278/10 - VALUE OF LOST LOAD REVIEW PROCESS

MEETING NAME BSC Panel Meeting 278

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Purpose of paper Decision
Classification Public

Summary The BSC Panel has a responsibility under the BSC to have a Value of Lost Load (VoLL) Review Process in place. ELEXON recommends a VoLL Review Process below, but does not believe a review is needed at this time. ELEXON recommends that an annual data review is conducted on the use of VoLL and presented to both the Panel and Imbalance Settlement Group (ISG).

1. Background

1.1 The Value of Lost Load (VoLL) is an assessment of the value that electricity consumers attribute to the security of supply. The VoLL was set at £3,000/MWh in the first phase of BSC Modification P305 'Electricity Balancing Significant Code Review (EBSCR) Developments', but will change to £6,000/MWh with the implementation of the second phase on 1 November 2018. Note that the VoLL of £16,940/MWh calculated for Ofgem’s EBSCR was not used. This calculation was made in a study performed by London Economics.

1.2 Other parameters used to set the Imbalance Price will also change on 1 November 2018. The Price Average Reference (PAR) volume will reduce from 50MWh to 1MWh, and the static function used to create the Loss of Load Probability (LoLP) will be changing to a dynamic function.

1.3 The VoLL is multiplied by the LoLP to set the Reserve Scarcity Price (RSVP). LoLP is the probability of there being insufficient supply to meet demand, and the RSVP is a price representing the prevailing scarcity.

1.4 Balancing actions taken by Short Term Operating Reserve (STOR) providers during a STOR availability Window are STOR Flagged, and assessed against the RSVP. If the Utilisation Price of a STOR flagged action is less than the RSVP, then the action will be repriced to the RSVP.

1.5 BSC Section T 1.12.4 states, ‘The Panel shall establish and maintain a VoLL Review Process which shall document the process for reviewing the VoLL’, but that the Panel may delegate this to a Panel Committee.

2. Determining the VoLL Review Process

2.1 Now that the second prescribed value of VoLL is due to be implemented on 1 November 2018, it is time to implement the process for VoLL review. Whilst a formal process has not been performed to date, information on VoLL has been published monthly in our System Price Analysis Report (SPAR).

1 The Value of Lost Load (VoLL) for Electricity in Great Britain https://www.ofgem.gov.uk/ofgem-publications/82293/london-economics-value-lost-load-electricity-gbpdf
2.2 BSC Section T 1.12.3 states: ‘The Panel, or any Panel Committee to whom responsibility for conducting a review of the VoLL has been delegated, shall review the VoLL:

(a) from time to time; and/or

(b) upon the request of the Authority,

in each case in accordance with the VoLL Review Process.’

2.3 ELEXON attended the ISG meeting held on 25 April 2018 (ISG204) to discuss the VoLL Review Process. The analysis undertaken by ELEXON (see Appendix 1) was well received, and the ISG requested this to be produced on an annual basis. Given the feedback from the ISG, ELEXON proposes to perform an annual data review on the use of VoLL. This review will be presented to the ISG and Panel, with comments fed back into the process.

2.4 At the April 2018 ISG meeting, ELEXON recommended that the VoLL review process be delegated by the Panel to the ISG. An ISG member expressed their view that the group should not have the authority to review and recommend changes to VoLL. They stated such a review should be led by the Authority (Ofgem), with input from all relevant parties (including, but not limited to, ELEXON, National Grid, the Department for Business, Energy and Industrial Strategy (BEIS) and Industry). The ISG agreed that any VoLL review should not be delegated.

2.5 In addition to the review triggers detailed in the BSC, ELEXON suggests a VoLL review may be triggered at any time by one of the following actions:

(a) irregularities in the Imbalance Prices, such as high or low prices caused by the use of RSVP; or

(b) the number of times RSVP is being used increases considerably.

2.6 If ELEXON finds data anomalies from the annual data review, the findings will be shared with the ISG and Panel. They will also be raised with the Authority, as this may influence their decision to request a more detailed VoLL review.

2.7 As part of this review, all relevant industry participants will be consulted. If this consultation identifies that further analysis is required, and ELEXON cannot provide this, then the Panel can suggest an external group conducts a more in-depth economic study. During this review, ELEXON will continue to monitor the effect of VoLL on the Imbalance Price out of best practice, and feedback any further anomalies to the external study group.

2.8 The findings of this study would be delivered back to the Panel and Industry. Once reviewed, any suggested changes to VoLL would require approval by the Authority.

2.9 The ISG agreed with the suggested VoLL Review Process.

3. Summary of VoLL Data Review

3.1 As the VoLL is a parameter used in the calculation of the RSVP, any data review of VoLL will by definition focus on the use of RSVP in setting the Energy Imbalance Price. ELEXON’s analysis focuses on how changing VoLL affects the RSVP and Imbalance Price (see Appendix 1 for full details). In summary, the main findings were as follows:

- Increasing VoLL from £3,000/MWh to £6,000/MWh has little impact. The number of actions repriced by the RSVP in Settlement Period 35 on 17 May 2017 increased by 1, from 44 to 45 (as shown in Graph 1);
The maximum difference to the Imbalance Price from VoLL £0/MWh to £6,000/MWh is £205/MWh, as shown in Graph 2. Above £6,000/MWh, the maximum difference remains unchanged up to a VoLL of £17,000/MWh (based on full year 2017 data); The RSVP has been used on seven calendar days, as shown in Graph 3 (5 November 2015 to 24 February 2018 analysed, referred to as the 'review period'); and Across the review period, RSVP was used to reprice 174 actions in eight Settlement Periods.

4. **Recommendations**

4.1 We invite you to:

   a) **NOTE** the VoLL analysis conducted as shown in Appendix 1; and
   b) **APPROVE** the VoLL Review Process and triggers, as detailed in this paper.

**Appendices**

Appendix 1 - VoLL Analysis conducted by ELEXON

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APPENDIX 1 – VOLL ANALYSIS CONDUCTED BY ELEXON

To show the impact that changing the VoLL has on the number of times the RSVP is applied to the Imbalance Price, the PAR 50 Imbalance Price calculations were re-run using VoLL values between £1,000/MWh and £17,000/MWh (in £1,000/MWh increments). These parameters align with the study conducted by London Economics in 2013. Data shown in Graph 1 covers the full year 2017:

Graph 1 - Effect of VoLL on the number of instances that RSVP is applied

STOR Flagged actions are repriced when the RSVP is greater than the Utilisation Price. With the VoLL set at current levels (£3,000/MWh), the RSVP repriced 44 STOR Flagged actions during Settlement Period 35 on the 17 May 2017. This is the only day and period that the RSVP was used to reprice the Imbalance Price in 2017.

If the VoLL was £6,000/MWh during the same period, as it will be from 1 November 2018 onwards, it would have only repriced one additional STOR Flagged action (45 STOR Flagged actions repriced). There is a step change when the VoLL is £7,000/MWh, as it would reprice 89 STOR flagged actions for this period.

Note RSVP repriced actions do not necessarily set the Imbalance Price, as they can be removed by Tagging operations in the Imbalance Price calculation.

The Price Average Reference (PAR) will change from 50MWh to 1MWh, and the VoLL from £3,000/MWh to £6,000/MWh, on 1 November 2018. The increase in the VoLL will increase the value of RSVP, and therefore the number of STOR flagged actions repriced. The reduction in PAR means less volume will set the Imbalance Price.

Table 1 below shows how the change in PAR and VoLL affected Imbalance Prices between September 2016 and May 2017. Under PAR 50 and VoLL £3,000/MWh, 123.53MWh of RSVP repriced actions set the Imbalance Price, compared to 4MWh of RSVP repriced actions setting the Imbalance Price under PAR 1 and VoLL £6,000/MWh.

73 RSVP repriced actions set the Imbalance Price under PAR 50 and VoLL £3,000/MWh, compared to 153 RSVP repriced actions setting the Imbalance Price under PAR 1 and VoLL £6,000/MWh. While there are more RSVP repriced actions setting the Imbalance Price under PAR 1 and VoLL £6,000/MWh, a smaller volume of these actions set the Imbalance Price due to the reduction in PAR.
## Table 1 – Summary of repriced RSVP actions, pre and post November 2018

<table>
<thead>
<tr>
<th>Settlement Date</th>
<th>Settlement Period</th>
<th>Pre 1 November 2018 PAR 50, VoLL £3,000/MWh</th>
<th>Post 1 November 2018 PAR 1, VoLL £6,000/MWh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Volume RSVP repriced Imbalance Price Setting Actions (MWh)</strong></td>
<td><strong>Number of RSVP repriced Imbalance Price Setting actions</strong></td>
</tr>
<tr>
<td>14/09/2016</td>
<td>40</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>30/09/2016</td>
<td>39</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>09/10/2016</td>
<td>39</td>
<td>50.00</td>
<td>27</td>
</tr>
<tr>
<td>25/10/2016</td>
<td>38</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>31/10/2016</td>
<td>35</td>
<td>23.54</td>
<td>2</td>
</tr>
<tr>
<td>17/05/2017</td>
<td>35</td>
<td>49.99</td>
<td>44</td>
</tr>
</tbody>
</table>

For two Settlement Periods in the table above (31 October 2016 and 17 May 2017), RSVP repriced actions set the Imbalance Price under PAR 50 and VoLL £3,000/MWh, but did not under PAR 1 and VoLL £6,000/MWh. For these two Settlement Periods, the volume of the RSVP Repriced actions was removed due to Net Imbalance Volume (NIV) Tagging.

**Graph 2 - Effect of increasing VoLL on Imbalance Price**

Source: ELEXON

- Sum of Number of Settlement Periods where there is a Price Difference
- Sum of Maximum Price Difference
Graph 2 shows the effect that an increase in VoLL has on the Imbalance Price. Imbalance Prices were calculated for the full 2017 year using VoLL values between £0/MWh to VoLL £17,000/MWh (£1,000 increments). The Imbalance Price in each scenario was compared against the VoLL is £0/MWh scenario. The maximum difference in Imbalance Price is £205.22/MWh; this price difference is constant at VoLL values between £6,000/MWh and £17,000/MWh.

Graph 3 shows the number of times the RSVP has reprice STOR flagged actions, for 5 November 2015 to 24 February 2018. The RSVP has been used to reprice 174 actions, across eight Settlement Periods, on seven days. Where the RSVP has set the Imbalance Price, the LoLP value has ranged from 0.0341 to 0.2902. The LoLP is the probability that there will be insufficient total generation capacity, indicating that the RSVP should only reprice actions when there is a system stress event.

On the 17 May 2017, the RSVP was used to reprice 44 actions in Settlement Period 35. For this Settlement Period the De-Rated Margin (DRM) was 1,130.25, which equated to a static LoLP value of 0.0532. With the VoLL set at £3,000/MWh, and using the RSVP formula (RSVP = LoLP x VoLL), the RSVP was £159.70 (£159.70 = 0.0532 x £3,000/MWh).

Given the above analysis, the increase in VoLL to £6,000/MWh on 1 November 2018 is not expected to have a major impact on Imbalance Prices. However, note that RSVP (and therefore VoLL) is only used under extreme market conditions. It could be that these extreme conditions have not occurred in the period analysed, and so continued monitoring is required.