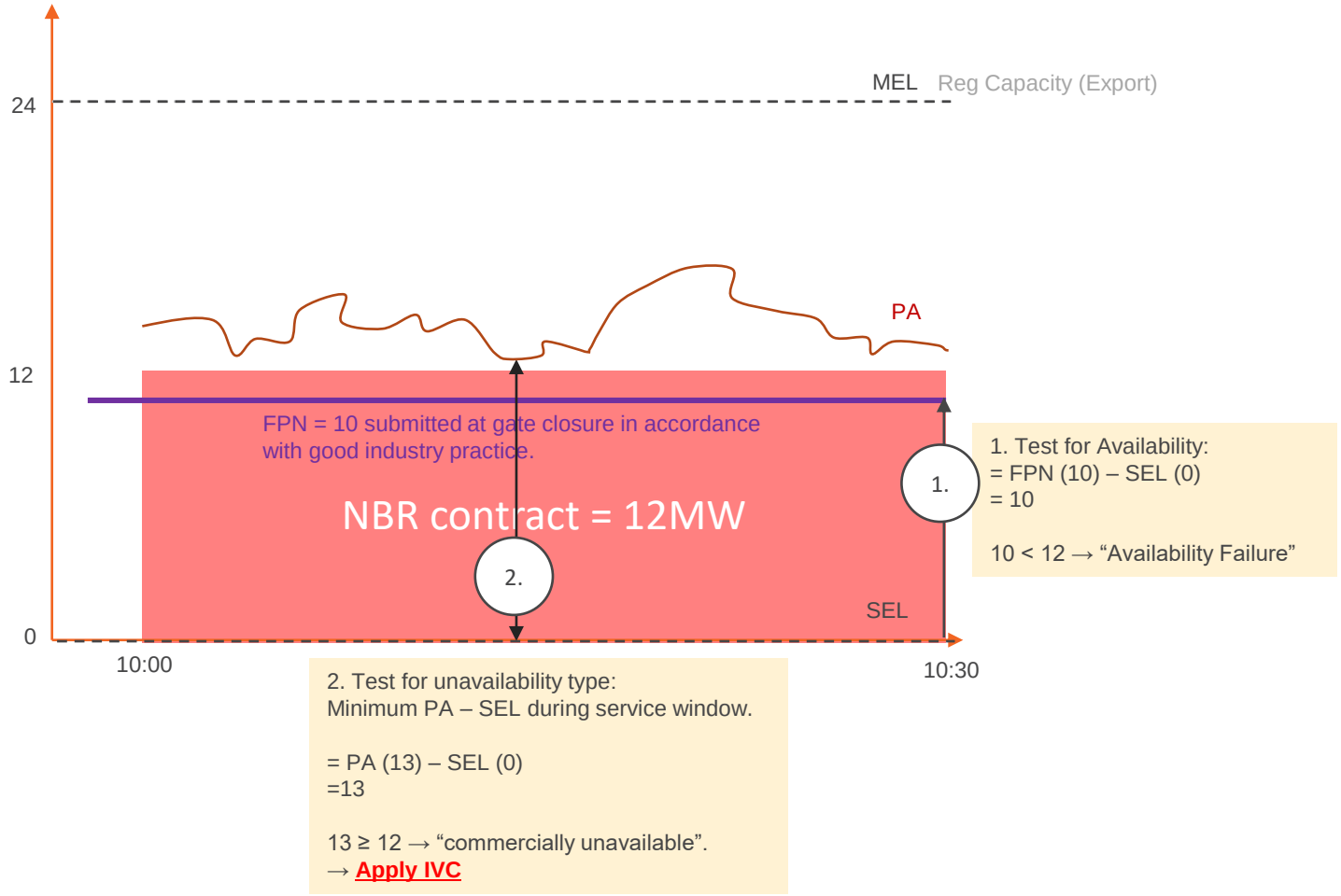
IVC edge cases: Partial unavailability on through-zero units



- In this situation, the Incremental Volume Cost penalty should not apply.
- Affected providers should contact the settlements team to raise a dispute and explain that they experienced a technical issue at their site.
- You can demonstrate this by showing that MEL ↓ and MIL ↑ by the same amount at the time of the technical fault. In this example 10:15.
- If a technical issue is known in advance of gate closure, then we would expect new FPN profiles to be submitted that avoid failing the reserve contract or for the provider to transfer their contract to a different unit.
- In the future we will be adjusting this measurement to use new State of Energy data developed as part of GC0166.

<u>If this ends up being a more common event than we expected, then we will need to review our approach to the automatic application of IVC.</u>

IVC edge cases: real time sudden sustained wind output increase



- In this situation, the Incremental Volume Cost penalty should not apply.
- Affected providers should contact the settlements team to raise a dispute and explain that an FPN was submitted in accordance with good industry practice. Wind output in real time as measured by PA was higher than anticipated.
- We are using the smallest PA – SEL value to assess commercial unavailability and expect that it is unlikely that this sort of scenario will occur.

<u>If this ends up being a more common event than we expected, then we will need to review our approach to the automatic application of IVC.</u>

Are there any other situations where a unit may be incorrectly deemed to be Commercially Unavailable?

Please feedback to us at futureofbalancingservices@nationalgrideso.com or via the Q+A – thank you in advance for your help!

IVC: Rules for calculating the size of the penalty

Rules for calculating Incremental Volume Cost for NBR:

1) Only consider actions from the **Sell Stack** for NBR - these are the actions with a negative volume.

2) As Negative bid prices are expensive for ESO we should search for the **lowest price** in the sell stack.

3) Remove all system flagged bids.

4) Remove actions that have flowed through from DISBSAD (Sell trades on the interconnectors taken by ESO for energy reasons).

5) Remove actions taken in error (where DMAT is set to 0).

6) Adjust the figure to be a £/MW/SP rather than £/MWh.

7) Subtract the clearing price for NBR from the result and floor at £0.

Rules for calculating Incremental Volume Cost for PBR:

1) Only consider the actions from the **Buy Stack** for PBR – these are the actions with a positive volume.

2) As Positive offer prices are expensive for ESO we should search for the **highest price** in the buy stack.

3) Remove all system flagged offers.

4) Remove actions that have flowed through from DISBSAD (Trades and NBM actions from OFR via PAS dispatches). Although trades could be included, they only set the PBR IVC 0.5% of the time, so we have decided to remove all trading actions.

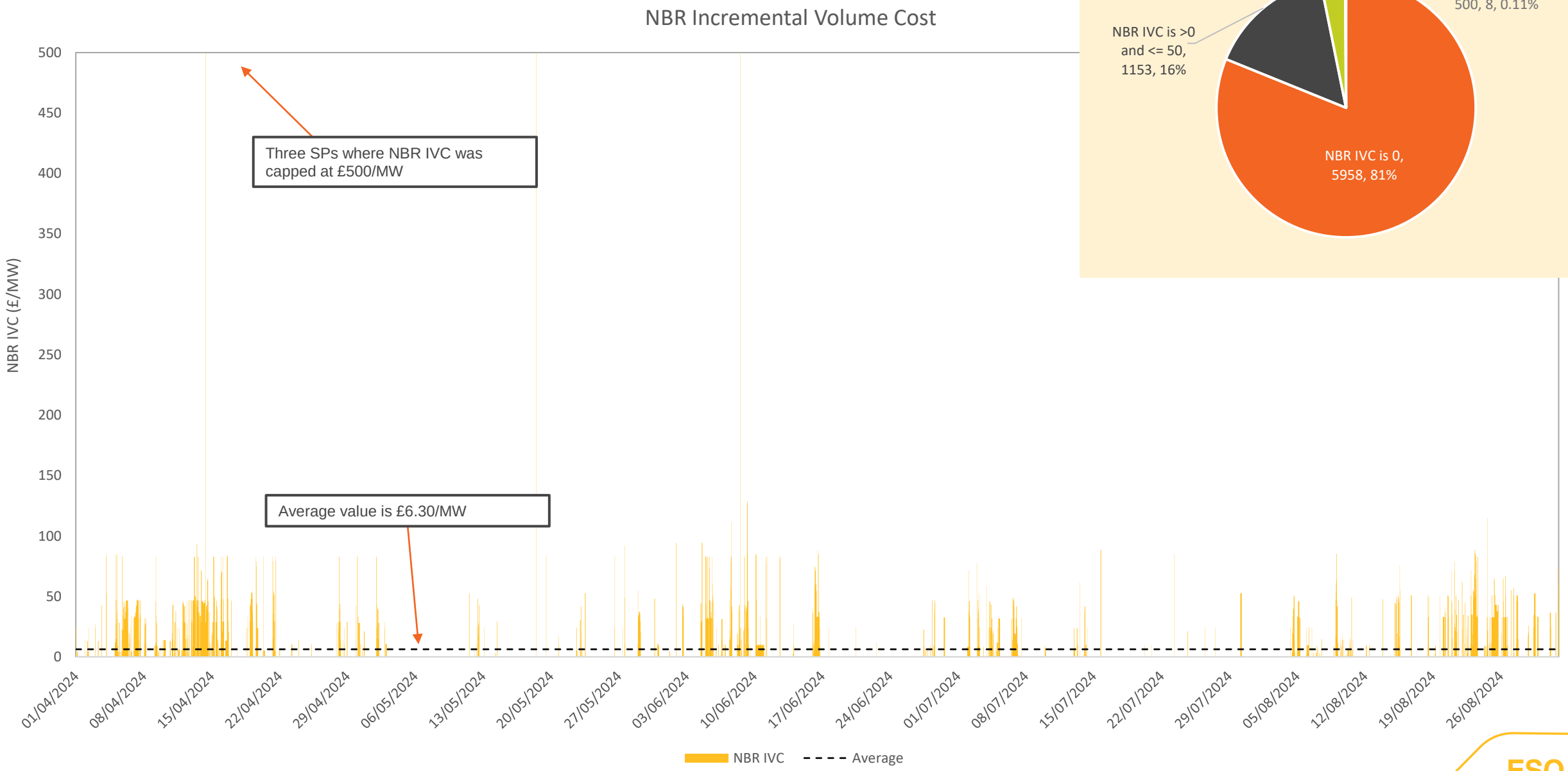
5) Remove actions taken in error (where DMAT is set to 0).

6) Adjust the figure to be a £/MW/SP rather than a £/MWh.

7) Subtract the clearing price for PBR from the result and floor at £0.

8) If the IVC for the half hour ends up being higher than £500/MW/SP. Cap it at £500/MW/SP.

IVC: For Negative BR



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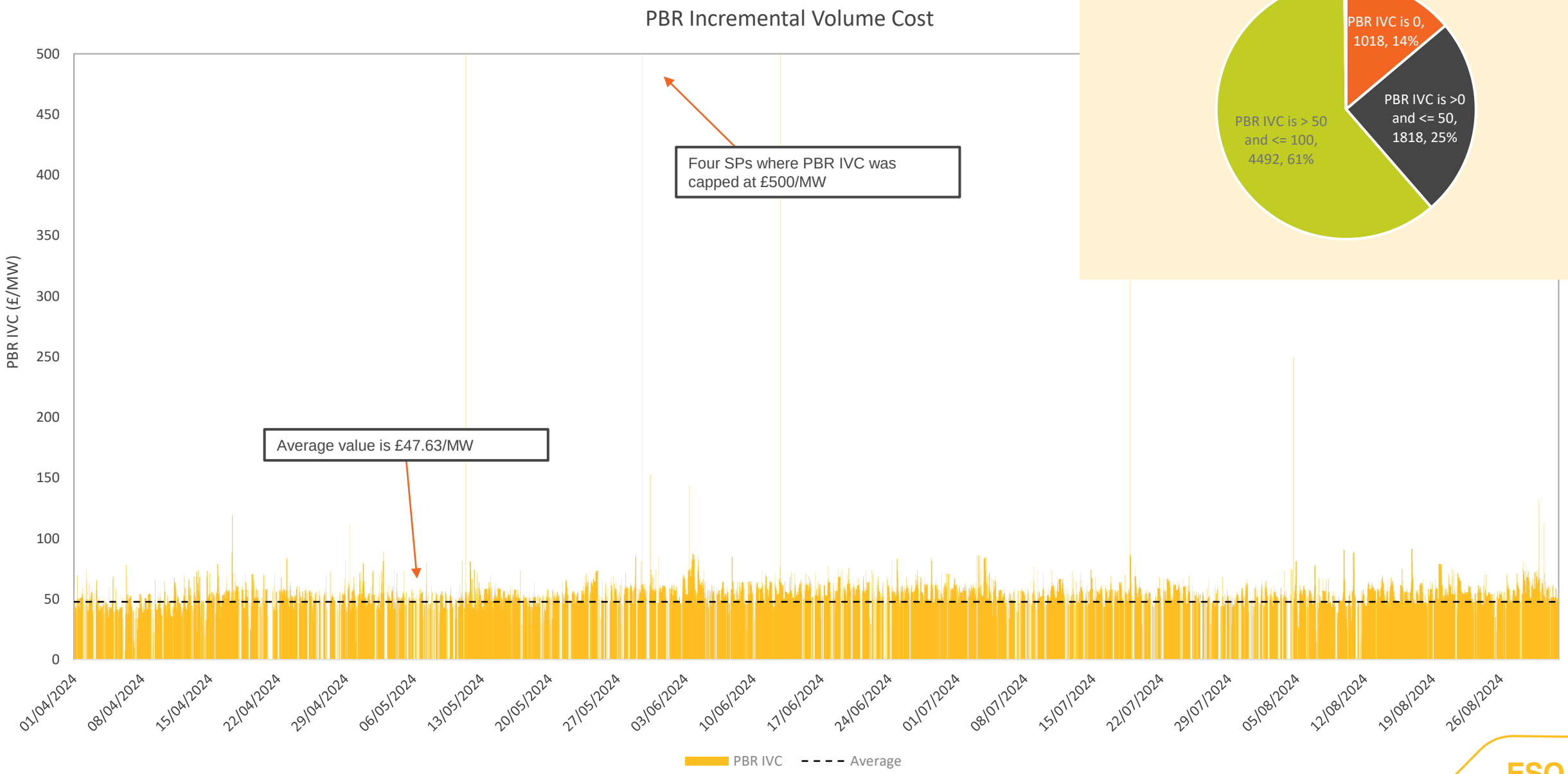
IVC: For Positive BR



Incremental Volume Cost (IVC) feature: implementation update

Key messages

- We are developing the capability to apply the IVC automatically during the performance monitoring part of our settlement process. The feature will go live for all contracts from **01 December 2024**.
- This will be first observed by BR providers in the settlement statements received in January.
- We are developing the feature simultaneously in our existing processes for BR settlement and in our new Settlements & Revenue system (STAR) which is planned to begin settling BR in December/ January and will run concurrently with the existing tool for c.3months to ensure consistency.
- This is a complex calculation to build into our systems and business process and it has taken time to develop to ensure Providers are not penalised incorrectly.

Stacking Reserve with Response

- Stacking Balancing Reserve and Response is only allowed in opposite directions
- For Phase 1 Quick Reserve stacking is not allowed with any other services
- There have been a small number of instances since the launch of BR where units have held contracts with mutually exclusive products
- From December, there will be checks in place and any units found to be stacking BR against the rules will not be paid for either service

		BR		QR (Phase 1)	
		PBR	NBR	QPR	QNR
DC	DCH	Y	N	N	N
	DCL	N	Y	N	N
DM	DMH	Y	N	N	N
	DML	N	Y	N	N
DR	DRH	Y	N	N	N
	DRL	N	Y	N	N

Dispatch Flexibility Rules Review: background

- Reviewing both the “Incremental MW” rule and the “1-minute” dispatch rule.

Expected Benefits of relaxing the rule:

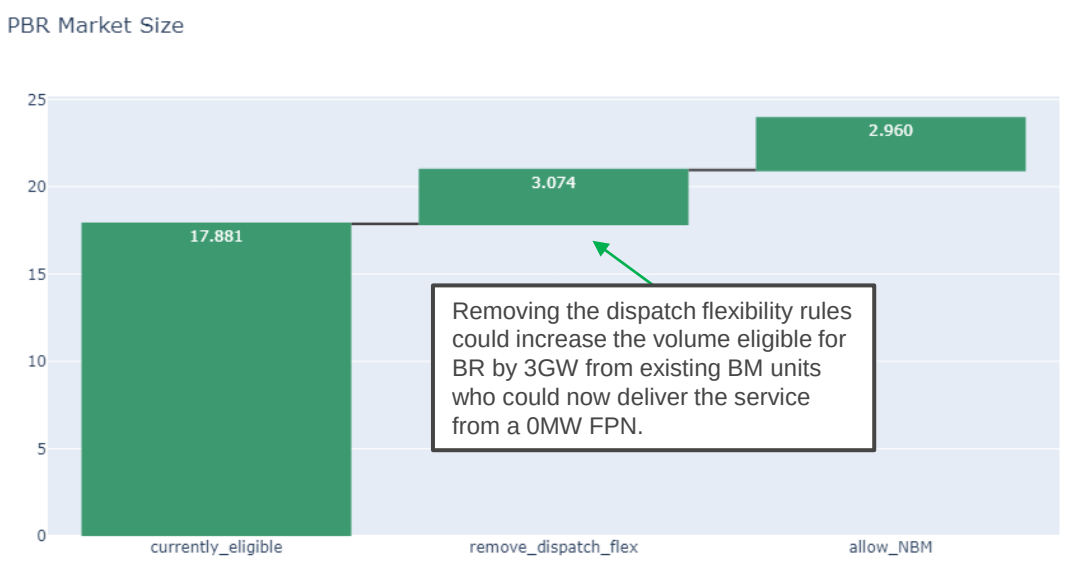
- Additional units participating in the BR market.
- Increased competition helps to reduce total cost of the BR auction.
- Diversify the provider base giving protection from technology specific market shocks.

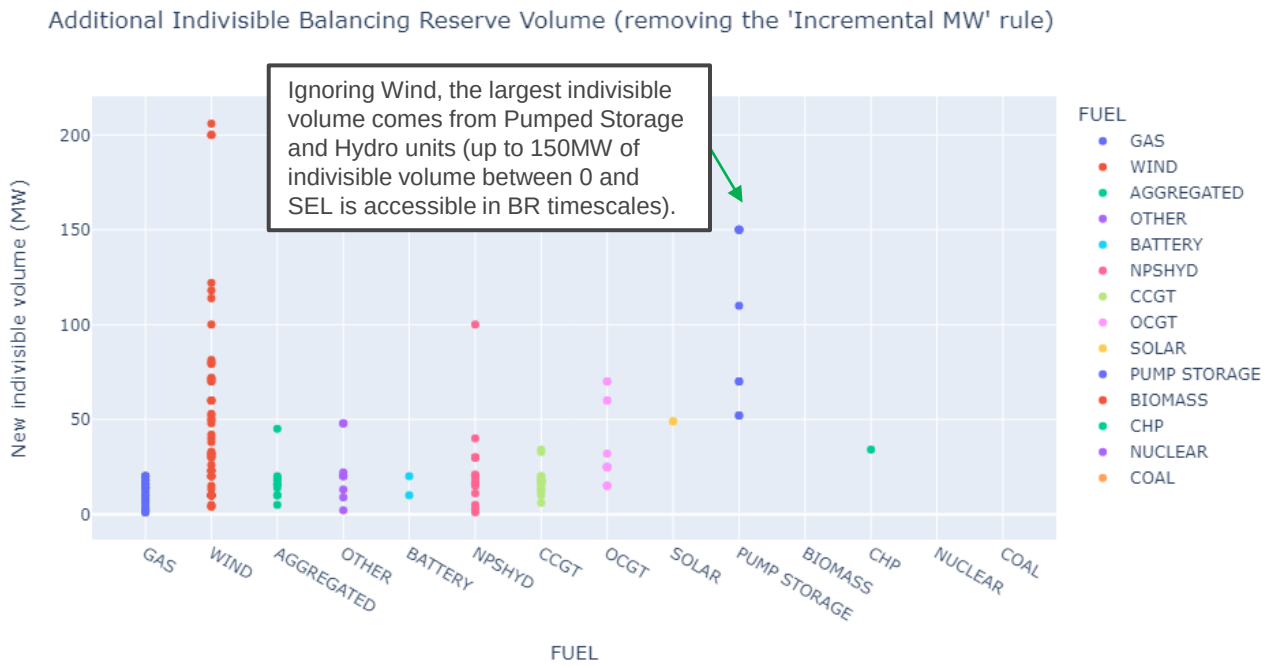
Possible costs of relaxing the rule:

- Additional cost in reserve dispatch through either overcorrecting the energy imbalance and then taking a reverse action or skipping over a unit to find a better fit.
- Additional cost in reserve scheduling if more flexibility is required.
- Weakens the signal to invest in truly flexible capacity.
- Existing flexible BR units reconfigure their sites and reduce their flexibility.

Dispatch Flexibility Rules Review: proposed method for feedback

1. Identify the possible new capacity for BR that could be unlocked:
   - Use BM data and consider the gap between 0 and SEL to be new capacity if deliverable in BR timescales (10 minutes incl. NTO/NDZ).
   - As a base case assume no participation by wind/solar for PBR from 0MW FPN but all other technologies are eligible.
   - As a high case assume some new capacity (non wind/solar) could join the BM to access the BR market.





Dispatch Flexibility Rules Review: proposed method for feedback

2. Run simulations of the BR market introducing a proportion of the new capacity to model the cost reductions:
    - Use some historic sample days: high wind, low wind, liquid market, illiquid market.
    - As a base case assume requirement is as today.
    - As a high case assume requirement is closer to ESO reg reserve requirement.

3. Compare against the costs of relaxing the rules:
    - Assume that all reserve is held on the most inflexible but still eligible BR units under a range of new dispatch flexibility rules.
    - Assess all pre-fault positive energy imbalances (Power Demand > Power Supply) and calculate how much over-dispatch would be required to match the size and duration of the imbalances assuming that no other units are available in the BM offering free reserve.
    - The total “overspend” is the cost of relaxing the rules.

Do you believe this study would “prove” what the dispatch flexibility rules should be? If not, how could we adapt the study?

How could we improve the method to better assess this design question? Are there other datasets you would recommend? Which assumptions need to be updated?

Please feedback to us at futureofbalancingservices@nationalgrideso.com or via the Q+A – thank you in advance for your help!

Q&A