

Public

P371 Inclusion of non-BM Fast Reserve actions into the Imbalance Price calculation

Workgroup 1

24 October 2018
Matthew Woolliscroft & Damian
Clough

Health & Safety

In case of an emergency

An alarm will sound to alert you. The alarm is tested for fifteen seconds every Wednesday at 9.20am

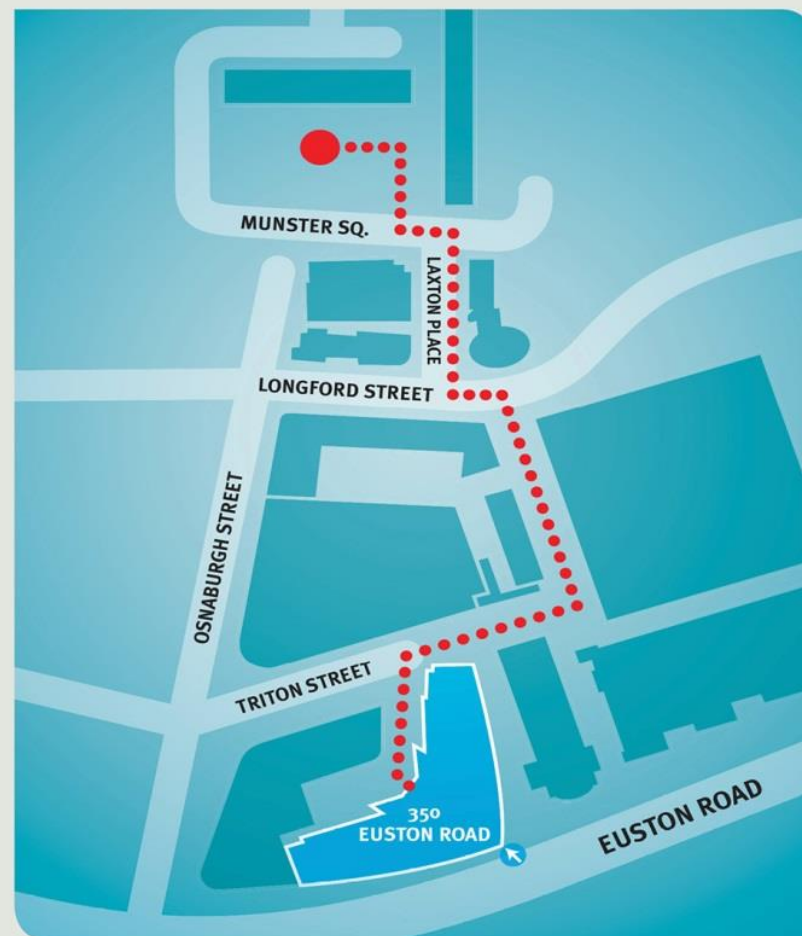
Evacuating 350 Euston Road

- If you discover a fire, operate one of the fire alarms next to the four emergency exits.
- Please do not tackle a fire yourself.
- If you hear the alarm, please leave the building immediately.
- Evacuate by the nearest signposted fire exit and walk to the assembly point.
- Please remain with a member of ELEXON staff and await further instructions from a Fire Warden.
- For visitors unable to use stairs, a Fire Warden will guide you to a refuge point and let the fire brigade know where you are.

When evacuating please remember

- Do not use the lifts.
- Do not re-enter the building until the all clear has been given by the Fire Warden or ground floor security.

Our team on reception is here to help you, if you have any questions, please do ask them.

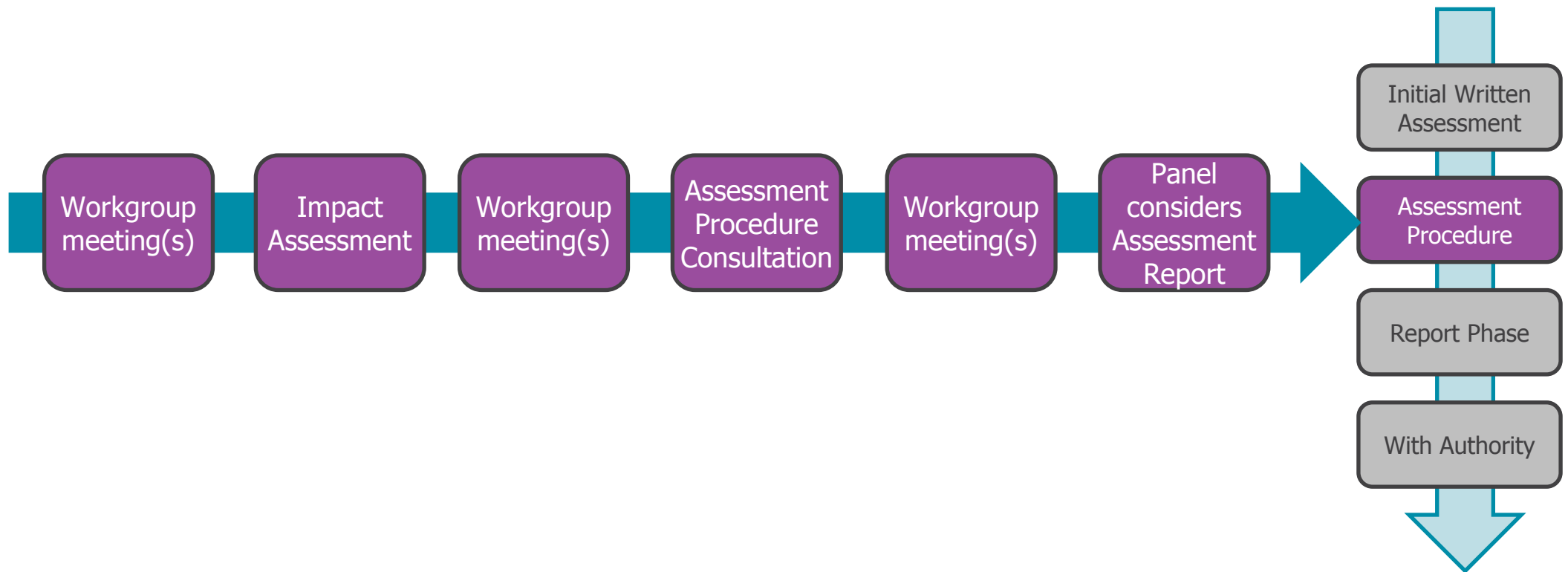


Agenda

- Welcome & Meeting Objectives
- Overview of Modification Proposal
- Consideration of P371 and Terms of Reference
- What are the characteristics of Fast Reserve Products
- How are Non BM Reserve Actions reported
- Flagging of System Actions (SO Flagging)
- How various actions feed into the Imbalance Price
- Next Steps and Progression Plan

Objectives

- Consider and validate Terms of Reference
- Consider impacts of Imbalance Pricing and Methodologies





Overview of Modification Proposal Proposers Slides

Terms of Reference (1 of 2)

- a) Has the compliance with current Code obligations and EU Regulation been considered?
- b) Which Balancing Actions should be classed as System Balancing Actions?
- c) Have the impacts and changes to System Prices (Energy Imbalance Price) Parameters been investigated?
- d) What checks can be done to ensure that relevant actions have been correctly flagged?
- e) How will the Balancing Services affected by this Modification change as part of National Grid's SNAPS work?
- f) Is it possible to future proof any solution for P371 against possible changes in name of existing Balancing Services as well as the potential creation of new Balancing Services and their associated Actions?
- g) What changes are needed to BSC documents, systems and processes to support P371 and what are the related costs and lead times?

Terms of Reference (2 of 2)

- h) Are there any Alternative Modifications?
 - i) Should P371 be progressed as a Self-Governance Modification?
 - j) Does P371 better facilitate the Applicable BSC Objectives than the current baseline?
-
- Please note that there are a number of Terms of Reference and discussion topics which are outside the scope of the BSC to actually change such as the BSAD and SMAF methodologies.
 - However it is crucial when understanding the defect and what actions can be undertaken within the BSC that these methodologies and processes outside the BSC are discussed
 - For example P354 required changes to be made to the ABSVD methodology for the BSC Modification to be successfully implemented

P371 – WG1 Meeting

24th October 2018



UKPR BSC Modification Proposal

UK Power Reserve has submitted a BSC modification proposal aiming to include Spin-Gen, Non-BM Fast Reserve and Non-Tendered Fast Reserve actions into the calculation of the Imbalance Price and extend of the cash-out price arrangements to Fast Reserve

Background

- EBSCR: need to put a higher value to capacity when the system is tight.
- P305: inclusion of Non-BM STOR utilisation costs into the cash-out calculation
- Need to correct the Imbalance Price: Fast Reserve (FR) actions (Spin-Gen, Non-BM and Non-Tendered) have not been included.
- Imbalance price signals have been distorted and undervalued

Why change? Objectives and defect

- **Correct the calculation of the imbalance price:**
 - NG non-compliance with the Balancing Services Adjustment Data Methodology Statement (BSAD) obligation.
- **Fully capture the value provided by all types of FR to the system, including Non-Tendered FR (typical of Spin-Gen contracts).**
- **Increase transparency of the process:**
 - Imbalance Price to be more reflective, openly sharing data on prices and volumes awarded to individual Spin-Gen service providers.
- **Send the right signal to market participants:**
 - Market participants allowed to verify services used by NG, with impact on market behaviour responding to actual scarcity in the system

Why change? Objectives and defect

- The defect is exacerbated by two issues:

1) Non-Tendered Fast Reserve actions represent the lion share of the costs paid by the ESO for Reserve products and these are not at present duly captured in the calculation of the cash-out price.

- National Grid spending on Non-Tendered Fast Reserve (majority of which relating to Spin Gen costs)
- Incorrect messages to the industry and distortion of the market signal, impacts on behaviour of market participants, effects to the costs to end consumers.

2) Selected units are allowed to be in receipt of STOR and Spin-Gen payments simultaneously.

- Stacking to the detriment of cash-out and market transparency. Pricing of Reserve actions distorting competition.
- Impact on system constraint signal and the required level of capacity.
- Need to remove the uneven playing field between market participants and access to scarcity-related information.

Proposed solution

- 1) Include Spin-Gen, Non-BM and Non-Tendered Fast Reserve actions into the calculation of the Imbalance Price by National Grid.**
- 2) Extend the application of the Reserve Scarcity Price (RSP) calculation methodology to Fast Reserve actions.**

Enduring (long-term) solution:

- Automated system
- ELEXON's system changes for the extension of the RSP calculation methodology.

Interim solution:

- manual process

Relevant objectives

Positive impact on Objectives:

- (a): The efficient discharge by the Transmission Company of the obligations imposed upon it by the Transmission Licence
- (b) The efficient, economic and co-ordinated operation of the National Electricity Transmission System
- (c) Promoting effective competition in the generation and supply of electricity and (so far as consistent therewith) promoting such competition in the sale and purchase of electricity and
- (d) Promoting efficiency in the implementation of the balancing and settlement arrangements

Neutral impact on Objectives:

- (e) Compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency [for the Co-operation of Energy Regulators]
- (f) Implementing and administering the arrangements for the operation of contracts for difference and arrangements that facilitate the operation of a capacity market pursuant to EMR legislation
- (g) Compliance with the Transmission Losses Principle

No negative impacts identified

Thank you

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www.ukpowerreserve.com

What are the characteristics of Fast Reserve Products?

- To provide context to the Modification and defect it is important to understand;
 - What is Fast Reserve?
 - What is it used for?
 - Average duration
- If it is determined that Fast Reserve is used entirely for System purposes then this may affect the decision to apply the Reserve scarcity Price

How are Non BM Reserve Actions reported?

- Gain an understanding of the BSAD methodology;
- How does it relate to the BSC

[https://www.nationalgrideso.com/sites/eso/files/documents/BSAD%20Methodology%20Statement%20v15 Effective%20from%201%20April%202018 0.pdf](https://www.nationalgrideso.com/sites/eso/files/documents/BSAD%20Methodology%20Statement%20v15%20Effective%20from%201%20April%202018%200.pdf)

- BSAD data does not include the duration of an action
 - Important concept for CADL pricing

BSAD within the BSC

- Gain an understanding of the BSAD methodology;
- Section Q of the BSC https://www.elexon.co.uk/wp-content/uploads/2017/11/Section_Q_v29.0.pdf
- **6.3 Balancing Services Adjustment Data**
- 6.3.1 In respect of each Settlement Period within a Settlement Day, the Transmission Company shall send: (a) subject to paragraph 6.3.4, to the BMRA: (i) (in relation to all such Settlement periods) not later than 17:00 hours on the preceding day, (ii) (in relation to each such Settlement Period) as soon as reasonably practicable after Gate Closure for, and in any event not later than the end of, such Settlement Period the Transmission Company's estimate (at the relevant time of sending) of Balancing Services Adjustment Data as described in paragraph 6.3.2; and (iii) in relation to any Settlement Period in which a DSBR action was taken, not later than ten minutes after the end of the relevant Settlement Period, its estimate of Balancing Services Adjustment Data including (**but not limited to**) that relating to DSBR actions, as described in paragraph 6.3.2; (iii) (in relation to each such Settlement Period) not later than fifteen minutes after the end of the relevant Settlement Period, its estimate of Balancing Services Adjustment Data including (**but not limited to**) that relating to Non-BM STOR actions, as described in paragraph 6.3.2;

How are Non BM Reserve Actions reported?

- **6.3.2 Balancing Service Adjustment Actions**
- **Any relevant balancing service including non-BM Short Term Operating Reserve (STOR) actions, taken outside the Balancing Mechanism, will be provided through BSAD as a Balancing Service Adjustment Action.** For each balancing service provided as a Balancing Service Adjustment Action, the energy bought or sold in MWh and the cost paid for each service in £ will be included. Each Balancing Service Adjustment Action will also be accompanied by an identifier indicating whether the balancing service was used for system management reasons. The System Management Action Flagging methodology statement describes BSAD Methodology Statement 10 the process National Grid will use to identify whether Balancing Service Adjustment Actions were used for system management reasons.

Flagging of System Actions (SO Flagging)

- The SMAF methodology determines which actions are flagged as SO
 - Actions which are flagged as SO are treated differently from Energy actions (important for RSP) when calculating the Imbalance Price

[https://www.nationalgrideso.com/sites/eso/files/documents/SMAF%20Methodology%20Statement%20v10 Effective%20from%201%20April%202018.pdf](https://www.nationalgrideso.com/sites/eso/files/documents/SMAF%20Methodology%20Statement%20v10%20Effective%20from%201%20April%202018.pdf)

How various actions feed into the Imbalance Price

- The SMAF methodology determines which actions are flagged as SO
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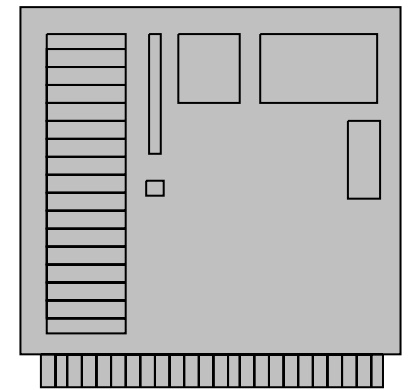
[https://www.nationalgrideso.com/sites/eso/files/documents/SMAF%20Methodology%20Statement%20v10 Effective%20from%201%20April%202018.pdf](https://www.nationalgrideso.com/sites/eso/files/documents/SMAF%20Methodology%20Statement%20v10%20Effective%20from%201%20April%202018.pdf)

What order do we do things?

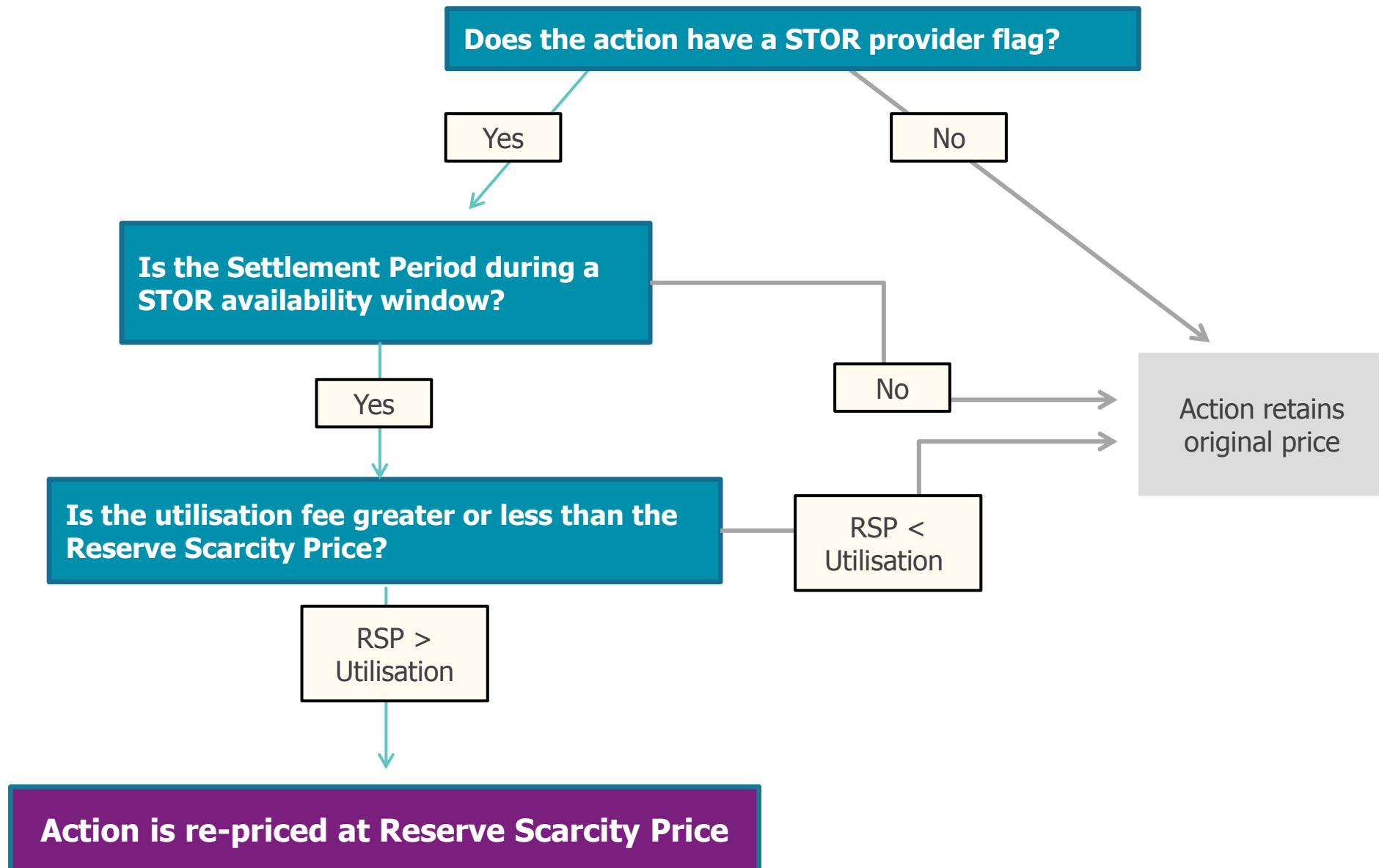
Processes (in order)

- 1 Receive all actions and prices
- 2 Flag actions 
- 3 Group and rank actions
- 4 De Minimis tagging 
- 5 Arbitrage tagging 
- 6 Classification 
- 7 NIV tagging 
- 8 Replacement Price 
- 9 PAR tagging 
- 10 Price Calculation (including TLM)
- 11 BPA/SPA
- 12 Finished Imbalance Price

Completed by
ELEXON systems



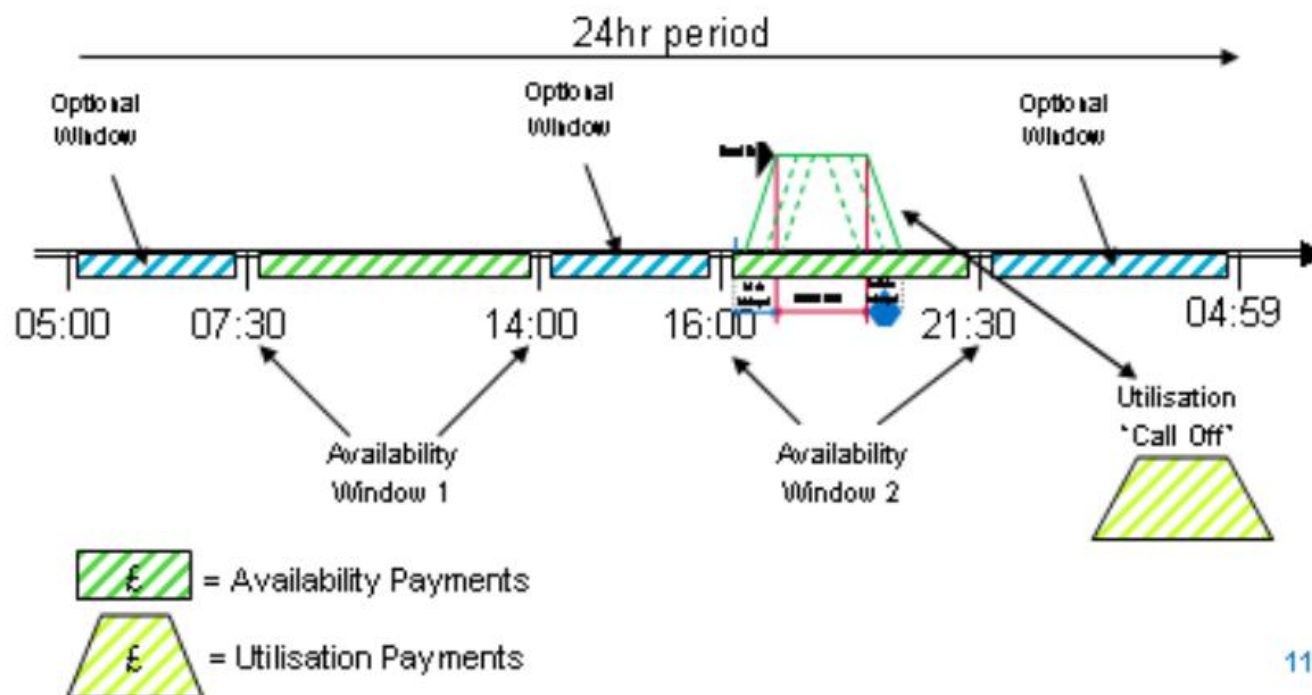
Re-pricing STOR actions



Short Term Operating Reserve

Typical Working Day STOR Format

- 2 x Availability Windows (sometimes 3 AWs)
- Remainder of time classed as Optional Windows

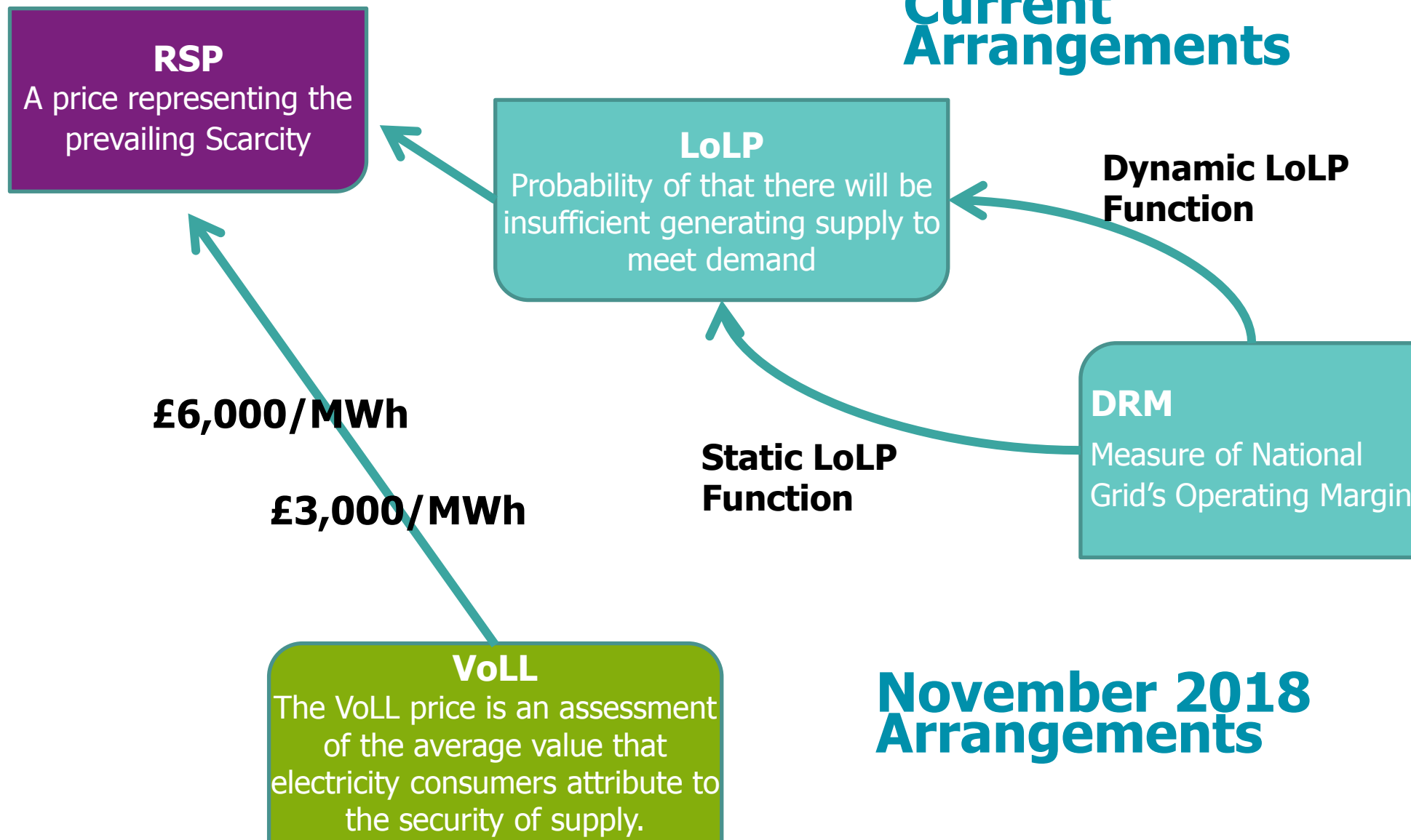


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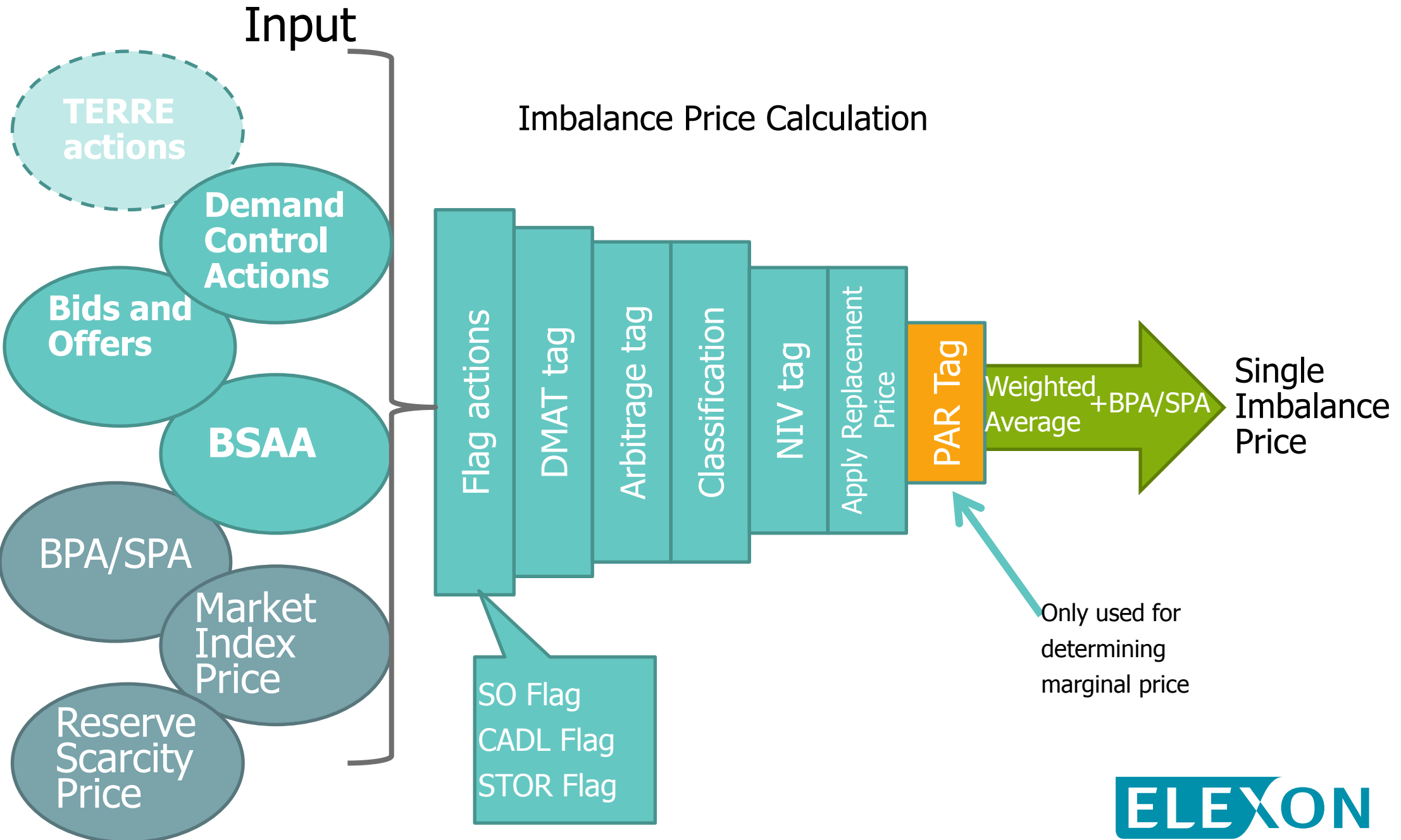
- <http://www2.nationalgrid.com/uk/services/balancing-services/reserve-services/short-term-operating-reserve/>

Making the Reserve Scarcity Price

Current Arrangements



Imbalance Price Calculation



1. Receive all balancing actions

- Bids and Offers
- Balancing Services Adjustment Actions (BSAA, actions taken outside the Balancing Mechanism)

BSAA—Sell
-600MWh at £30/MWh

Bid **SO Flag**
-10MWh at £55/MWh

Bid **SO Flag**
-140MWh at £0/MWh

Offer **SO Flag**
100MWh at £70/MWh

Bid **10 Mins**
-40MWh at £40/MWh

BSAA – Buy
500MWh at £50/MWh

Bid **SO Flag**
-500MWh at -£70/MWh

Bid **SO Flag**
-0.5MWh at -£50/MWh

Bid **SO Flag**
-70MWh at £20/MWh

Bid **SO Flag**
-200MWh at £10/MWh

Offer
80MWh at £80/MWh

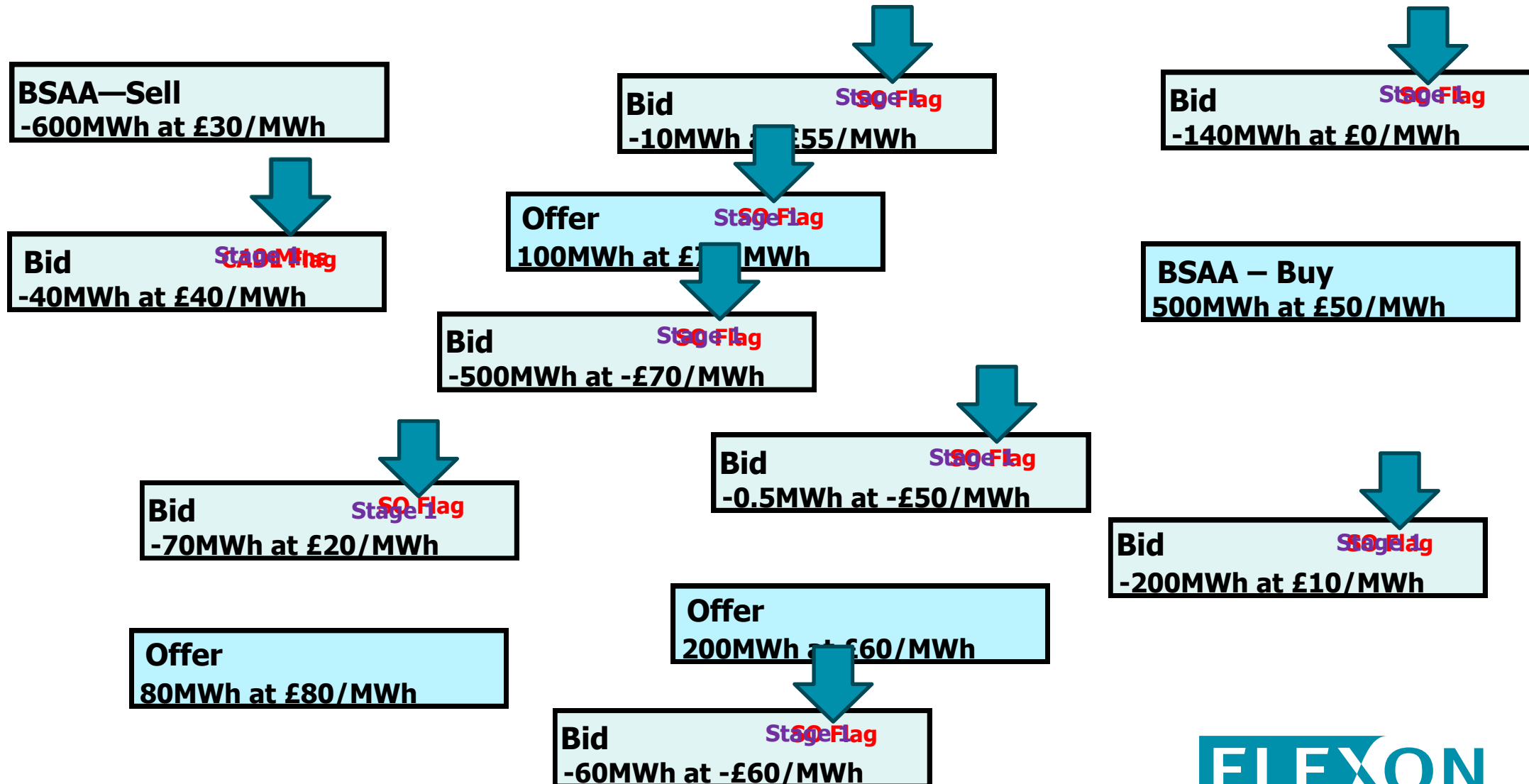
Offer
200MWh at £60/MWh

Bid **SO Flag**
-60MWh at -£60/MWh



2. Flag balancing actions

- Assess STOR Flagged actions against the RSP, reprice STOR Flagged actions if necessary
- CADL flag any actions with a duration of less than 15 minutes,
- Treat SO and CADL flagged actions as Stage 1 Flagged.



3. Group and Rank balancing actions

- Group the buy and sell actions together
- Rank in merit order
 - Buy stack in most expensive to cheapest
 - Sell Stack in Cheapest to most expensive

BSAA—Sell
-600MWh at £30/MWh

Bid Stage 1
-10MWh at £55/MWh

Bid Stage 1
-140MWh at £0/MWh

Bid Stage 1
-40MWh at £40/MWh

Offer Stage 1
100MWh at £70/MWh

BSAA – Buy
500MWh at £50/MWh

Bid Stage 1
-500MWh at -£70/MWh

Bid Stage 1
-0.5MWh at -£50/MWh

Bid Stage 1
-70MWh at £20/MWh

Bid Stage 1
-200MWh at £10/MWh

Offer
80MWh at £80/MWh

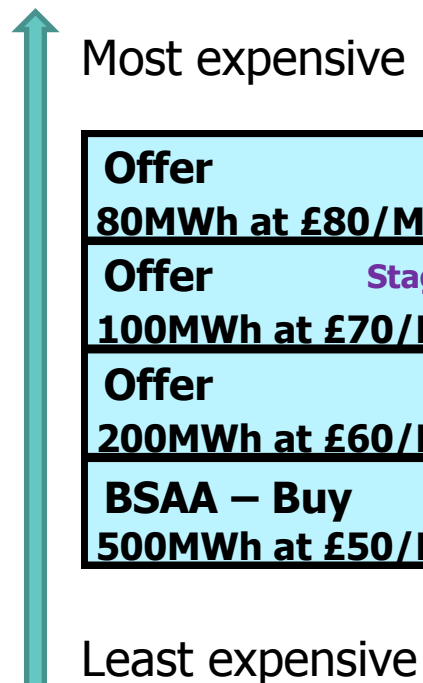
Offer
200MWh at £60/MWh

Bid Stage 1
-60MWh at -£60/MWh

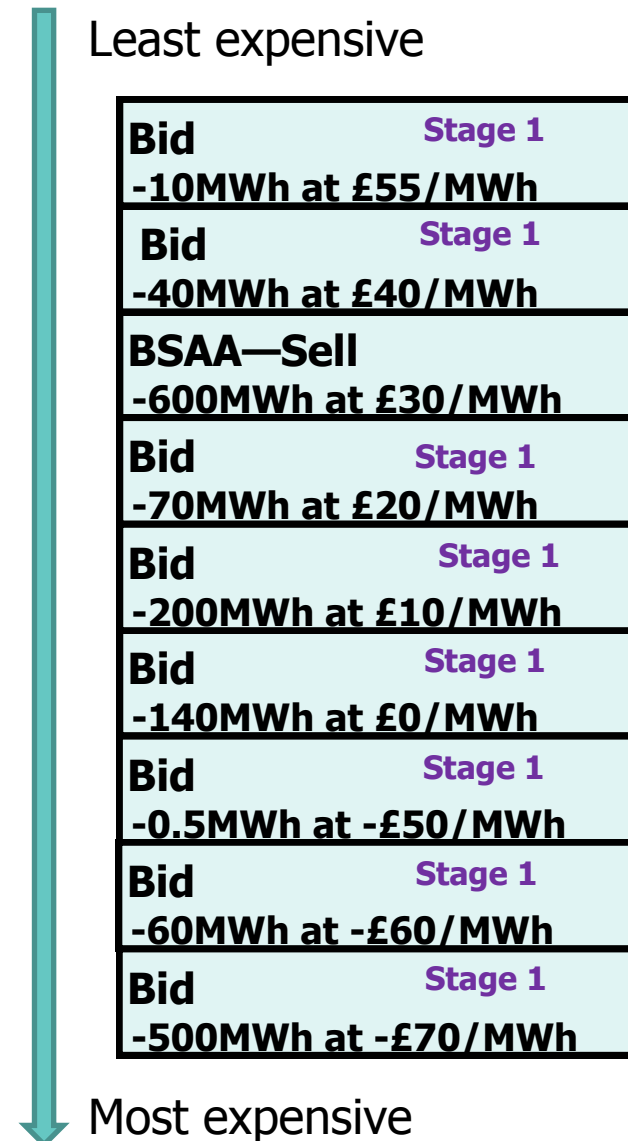
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Buy stack



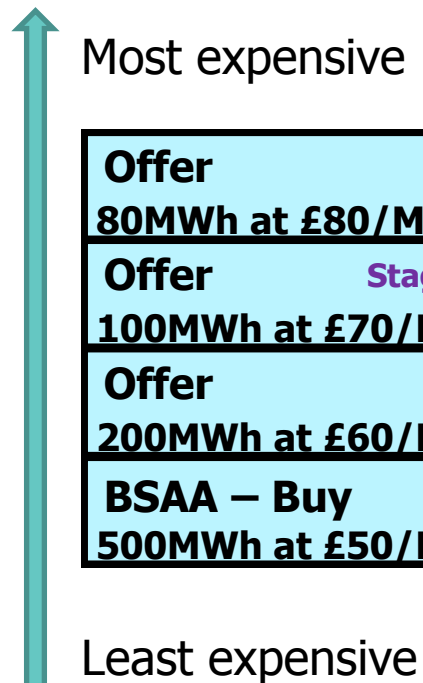
Sell stack



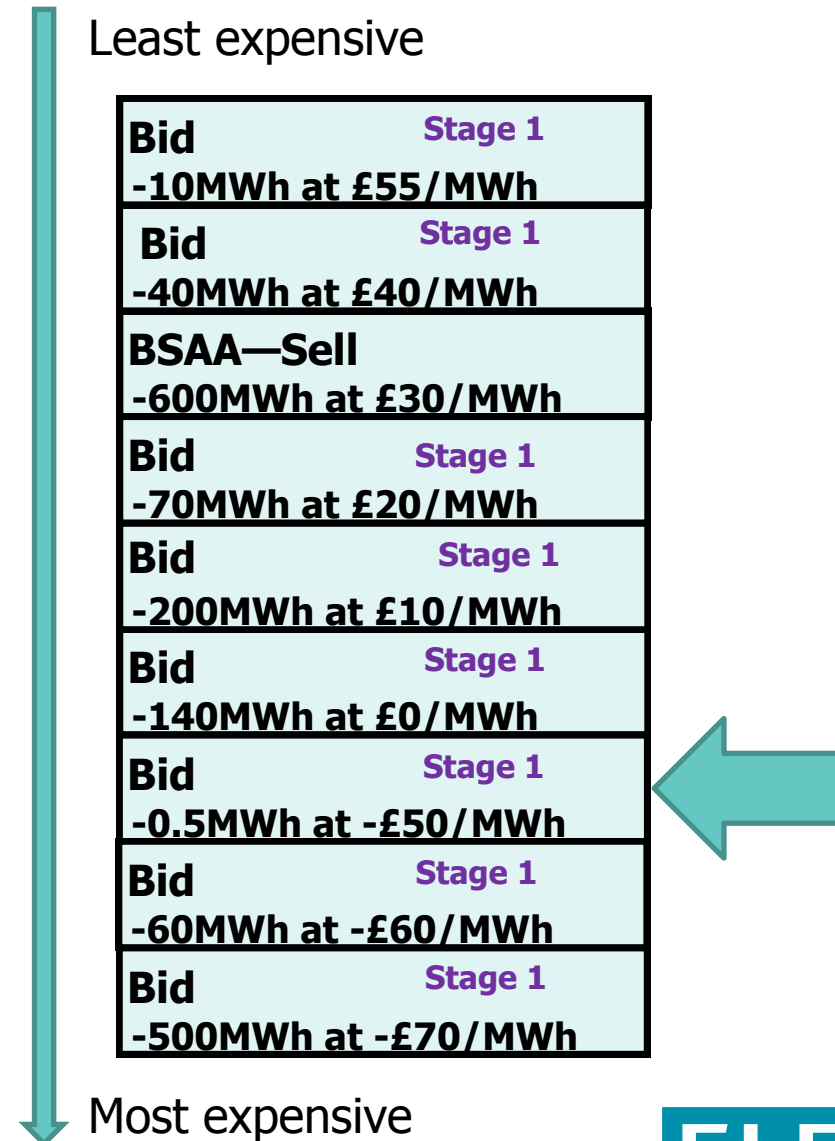
4. DMAT tag actions

- Remove actions with a volume between 1MWh and -1MWh

Buy stack



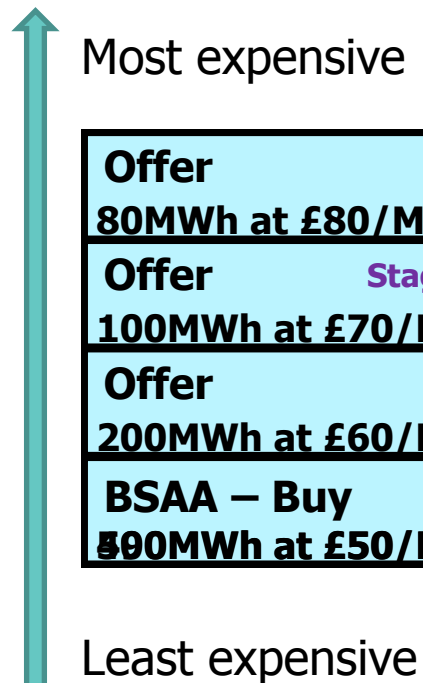
Sell stack



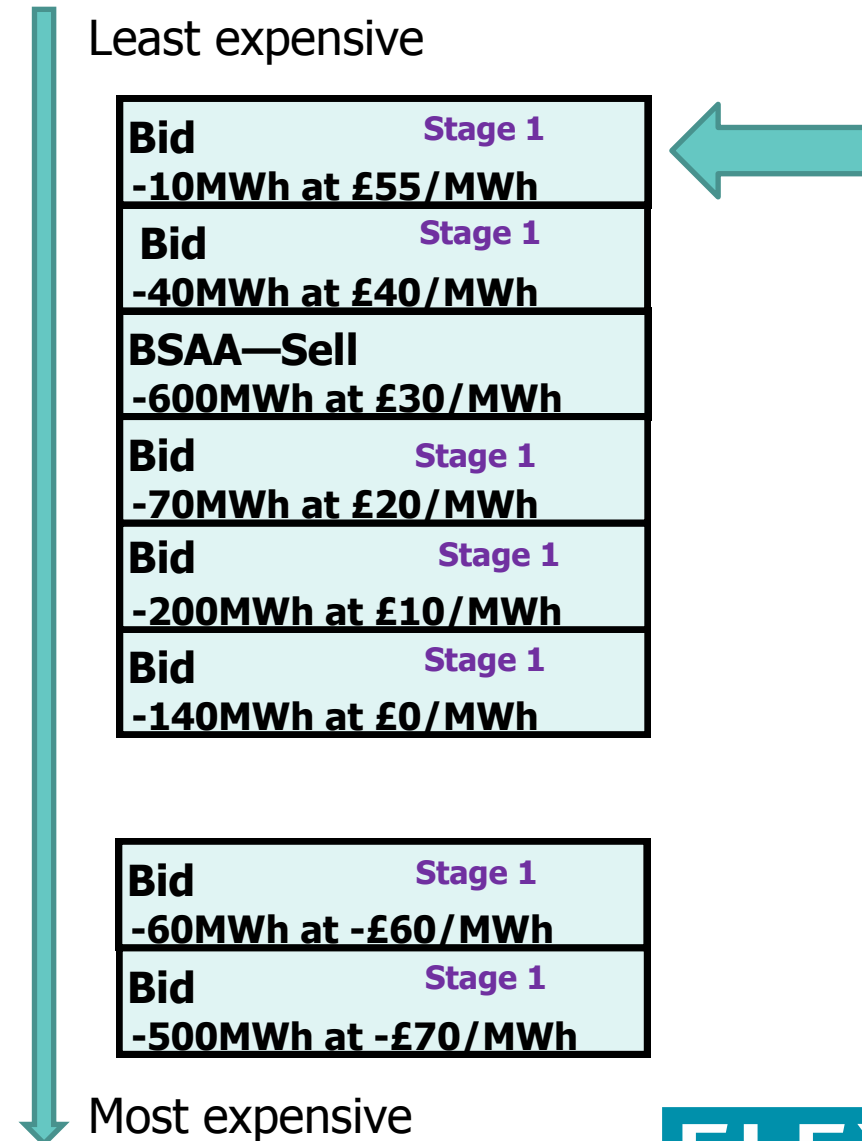
4. Arbitrage tag actions

- Tag volumes where the price of a buy action is less than or equal to the price of a sell action

Buy stack



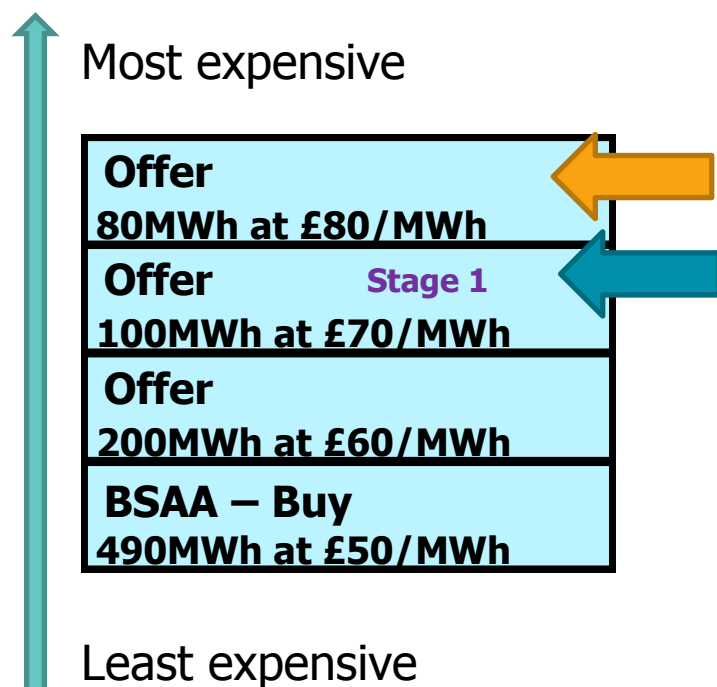
Sell stack



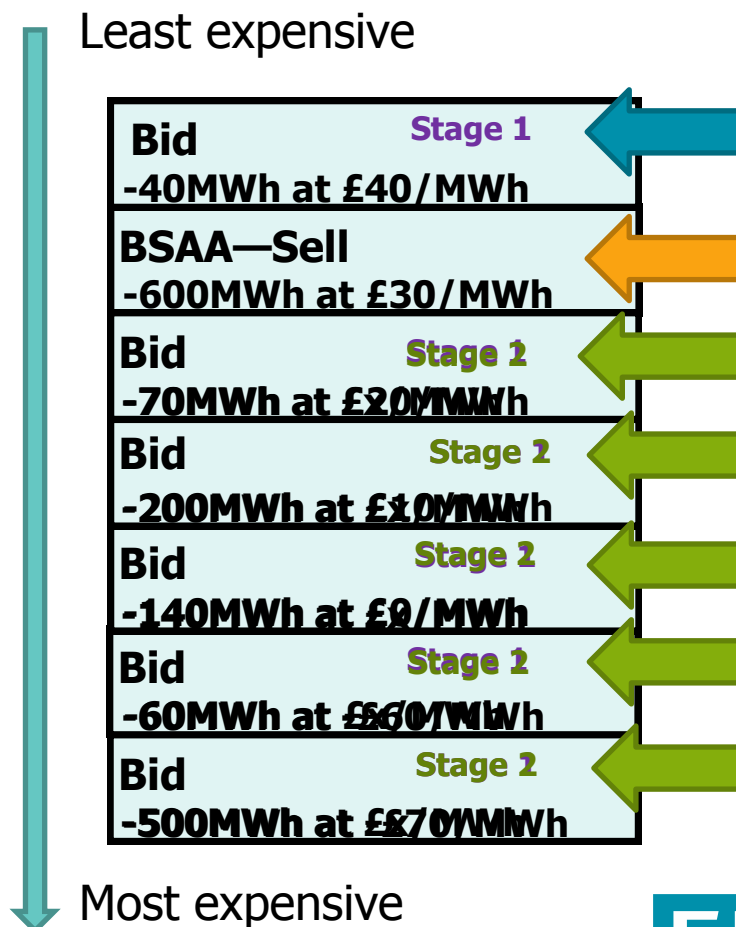
6. Classification

- Assess Stage 1 Flagged actions against the price of the most expensive unflagged action.
 - If the Stage 1 Flagged action is less expensive the action loses its flag and keeps its price.
 - If the Stage 1 flagged action is more expensive then the action becomes Stage 2 Flagged and loses its price.

Buy stack



Sell stack

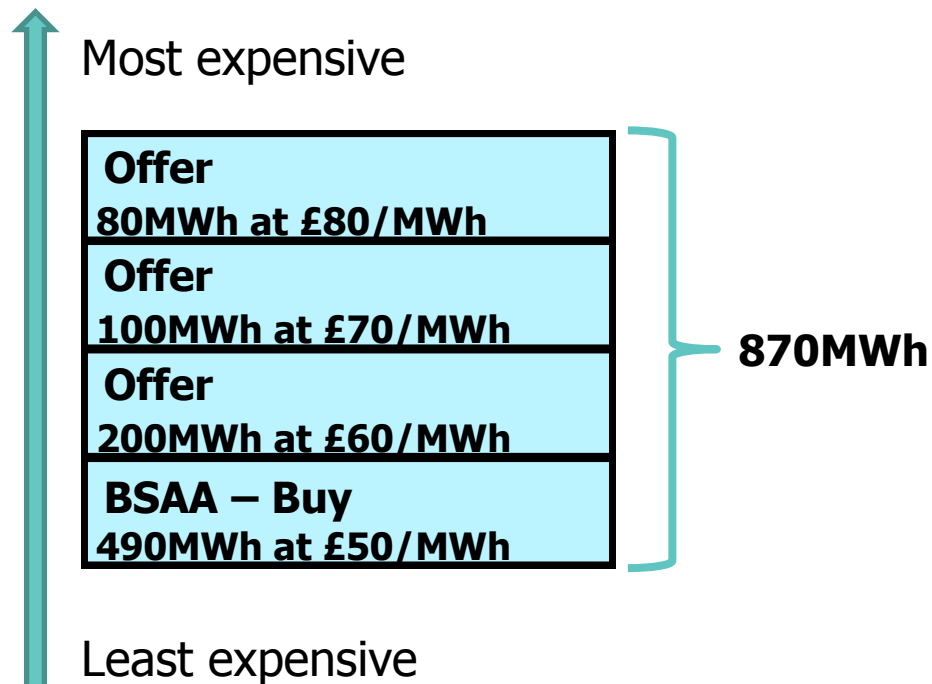


7. NIV Tagging

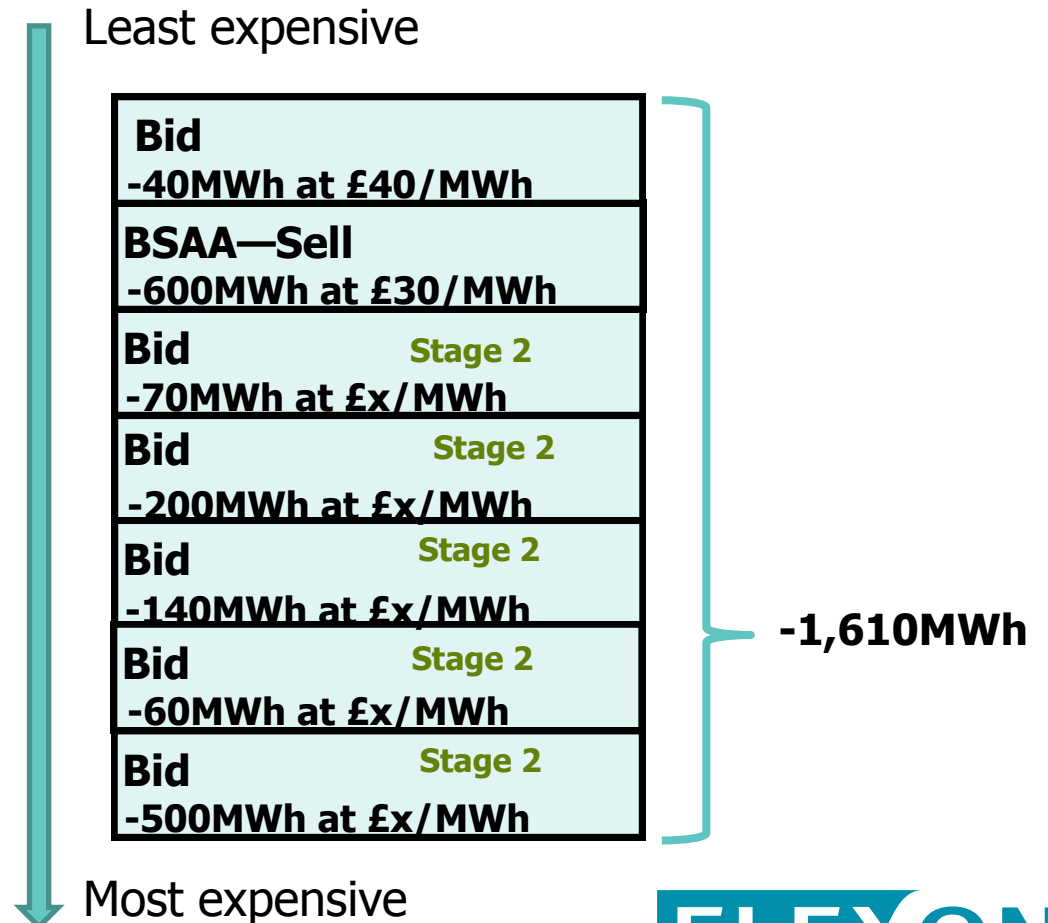
Net Imbalance Volume (NIV)

- Nets off the most expensive balancing actions
- Remaining actions in only one direction

Buy stack



Sell stack



Buy Vol + Sell Vol = NIV

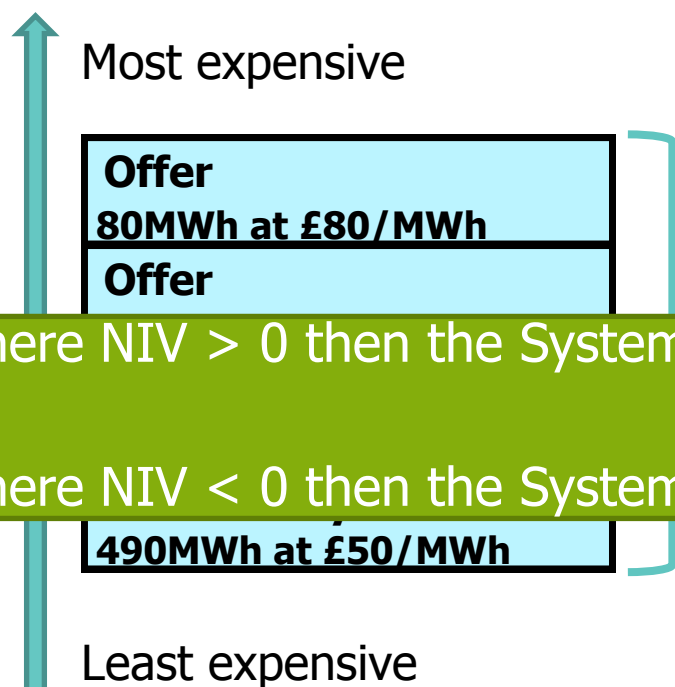
870MWh + (-1,610MWh) = -740MWh

7. NIV Tagging

Net Imbalance Volume (NIV)

- Nets off the most expensive balancing actions
- Remaining actions in only one direction

Buy stack



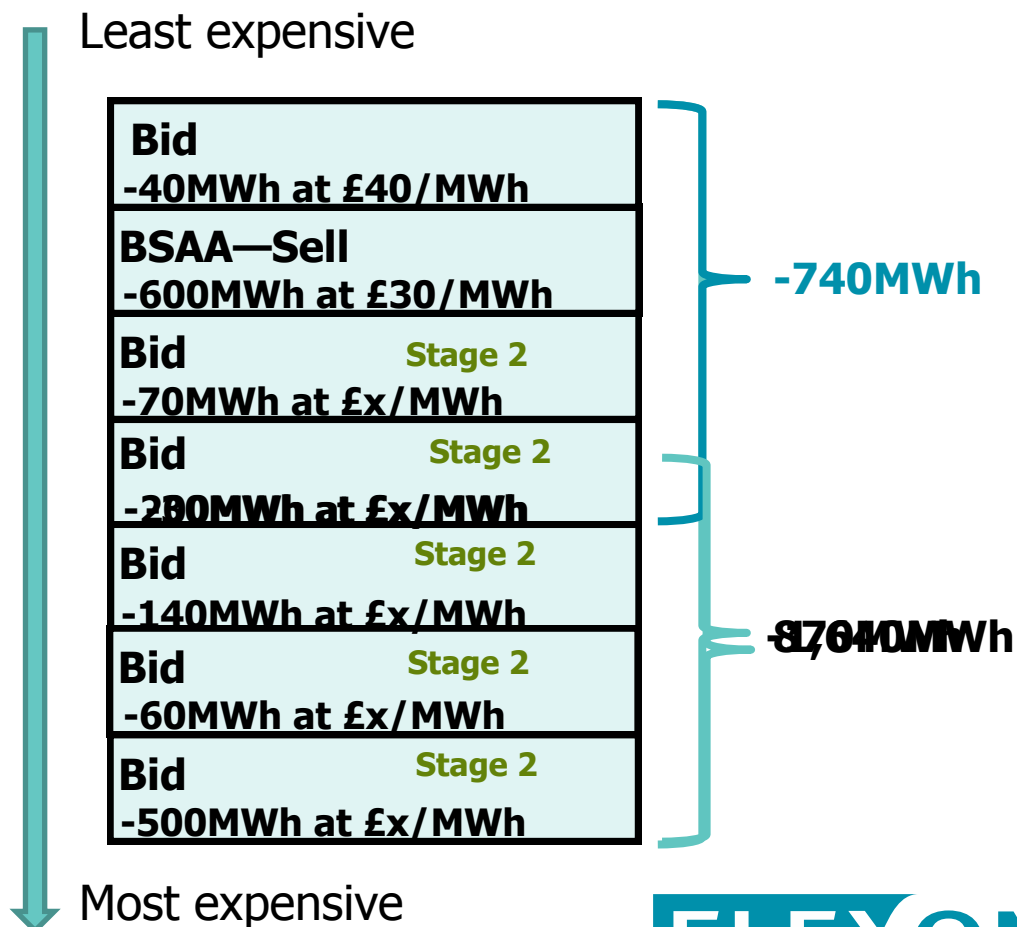
Where $NIV > 0$ then the System is SHORT

Where $NIV < 0$ then the System is LONG

$$\text{Buy Vol} + \text{Sell Vol} = \text{NIV}$$

$$870\text{MWh} + (-1,610\text{MWh}) = -740\text{MWh}$$

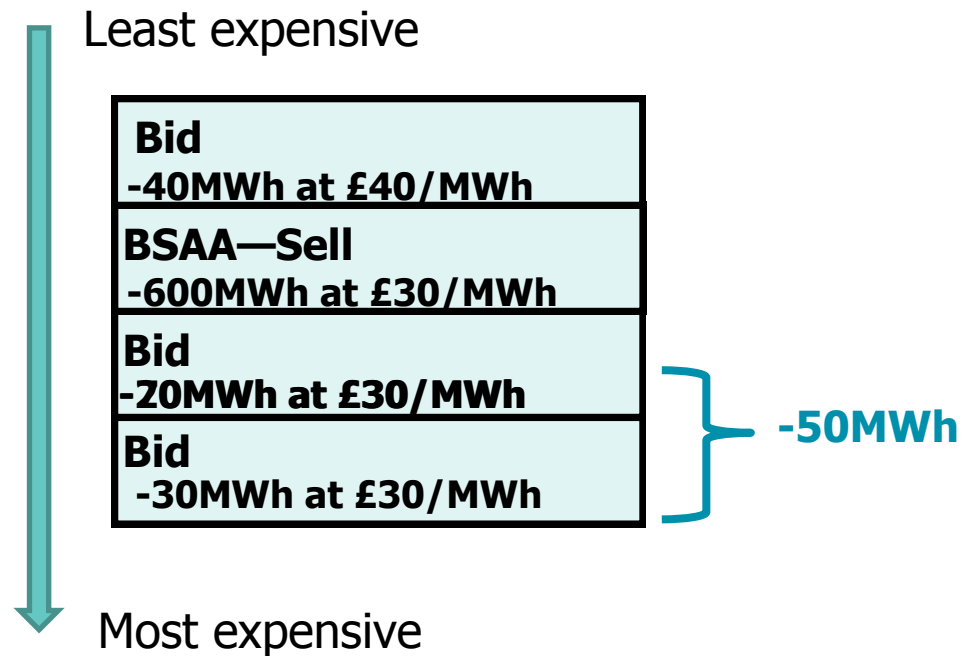
Sell stack



9. PAR Tagging

- Keep only the most expensive 50MWh of actions
- Everything else is tagged out

Sell stack



10. TLM and weighted average

- Adjust the volume of actions with the Transmission Loss Multiplier (TLM)
- Calculate a **volume weighted average of remaining actions**

$$\text{Imbalance Price} = \frac{((-30 \text{ MWh} \times £30/\text{MWh}) + (-20 \text{ MWh} \times £30/\text{MWh}))}{(-30\text{MWh} + (-20\text{MWh}))} + \text{SPA}$$

11. BPA/SPA Adjustment

- Add the BPA to the weighted average if the market is Short
- Add the SPA to the weighted average if the market is Long

Sell stack

Least expensive

Bid -20MWh at £30/MWh
Bid -30MWh at £30/MWh

-50MWh

Most expensive

12. Imbalance Price

- Now have an Imbalance Price that can be applied to Parties Imbalance Volumes

$$\text{Imbalance Price} = \frac{((-30 \text{ MWh} \times \text{£}30/\text{MWh}) + (-20 \text{ MWh} \times \text{£}30/\text{MWh}))}{(-30\text{MWh} + (-20\text{MWh}))} + 0$$

$$\text{Imbalance Price} = \text{£}30/\text{MWh}$$

How various actions feed into the Imbalance Price

- Any questions on Imbalance Pricing?
- What further information do we need?
- What else do we need to consider for P371?

Progression Plan

Proposed Progression Timetable for P371	
Event	Date
Present Initial Written Assessment to Panel	13 September 2018
Workgroup Meeting 1	W/B 15 October 2018
Workgroup Meeting 2	W/B 12 November 2018
Workgroup Meeting 3	W/B 10 December 2018
Assessment Procedure Consultation and Industry Impact Assessment	7 January 2019 – 25 January 2019 (15 WDs)
Workgroup Meeting 4	W/B 11 February 2019
Present Assessment Report to Panel	14 March 2019
Report Phase Consultation	20 March 2019 – 2 April 2019 (10 WDs)
Present Draft Modification Report to Panel	11 April 2019
Issue Final Modification Report to Authority	18 April 2019

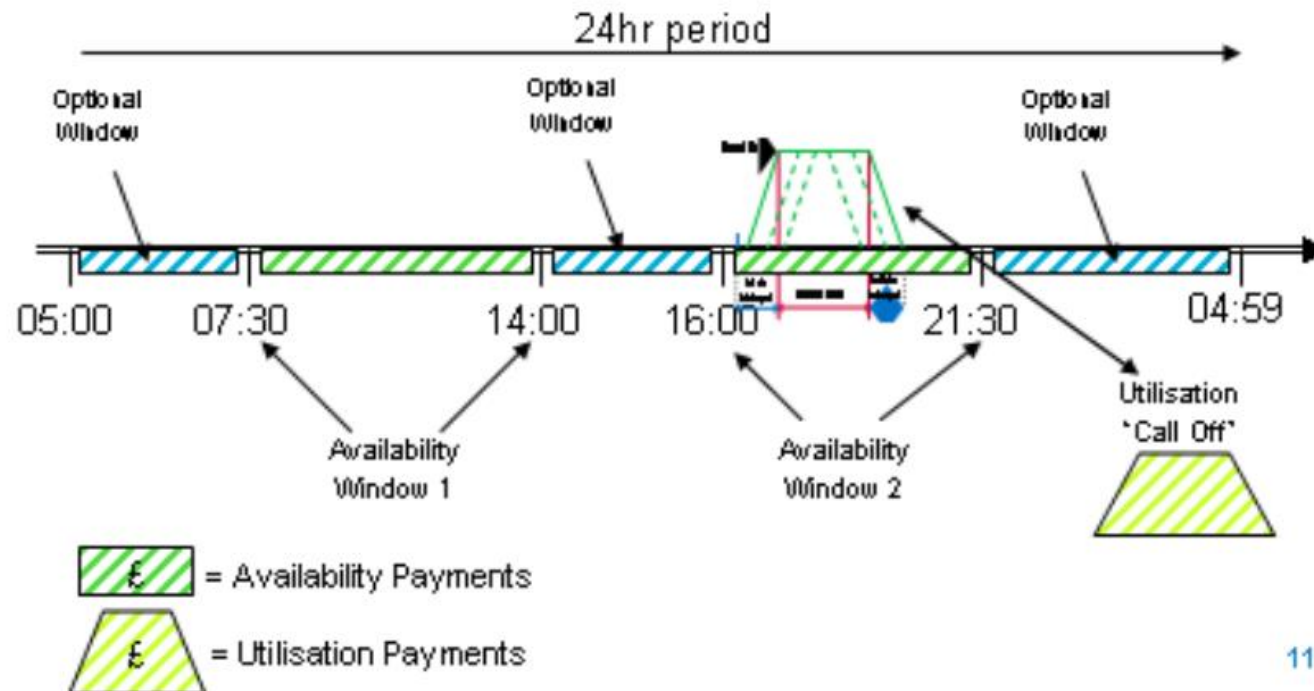


Appendix

Short Term Operating Reserve

Typical Working Day STOR Format

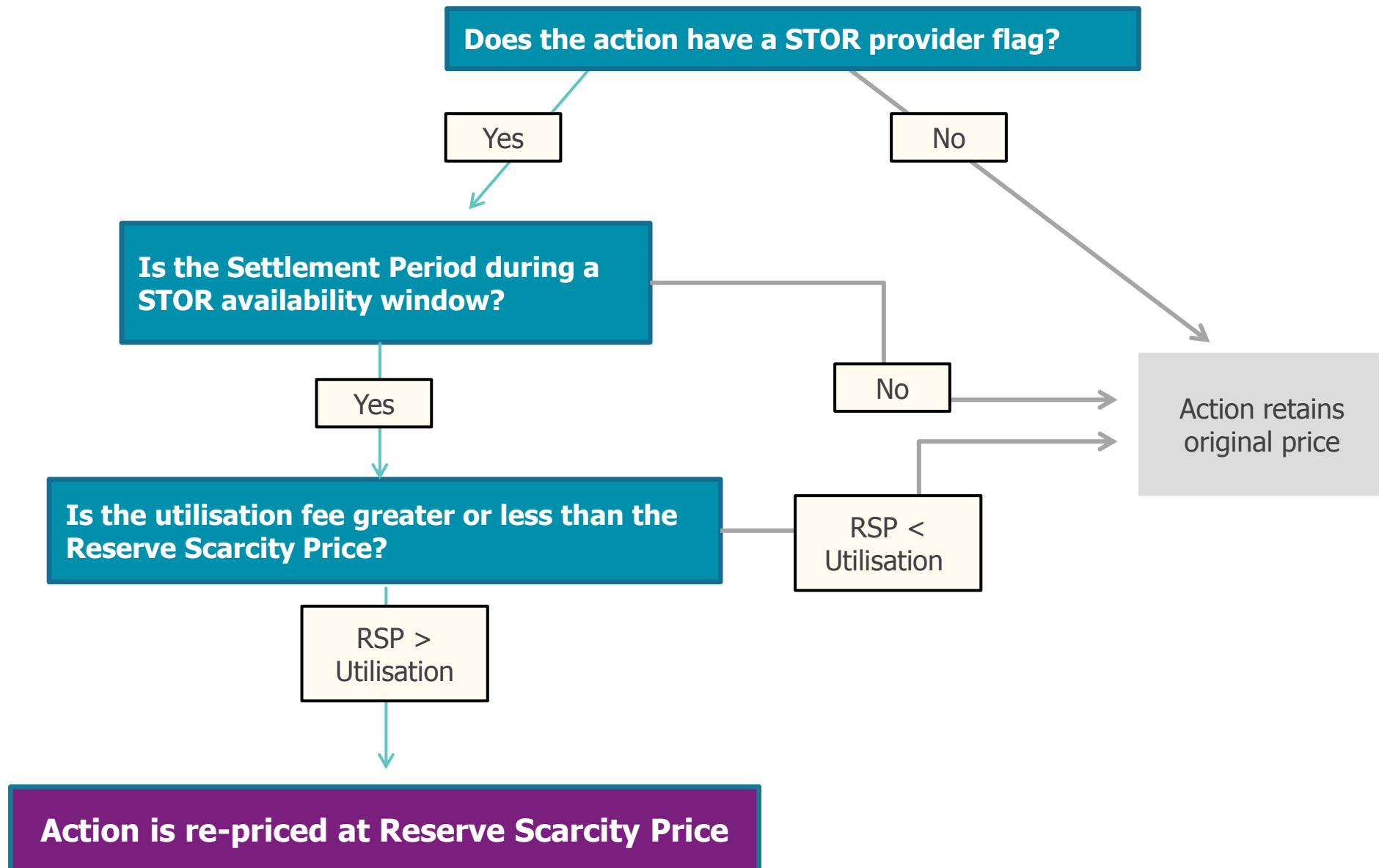
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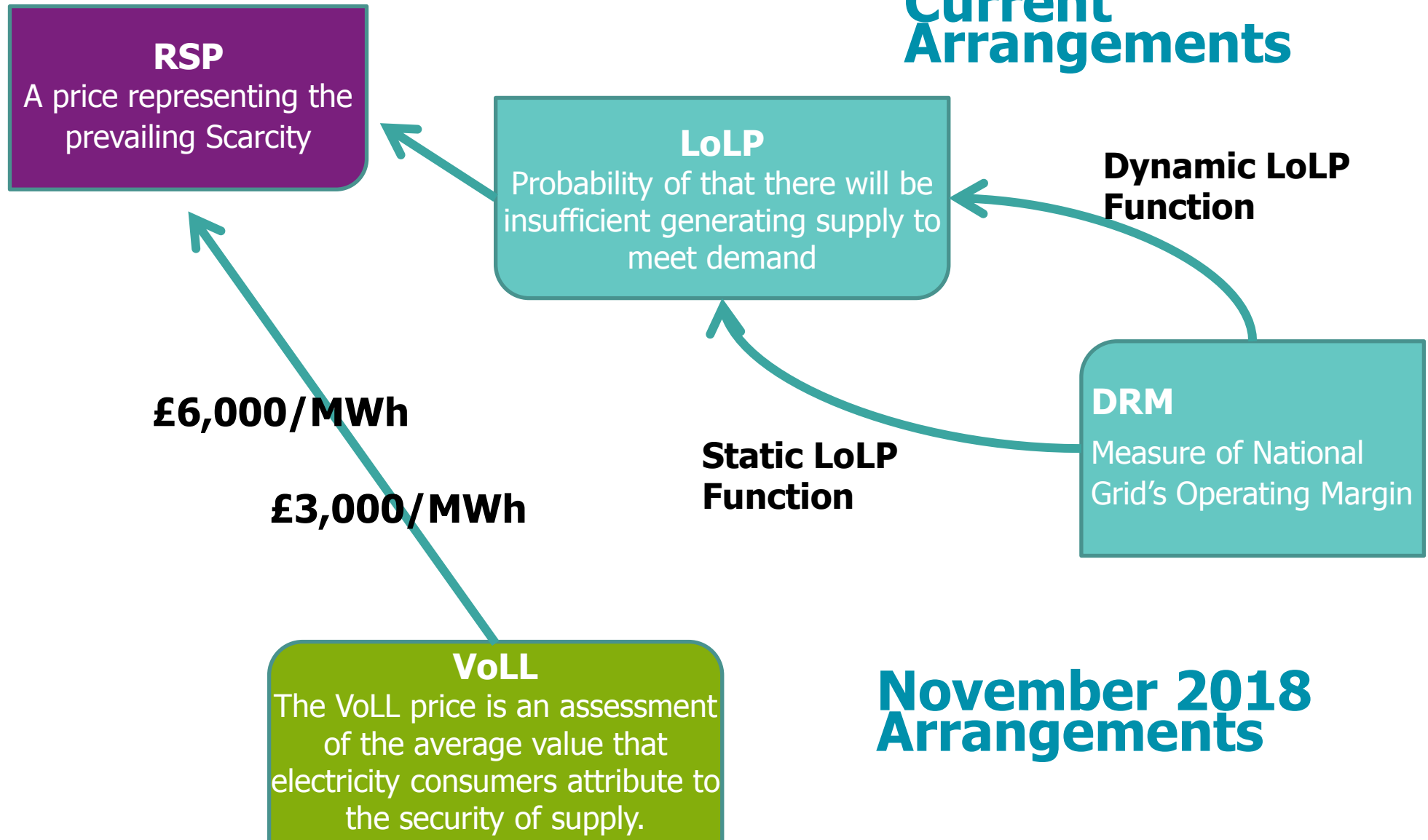
<http://www2.nationalgrid.com/uk/services/balancing-services/reserve-services/short-term-operating-reserve/>

Re-pricing STOR actions



Making the Reserve Scarcity Price

Current Arrangements



November 2018 Arrangements

