July 2002

ASSESSMENT REPORT

MODIFICATION PROPOSAL P78 – Revised Definition of System Buy Price and System Sell Price

Prepared by the Pricing Issues Modification Group on behalf of the Balancing and Settlement Code Panel

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Name	Organisation
Each BSC Party	Various
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The Gas and Electricity Markets Authority	Ofgem
Each BSC Panel Member	Various
Energywatch	Energywatch
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c Related Documents

Reference	Document
Reference 1	Modification Proposal P78 'Revised Definitions of System Buy Price and System Sell Price' (5 April 2002)
Reference 2	Initial Written Assessment of Modification Proposal P78 'Revised Definitions of System Buy Price and System Sell Price' (IWA078, 18 April 2002)
Reference 3	Modification Proposal P74 'Single Cost-reflective Cash-out Price' (4 April 2002)
Reference 4	Initial Written Assessment of Modification Proposal P74 'Single Cost-reflective Cash-out Price' (IWA074, 18 April 2002)
Reference 5	Consultation Document for Modification Proposals P74 and P78 (24 May 2002)
Reference 6	Modification Proposal P78 'Revised Definition of System Buy Price and System Sell Price' Requirements Specification (P078AS11, 26 June 2002)
Reference 7	Modification Proposal P74 'Single Cost-reflective Cash-out Price' Requirements Specification (P074AS11, 26 June 2002)

Reference	Document
Reference 8	Modification Report Modification Proposal P72 'Correction of a Minor Inconsistency in the BSC Arbitrage and Trade Tagging Methodology' (020MMU V1.0, 16 May 2002)
Reference 9	Modification Proposal P74 'Single Cost-reflective Cash-out Price' Assessment Report (P074AR03, 8 July 2002)

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1 SUMMARY AND RECOMMENDATIONS

1.1 Recommendations

On the basis of the analysis, consultation and assessment undertaken in respect of this Modification Proposal during the Assessment Phase, and the resultant findings of this report, the Modification Group recommends that the BSC Panel should:

- **Recommend to the Authority that the Alternative Modification P78 should be made;**
- **If an Authority decision is made by 15 October 2002 the Implementation Date should be 25 February 2003. If an Authority decision is received after this date, but before 19 February 2003, the Implementation Date should be 24 June 2003; and**
- **Note the development and implementation costs from the Alternative Modification of £362,000, BSC Central Service Agent costs. This cost excludes ELEXON effort (300 man days).**

- **Recommend to the Authority that the Proposed Modification P78 should not be made;**
- **However, if the Authority determine that the Proposed Modification should be made, the Implementation Date should be 25 February 2003, if an Authority decision is received by 6 September 2002. If an Authority decision is received after this date, but before 8 January 2003, the Implementation Date should be 24 June 2003; and**
- **Note the development and implementation costs from the Proposed Modification of £614,500, from BSC Central Service Agent costs. This cost excludes ELEXON effort (400 man days), and any cost of procurement of the Market Index Data.**

1.2 Background

Modification Proposal P78 'Revised Definition of System Buy Price and System Sell Price' was raised by National Grid (the Transmission Company) on 5 April 2002. The Modification requires that the definition of the Energy Imbalance Prices be revised such that there is a main and reverse price. The Modification Proposal requires that the main price be calculated from those balancing actions (including net BSAD) taken to alleviate the Net Imbalance Volume (NIV) of the overall system (as defined in section 5). Thus, for a Settlement Period:

- Where the larger stack is the Bid stack, then the main price will be the System Sell Price, and the reverse price will be the System Buy Price; and
- Where the larger stack is the Offer stack then the main price will be the System Buy Price and the reverse price will be the System Sell Price.

The reverse price is derived from a market price, based on trading on the forwards and spot markets.

The Initial Written Assessment for Modification P78 (Reference 2) was considered by the Panel at its meeting of 18 April 2001. The Panel agreed to submit Modification Proposal P78 to the Assessment Procedure at that meeting, with the Assessment to be undertaken by the Pricing Issues Modification Group (PIMG). The Panel also tasked the PIMG with defining the Terms of Reference for Modification Proposal P78.

The Panel also agreed, at its meeting of 18 April 2002, that Modification Proposal P78 should be considered in parallel with Modification Proposal P74 'Single Cost – reflective Cash-out Price' (Reference 3), as the Initial Written Assessment for Modification Proposal P74 (Reference 4) was also considered by the Panel.

During the Assessment Procedure, the PIMG met ten times (on 25 April 2002, 1, 8, 15, 22 and 29 May 2002, 12 and 19 June 2002, and 3 and 10 July 2002). Two consultations were issued, the first on 27 May 2002 (responses due 11 June 2002) and the second on 4 July 2002 (responses due 11 July 2002). One impact assessment (detailed level) was requested from the BSC Central Service Agent, BSC Parties and ELEXON on 21 June 2002 (CPC0196, responses due 8 July 2002).

The PIMG agreed the Terms of Reference for the Assessment Procedure, and these were endorsed by the Panel at its meeting of 18 May 2002 (attached in ANNEX 8). The PIMG submitted an interim report for consideration by the Panel at its meeting of 13 June 2002, and in this report, the PIMG requested an extension to the Assessment Procedure in recognition of the complex issues raised by this Modification and the requirement for further analysis and assessment. The Panel agreed to an extension to the Assessment Procedure for Modification Proposal P78.

However, the Authority issued a notice pursuant to the BSC Section F 1.4.3, directing that the extension to the Assessment Procedure should not be made. The reasons for such direction were provided in the notice (dated 19 June 2002) as follows:

"*It has been acknowledged by NGC and the industry that the issues that the Modification Proposals* [P74 and P78] *seek to address are of great importance, which is demonstrated by the considerable amount of time the industry has already devoted to assessing the Modification Proposals to date.*

Having had regard to the relevance and importance of the outcome of these Modification Proposals in relation to a number of aspects of the regulatory regime, Ofgem considers that Modification Proposals P74 and P78 should be dealt with within the timeframes as set out within F2.2.9 of the BSC. Therefore Ofgem considers that it is essential for the 3-month Assessment Procedure to be adhered to."

The PIMG, at its meeting of 19 June 2002, in recognition of the time constraints, revised and agreed their work plan for the remainder of the Assessment Procedure, such that an Assessment Report for Modification Proposal P78 could be presented for consideration by the Panel at its meeting of 18 July 2002, thus adhering to the three months Assessment Procedure.

The PIMG agreed the provisional recommendations with regards to Modification Proposal P74 at its meeting of 3 July 2002 and these were provided, in a draft of this Assessment Report, for industry consultation on 8 July 2002 (responses due 15 July 2002).

The consultation responses from the second Assessment consultation were considered by the PIMG (by e-mail), and consequently, with due consideration to the consultation responses, the provisional recommendations of the PIMG with regards to Modification Proposal P78 were finalised by the PIMG (by e-mail and telephone).

1.3 Rationale for Recommendations

The following details the high level rationale for the decisions and determinations of the PIMG with regards to the Proposed and the Alternative Modification P78. The supporting deliberations and considerations are provided throughout this Assessment Report.

1.3.1 Proposed and Alternative Modification

The PIMG considered the Proposed Modification, namely the derivation of the Net Imbalance Volume, and the calculation of the Energy Imbalance Price. The majority of the PIMG believe that this approach to calculating the Energy Imbalance Price better separates system and energy balancing, by deriving the Net Imbalance Volume (i.e. the net system imbalance) and calculating an Energy Imbalance Price from only those balancing actions (Bid - Offer Acceptances and BSAD) taken to alleviate the Net Imbalance. The mechanism is set out in section 5 of this Assessment Report.

This mechanism effectively deems the Net Imbalance Volume to be energy balancing only, with all other actions (i.e. those in the opposite direction to the Net Imbalance, and an equal amount in the same direction as the Net Imbalance) to be system balancing actions. This results in a main price which, in the opinion of the majority of the PIMG, is more cost-reflective of the actions taken by the system operator for the purposes of energy balancing.

However, it should be noted that a number of PIMG members believe that this differentiation between system and energy balancing actions is not better than the current definition for differentiation, merely different. They believe that the Net Imbalance Volume tagging has the potential to remove too many energy balancing actions, from both the main and the reverse stack. For clarity, it should also be noted that these PIMG members did not support either the Proposed Modification or the Alternative Modification Proposal P78.

The mechanism for calculating the Net Imbalance Volume and the resultant Energy Imbalance Price necessarily means that there is no reverse price calculated from the balancing actions on the reverse Bid - Offer Acceptance stack, as these are deemed to be attributable to system balancing under this mechanism. Therefore a reverse price is required to retain the dual cash-out regime. The Modification Proposal proposed a market based reverse price, i.e. one derived from the forwards and spot markets, and suggested a straw man of the Settlement Period Net Imbalance Reference Price (SPNIRP), which is a simple average of the APX and UKPX Reference Prices.

The PIMG considered the market based reverse price and agreed that a market based reverse price should, in principle, reflect the costs of short term energy, be representative of a liquid traded market and be available for publication / calculation close to real time. Therefore the PIMG considered the currently available market indices (section 4) to determine if there were any that met this criteria. The PIMG determined that, in their opinion, none of the currently available indices were reflective of short term energy costs (as they are calculated from trades made some time out from the Settlement Period, and the PIMG believe that short term

means only 24 to 48 hours out from the relevant Settlement Period), nor were they available for publication until some time after real time.

Therefore the PIMG agreed that it would be appropriate to request a new index from any source that trades within day (i.e. short term trading) and that has sufficient liquidity in the majority of Settlement Periods close to real time. The PIMG noted that a number of potential index providers trade different products, but considered that it would be valid to include an index from differing products, as long as they were all being traded within a specified time from the Settlement Period, such that the resulting index is short term energy cost-reflective.

The PIMG placed the responsibility for defining what time period constitutes short term, in respect of trading energy, on the Panel, by recommending that, at least initially, it be set to 24 hours out from the Settlement Period in order to maximise inclusion of within day trades in any index provided.

However, the PIMG, in considering the market based reverse price, determined that a number of issues made the use of a market based reverse price 'unwieldy' (as set out in section 4.4). The PIMG believe the key issue to be liquidity in the forwards and spot markets (index providers), as there are still periods where there is relatively low liquidity in the index providers, and it could be argued that it is inappropriate to use an illiquid index in the calculation of the Energy Imbalance Price, as it then becomes unrepresentative of the costs of short term energy.

The information on traded volumes currently available from the forwards and spot markets is based upon trading for a Settlement Period over long periods prior to the Settlement Period. Therefore it is difficult to determine the level of within day liquidity. It could be considered that if there are five Settlement Periods a day with insufficient liquidity based upon all trading (explored in section 4), that this number may increase (perhaps significantly) if the window for trades being eligible to go forward into the Energy Imbalance Price is reduced. However, it is not possible to estimate the number of Settlement Periods for which the liquidity would be insufficient to set the reverse Energy Imbalance Price.

The PIMG also noted that there is the potential for manipulation of the index provided by trading on the index provider in order to influence the resulting index (section 4.4). However, the PIMG believe that there are probably sufficient safeguards are in place, and that there may be insufficient incentives / rewards to make such manipulation worthwhile.

The PIMG also considered the procurement process for obtaining the market index information from the forwards and spot markets. The PIMG noted that no information is available from the potential providers of the data at this time, despite requests for indicative costs and timescales. Therefore the PIMG believe there to be a relatively high risk associated with the procurement of the data, as the costs of such procurement are currently unquantifiable and have the potential to be substantial.

An additional risk resulting from the unquantifiable procurement costs is the requirement to go through Official Journal of the European Community (OJEC) procurement process if the costs of procuring the entire service exceed £100,000. It is expected that this would take in the region of five to six months to procure the service before any development and implementation of the interfaces to the BSC Central Service Agent can be undertaken.

As a consequence of the concerns raised by some members of the PIMG regarding liquidity levels close to real time, some members of the PIMG still believe that there would be

significant risks associated with the implementation of Proposed Modification P78, even if the procurement risks could be satisfactorily addressed.

The PIMG therefore wished to consider an alternative mechanism for deriving the reverse price.

The PIMG set out a number of criteria which any reverse price would be required to meet (section 4.2.2), but agreed that the three most important are:

– Ability for prompt price reporting;

– Robust against manipulation; and

– Reflective of the cost of short term energy.

The PIMG also considered the incentive properties of a reverse price, and in particular the Transmission Company's concerns that SC Parties should not be inappropriately incentivised by any reverse price valuing uninstructed imbalances more highly than Bid – Offer Acceptances.

On this basis, the potential options were reduced to two:

1. Main price with a non arbitrary spread; and

2. First non Arbitrage Bid - Offer Acceptance in the main stack.

The PIMG considered option (1) and agreed that all spreads proposed, that could be applied, could be considered to be arbitrary (given the timescales for deriving the formulation of a non arbitrary spread). Therefore this option was disregarded.

The PIMG considered (2) and agreed that since this formulation of the reverse price will be:

– Robust against gaming / manipulation (although it should be noted that there is a converse (minority) view that this could be gamed by tacit collusion amongst BSC Parties);

– Derived from a balancing action taken to alleviate the energy imbalance for the Settlement Period;

– Derived from an action taken by the system operator in the Balancing Mechanism in the Settlement Period, or from a contract struck in the open market (BSAD); and

– Valuing BSC Party actions by rewarding spill at the smallest, in absolute terms, Bid / BSAD price in the Settlement Period, and charging top-up at the smallest, in absolute terms, Offer / BSAD in the Settlement Period. Thus offering no benefit over that Party having Bid – Offered into the Balancing Mechanism for that Settlement Period.

This formulation could be considered, by some, to be sufficiently cost-reflective of short term energy and to preserve appropriate incentives on BSC Parties.

This formulation of the reverse price also creates a smaller spread between the two Energy Imbalance Prices than the current baseline, which could be considered to be appropriate, as it reduces the risk of imbalance exposure, whilst retaining appropriate incentives. Where the first non Arbitrage Bid – Offer Acceptance (or BSAD) is used, then, given the formulation of the Net Imbalance Volume and resulting main price, the resulting reverse price must always be:

– In the case of a positive Net Imbalance Volume (where the main price is the SBP) less than (or equal to, depending upon the depth of Offers) the SBP; and

– In the case of a negative Net Imbalance Volume (where the main price is the SSP) more than (or equal to, depending upon the depth of Bids) the SSP.

Given that this formulation of the reverse price meets all of the relevant criteria defined in section 4.2.2, the majority PIMG agreed that this is the most appropriate reverse price, and proposed that this option be taken forward in preference to the market based reverse price.

The Proposer of Modification P78 does not support the BOA based reverse price, as the Proposer believes that the Alternative Modification with the BOA based reverse price does not better facilitate the Applicable BSC Objectives than the Proposed Modification, with the market based reverse price, and, by definition, an Alternative Modification has to better facilitate Achievement of the Applicable BSC Objectives than the Proposed Modification (it should be noted that the Proposer believes that the Alternative Modification better facilitates achievement of the Applicable BSC Objectives than the current baseline).

The rationale for this preference is that the Proposer believes that the price associated with a Balancing Mechanism action / BSAD will unduly over reward imbalances in the opposite direction to the overall system imbalances, i.e. 'helpful' imbalances. However, it should be noted that a number of PIMG members do not support this rationale.

The PIMG compared the cost-reflectivity of the two reverse price formulations, the market based reverse price and the reverse price derived from the first non Arbitrage Bid – Offer Acceptance / BSAD (BOA based reverse price).

The majority of the PIMG believe that defining any reverse price is complex, on the grounds that the costs (to the system) of imbalances in the opposite direction to the system imbalance cannot be accurately assessed / quantified. Therefore this should be taken into consideration when determining the reverse price to be applied, and when considering the cost-reflectivity of such reverse price.

Therefore applying a market based reverse price was considered by some to be appropriate on the grounds that it values 'helpful' imbalances at a 'neutral price', i.e. the 'get out of imbalance' price, offering no benefit over having traded out of imbalance prior to the Settlement Period.

On this basis, some members of the PIMG believe that the market based reverse price could be considered to be a more cost-reflective option than the BOA based reverse price, on the grounds that a BOA based reverse price is reflective only of the cost of one balancing action in the same direction to the overall system imbalance.

This therefore may not be considered to be reflective of the costs of energy balancing the system, nor may it be considered to be targeting the costs of the System Operator energy balancing the system, as it is based on one balancing action in the opposite direction to the imbalances it is being levied on.

The majority of the PIMG do not support this rationale for the market based reverse price, as they believe that the BOA based reverse price is more cost-reflective of the actions taken to energy balance the system, as a consequence of it being derived from a balancing action (BOA or BSAD) taken to alleviate the energy imbalance for the Settlement Period and is also valuing BSC Party actions by rewarding spill at the smallest, in absolute terms, Bid / BSAD

price in the Settlement Period, and charging top-up at the smallest, in absolute terms, Offer / BSAD in the Settlement Period. Thus offering no benefit over that Party having Bid – Offered into the Balancing Mechanism for that Settlement Period.

In considering the cost-reflectivity and cost targeting of the BOA based reverse price, the PIMG indicated that they believe that the incentives that such a reverse price would place on BSC Parties (as a number of PIMG members believe that the BOA based reverse price will incentivise participation in the Balancing Mechanism, the balancing of individual positions and bilateral forward contracting, although it should be noted that some PIMG members believe that Proposed Modification P78 incentivises these things as well) are more important than the cost – reflectivity and cost targeting aspects.

Therefore, the majority of the PIMG prefer the use of the first non Arbitrage Bid - Offer Acceptance / BSAD from the main stack over the market based reverse price, for the reasons set out above.

It should be noted that on balance, the PIMG have concerns over the potentially significant procurement risk, robustness and practicality, as some members of the PIMG believe that there is a significant risk that the market based reverse price is impracticable, or would be based on small, possibly zero, volumes which might not be adequately cost-reflective. The arguments as to why this is considered to be the case are set out in section 4.4 of this Assessment Report. Therefore these aspects of the Proposed Modification have lead to the Alternative being the preferred option of the majority of the PIMG.

1.3.2 Impacts and Incentives from the Proposed and Alternative Modification

The following represent some conclusions reached by the PIMG on the impacts and incentives from the implementation of the Proposed and the Alternative Modification. The issues are set out in more detail in ANNEX 10 of this Assessment Report and the conclusions reached by the PIMG are provided in more detail in section 7.

- The calculation of the main price used by Modification Proposal P78 and its Alternative, improves cost-reflectivity over the current baseline, by better reflecting the split between energy and system balancing actions, which results in an Energy Imbalance Price which is more reflective of the costs of energy balancing than the current Energy Imbalance Price;
- The reverse price for both the Proposed and the Alternative Modification is more cost-reflective than the current Energy Imbalance Prices, as the reverse price for both the Proposed and the Alternative Modification removes the influence from system balancing actions inherent from the current Energy Imbalance Price regime (as the smaller stack, which effectively sets the reverse price under the current regime, is more likely to be influenced by system balancing actions);
- However, the reverse price for the Alternative Modification is considered by some to be more cost-reflective of the costs of the system operator in (energy) balancing the system, as it is based upon either the BSAD traded by the Transmission Operator prior to Gate Closure, or a Bid – Offer Acceptance taken by the Transmission Company in the Settlement Period, whereas the reverse price for the Proposed Modification is market based and therefore reflective of the costs of trading out any imbalance prior to the Settlement Period;

- The Proposed Modification values passive (uninstructed spill / top-up) and active (deliberate spill / top-up against contract position) actions by parties at a (reverse) price derived from the Forwards and Spot markets, such that parties with 'helpful' imbalance positions (i.e. those with imbalances in the opposite direction to the overall system length) are not unduly rewarded, nor are they unduly penalised, as this approach offers no benefit over trading out of imbalance ahead of Gate Closure and is therefore neutral;

  However, it could also be argued that as the market based reverse price does not include a premium for flexibility, it under rewards imbalances in the opposite direction to the system (i.e. 'helpful' imbalances) and is not cost-reflective of short term energy;

- The Alternative Modification places a value of BSAD or the cheapest Offer / most expensive Bid (non Arbitrage) (from the same direction as the overall system imbalance) on imbalances helping the system at a price which reflects the minimum 'reward' for bidding into the Balancing Mechanism, therefore adding no benefit over having bid into the Balancing Mechanism;

- Asymmetric risk would be reduced, but not removed, under both the Proposed Modification and the Alternative, as a consequence of the reduction in spread and associated volatility of the Energy Imbalance Prices;

- Both the Proposed and the Alternative Modification better incentivise parties to balance their individual positions, over the current baseline, by reducing the perceived volatility. Parties would seek to come closer to balance, thus bringing the market closer to balance;

- It is unlikely that price hunting behaviour would emerge under either the Proposed or the Alternative Modification, as the cost-reflective Energy Imbalance Pricing would not make such behaviour worthwhile, in terms of imbalance reward. Therefore there are no undue concerns over system stability under the implementation of the Proposed or the Alternative Modification;

- Both the Proposed and the Alternative Modification will have the effect of increasing efficiency in the forwards markets as parties seek to trade out their imbalances. The potential reduction in the perceived volatility and spread of the Energy Imbalance Prices may have the effect of reducing notification risk, therefore encouraging more trading, closer to real time;

- Use of a market based reverse price will have a bigger effect on liquidity and efficiency in the forwards and spot markets (at least those utilised for the provision of the information used in calculating the market based reverse price) than the Alternative Modification, as parties will seek to trade on the forwards and spot markets in order influence the Energy Imbalance Price with their trading. This may increase liquidity on those forwards and spot markets that contribute to the Energy Imbalance Price;

- Implementation of either the Proposed or the Alternative Modification could have the effect of reducing risk profiles of parties, however, there is no effect from either the Proposed or the Alternative on the relative risk profiles of parties; and

- There is no direct effect on prompt price reporting or market transparency from the implementation of either the Proposed or the Alternative Modification. However, this is dependent upon the supporting changes to BSAD (for the reasons noted in the discussion document), which are beyond the vires of the PIMG and this Assessment Report.

1.3.3 Applicable BSC Objectives

On balance, the majority of the PIMG believe that the Alternative Modification is better than the Proposed in the overall facilitation of the Applicable BSC Objectives. The PIMG believe this to be the consequence of the utilisation of a market based reverse price, as the majority view is that such market based reverse price is not as cost-reflective of the energy balancing actions of the system operator as a Balancing Mechanism based reverse price (i.e. the Alternative Modification).

The majority of the PIMG agreed that in all other respects, the Proposed and the Alternative Modification were equal in better facilitating the Applicable BSC Objectives.

Reasons for better facilitating the Applicable BSC Objectives are:

- A proposed outcome of both the Proposed and the Alternative Modification is that the market will come closer to balance. On this basis, the system operator should be able to balance the market more efficiently and effectively;
- A proposed outcome of both the Proposed and the Alternative Modification is that the buy – sell spread of the Energy Imbalance Prices will be reduced, thus reducing the risks of exposure to imbalance, thus improving competition in the sale and purchase of electricity;
- The increased incentive for parties to balance their individual positions ahead of Gate Closure should result in increased accuracy of information provided to the system operator ahead of Gate Closure, thus enabling it to make informed decisions about balancing the system, improving efficiency and economic operation;
- Improving the cost-reflectivity of the Energy Imbalance Prices (assuming that the main price derived from the Net Imbalance Volume calculation is representative of the costs of energy balancing) should promote the efficient, economic and co-ordinated operation of the Transmission Network by providing more accurate signals to the system operator (and BSC Parties) of the costs of balancing the system;
- The Proposed and the Alternative Modification value 'uninstructed assistance' to the system (i.e. imbalances in the opposite direction to the overall system imbalance) at the same (Proposed Modification) or a less good price (Alternative Modification) than if they had been fully contracted, to reflect that they may be imposing costs on the system. Both could be considered to be more cost-reflective than the current baseline;
- Improving the cost-reflectivity of the Energy Imbalance Prices (again assuming that the main price derived from the Net Imbalance Volume calculation is representative of the costs of energy balancing) means that the cost of energy balancing is more correctly targeted at those causing the imbalance, and therefore this improves competition by preventing cross-subsidies;
- The implementation of a more cost-reflective dual cash-out price regime incentivises participants to balance their individual positions ahead of Gate Closure, therefore minimising the actions that the system operator has to take to correct the system energy imbalance. Thus, this assists in minimising the role of centrally administered mechanisms and facilitates the bilateral trading of energy; and
- Reduction in the risk of exposure to imbalance, whilst maintaining the incentives to balance, and therefore trade bilaterally, ahead of Gate Closure, may have the effect of

encouraging participants to trade closer to real-time, with the associated effect of improving liquidity in the forwards and spot markets, thus increasing competition.

1.3.4 Implementation Aspects

The PIMG noted that the Detailed Level Impact Assessment from the BSC Central Service Agent quoted timescales as follows:

- Proposed Modification – 21 weeks development and implementation; and
- Alternative Modification – 15 weeks development and implementation.

ELEXON require a number of weeks following the BSC Central Service Agent development and implementation to complete full participant testing. It is envisaged that this will incur four to five weeks additional to the timescales quoted by the BSC Central Service Agent.

The PIMG agreed that, given the significance of the Modification and its Alternative, that any implementation should be undertaken at the earliest opportunity. The PIMG noted the current timetable of BSC Releases allows the Proposed and the Modification to be implemented as part of the 25 February 2003 release, depending upon the date of Authority decision, and the PIMG agreed that this was the earliest practicable implementation date.

However, given the PIMG requirement for implementation at the earliest opportunity, the possibility of advancing the potential Implementation Date for the Proposed and Alternative Modification is being investigated.

1.4 Issue with BSAD Reporting

An issue has been identified with the mechanism proposed by the Transmission Company (the Proposer of P78) for the calculation and reporting of BSAD under Modification P78 (both the Proposed and the Alternative). The Modification Proposal requires that the volumes associated with system balancing trades be included in the BSAD reported into the BSC Central Service Agent in order to derive a true Net Imbalance Volume.

The issue arises when the system operator undertakes system to system trades across the Interconnector with France. An example of these trades is when, overnight, the system operator has bid back gensets as far as their Stable Export Limits (SELs), but still needs to create downward regulation ("footroom"). The economic decision maybe for the Transmission Company and RTE to agree to deviate the Interconnector flow 'downwards' (reduced import) from the day ahead schedule.

The volume of deviation is then calculated and agreed (manually) over the next one to two working days (in accordance with BSCP04) (it should be noted that the volumes, by definition, are classed as system). Therefore these volumes currently, are not finalised until some time after real time. This means that the real time reported BSAD under Modification P78 does not include these volumes.

Analysis was undertaken to determine what materiality this has on the Net Imbalance Volume, and therefore the Energy Imbalance Price, and 20,000+ Settlement Periods were looked at. It was determined that these system to system trades have been undertaken for 15% of Settlement Periods, and are consistently for volumes in the order of 300 MWh. It was determined that for 2% of Settlement Periods (~400), not including these system to system

trades in the Net Imbalance Volume calculation would have resulted in an overall system imbalance in the opposite direction to that calculated with the system to system trades.

Therefore it can be seen that prompt price reporting (which would not include these volumes) would be inaccurate for 15% of Settlement Periods as a consequence of these trades. This is clearly unacceptable, given the importance placed on prompt and accurate price reporting.

The Transmission Company is currently exploring solutions to this issue, but believe that it will be possible to report these system to system trades promptly, such that the prices reported on the BMRA are accurate for the vast majority of Settlement Periods.

The Transmission Company believe that a robust automated solution will be available by any implementation in the BSC Systems 24 June 2003 release. However, if the Modification (Proposed or Alternative) is implemented in the 25 February 2003 BSC Systems release, the Transmission Company believe that it may be possible to develop a (manual) workaround, as an interim solution, until the fully automated solution could be developed and implemented, and it should be recognised that any manual workaround may not be as robust as the automated solution.

However, the Transmission Company have indicated that there may not be an interim solution available by the February release. Therefore it should be recognised that, following the precedent set by Modification Proposal P18A, prompt price reporting will be inaccurate, under the circumstances outlined above, until such an interim workaround / automated solution is implemented.

2 INTRODUCTION

This Report has been prepared by ELEXON Ltd., on behalf of the Balancing and Settlement Code Panel ('the Panel'), in accordance with the terms of the Balancing and Settlement Code ('BSC'). The BSC is the legal document containing the rules of the balancing mechanism and imbalance settlement process and related governance provisions. ELEXON is the company that performs the role and functions of the BSCCo, as defined in the BSC.

An electronic copy of this document can be found on the BSC website, at www.elexon.co.uk

3 MODIFICATION GROUP DETAILS

This Assessment Report has been prepared by the Pricing Issues Modification Group. The Membership of the Modification Group was as follows:

Name	**Organisation**
Justin Andrews	ELEXON (Chair)
Peter Wibberley	ELEXON
Mandi Francis	ELEXON
Rob Barnett	Campbell Carr (Proposer)
Bob Brown	Cornwall Consulting
Paul Dawson	Barclays Capital

Name	**Organisation**
Libby Glazebrook	Edison Mission
Martyn Hunter	St. Clements Services
Sharif Islam	TotalFinaElf
Paul Jones	PowerGen
Danielle Lane	British Gas Trading
Richard Lavender	National Grid
Chris Leeds	Entergy - Koch Trading
Martin Mate	British Energy
Paul Mott	London Electricity Group
Ian Mullins	BP Gas, Power and Renewables
Andrew Murray	Entergy
Graham Oxley	RWE Trading Direct
Bill Reed	Innogy
Lisa Waters	Dynegy
Michael Wilks	Williams Energy
Ben Willis	Npower
Adam Higginson / Anthony Doherty	Ofgem

4 REVERSE PRICE CONSIDERATION

4.1 Proposed Modification Proposal

Modification Proposal P78 'Revised Definition of System Buy Price and System Sell Price' was raised by National Grid (the Transmission Company) on 5 April 2002, The Modification requires that the definition of the Energy Imbalance Prices be revised such that there is a main and reverse price. The Modification Proposal requires that the main price be calculated from those balancing actions (including net BSAD) taken to alleviate the Net Imbalance Volume (NIV) of the overall system (as defined in section 5). Thus, for a Settlement Period:

- Where the larger stack is the Bid stack, then the main price will be the System Sell Price, and the reverse price will be the System Buy Price; and
- Where the larger stack is the Offer stack then the main price will be the System Buy Price and the reverse price will be the System Sell Price.

The reverse price is to be a market price, derived from trading (close to real time) in the forwards and spot markets.

The Proposer of Modification Proposal P78 did not include a definition of the reverse price in the Modification Proposal, as it was felt that is was more appropriate for the Modification Group to define the reverse price. The Modification Proposal contained a straw man of Settlement Period Net Imbalance Reference Price (SPNIRP), which is a simple average of the Reference Prices from UKPX and APX (published after real time).

The PIMG therefore considered the most appropriate reverse price for Modification Proposal P78.

4.2 Formulation of the Reverse Price

Modification Proposal P78 requires that the reverse price to be applied to energy imbalances opposite to the Net Imbalance Volume be a market price, derived from forwards and spot market based trading. It should be noted that the following reflects the conclusions of the PIMG relating to the market price. However, there were preliminary discussions surrounding the market price, and these are provided in Annex 9.

The following represents the consideration of such a reverse price by the PIMG.

4.2.1 Market Indices and Available Information

Modification Proposal P78 proposes the use of a market price index in the Energy Imbalance Price calculations. The intention of this index is to reflect the value of energy traded immediately prior to Gate Closure in the pricing of (post Gate Closure) imbalances.

The PIMG requested that ELEXON investigate and report the information currently available within the market which could be used to formulate a market based reverse price for Modification Proposal P78. The following represents that report to the PIMG.

The following describes market price indices that are available which could be considered for such a purpose.

The attached table describes indices available for electricity trading in England & Wales. The sources available are:

1. Price reporters that undertake independent surveys of the market, and who include Heren, Platts and Argus;

2. The power exchanges, UKPX and APX; and

3. Andersen Spectron, which bases an index on all trades brokered by it.

Only the power exchanges provide indices for within-day trading; all other indices are for, at best, day-ahead trades. Likewise, only the power exchanges publish indices for less than whole-day trades. Some brokerages trade EFA blocks, but do not publish indices due to low liquidity.

Scottish Administered Wholesale Price

The Scottish Administered Wholesale Price is used to cap the price of wholesale purchases of electricity by Suppliers from the incumbent generation businesses, and provides a precedent for deriving a half-hourly price from the traded markets.

The energy component of the Scottish Administered Wholesale Price is calculated using:

– 20% weighting of the cumulative OTC baseload month ahead Petroleum Argus index;

– 20% weighting of the cumulative OTC baseload month ahead Heren index;

– 20% weighting of the cumulative OTC baseload month ahead Platts power index; and

– 40% weighting of the cumulative OTC baseload month ahead Andersen Spectron Power Index ("ASPI").

The flat monthly OTC price is then shaped to a half-hourly basis using UKPX power exchange half-hourly price profiles, to give a half-hourly profiled price. This method was consulted upon by Ofgem ('Scottish Administered Wholesale Pricing Arrangements: A review of the present arrangements and consultation on prices to apply from 1 April 2002', published December 2001).

By the nature of the method, the Scottish Administered Wholesale Price cannot be calculated until the end of the month.

Settlement Period Net Imbalance Reference Price (SPNIRP)

The Transmission Company's incentive arrangements, defined in the Transmission Licence, use a Settlement Period Net Imbalance Reference Price (SPNIRP), thus providing a further precedent for use of a market based price. In Ofgem's recent consultation on this arrangement, the Transmission Company proposed that this price should be derived from equal shares of each Platts, Argus and Spectron day-ahead prices, and also the daily UKPX and APX indices. After consultation, Ofgem's final proposals proposed an equal weighting of just the UKPX half-hourly index and APX EFA-block index. A benefit for this approach is to ensure that SPNIRP comprises prices varying within-day, and not a flat daily price.

Timing of Publication

Day-ahead prices are published on the day following trading. Power Exchanges publish their indices to comply with the requirements of their quote vendors but, in principle, could make data available within a couple of hours of the end of trading for a contract. This would

correspond more or less with the end of the Settlement Period for half-hourly contracts (assuming one hour Gate Closure). For four-hourly blocks, the contract will stop trading approximately one and a half hours in advance of the first Settlement Period in the four hour block, and five hours in advance of the last Settlement Period of the block.

Exchange data could be made available close to real-time, although the shortening of Gate Closure means there will be only two, rather than four and a half, hours from the exchange markets closing (which is typically half-an-hour before Gate Closure) to the end of the Settlement Period.

Timing of Trades

The closer to Gate Closure the trades are on which an index is based, the more reflective of market conditions at Gate Closure will be the index. Conversely if an index is based on trades that may have been done sometime before Gate Closure then:

(1) The index will be based on trades done when the information in the market (which is what moves market prices) was other than that which was available at Gate Closure. In this respect, the index will not reflect market conditions at Gate Closure, and hence arbitrage opportunities will exist;

(2) Market participants will have the opportunity to anticipate the index, by observing the development of market conditions in the run up to Gate Closure. Thus, in a falling market, say, participants will know that the index is likely to be higher than the market prices obtainable immediately prior to Gate Closure.

Note, however, that predictability of an index - point (2), above – is not of itself an undesirable property – and, conversely, unpredictability is not a virtue. On the contrary, the importance of well-informed participants to an efficient market is often emphasised. However, it is the arbitrage opportunities presented by (1), which is likely to lead to inefficient prices both in the balancing mechanism and close to Gate Closure in the OTC and exchange-traded markets.

Liquidity

The more restrictive the transactions included in an index, the smaller will the volume on which the index price is calculated. The table shows volumes of up to circa 50GWh for a day-ahead index, equivalent to an average of approximately 2GW in all Settlement Periods.

The attached graphs show for purely half-hourly contracts on the UKPX power exchange, the number of Settlement Periods in the interval 1 June 2001 to 31 May 2002 for which the volume traded is less than any given amount. In deciding what proportion of Settlement Periods will not generate a sufficiently robust index, it is necessary to take a view as to what constitutes an adequate volume.

One possible criterion is that price reporters generally will not produce an index where there have been less than three trades. Assuming that in OTC markets these trades will be for no less than 25 MW, places a lower bound of 75 MW or 37.5 MWh on the acceptable volume in a half-hour. On this basis, the UKPX index would have sufficient liquidity in all but around 250 Settlement Periods. Doubling that requirement would increase the number of Settlement Periods with inadequate liquidity to 1300. Further analysis shows that the number of periods

of low liquidity has been higher in 2002, running at around 150 Settlement Periods a month with less than 75 MWh since the turn of the year[1].

During these periods of low liquidity, the index could be supplemented using 4 hourly contract data or, in extremis, day-ahead price indices.

A within-day index clearly would further limit the volumes in the index.

Conclusion

Only power exchange prices can (currently) be made available promptly. Even if day-ahead prices for daily baseload could be made available before the first Settlement Period to which they refer, it is unclear how these daily prices would be aggregated with half-hourly prices from the power exchanges.

Depending on the criterion for adequate liquidity, a single exchange could provide an adequate index on average 43 out of 48 Settlement Periods per day. During these periods, a price based on the trading of four hour blocks could be used (or the volumes of four hour blocks traded used to augment the half-hourly data) and, in extremis, a day-ahead index used.

Further work could be done to develop a within-in day index of on-exchange half-hourly trades based on the last 5 or 8 hours, say, of trading.

Further work with the exchanges would be needed to establish how promptly the index could be made available. However, irrespective of whether the explicit index is available promptly, it could be argued that the transparency of the exchange-traded market is high, giving some indication of the level of likely imbalance prices.

[1] There appears to be no clear daily pattern to the periods of low liquidity, although 60% occur overnight between 23:00 and 07:00.

Table 1 - Summary of Available Indices

Source		Index	Method	Contract Volumes (GWh)[2]	Comments
Andersen Spectron Power Indices (APSI)	Screen-based brokerage, using (all?) brokered trades.	Day Ahead	Volume-weighted average of all trades executed through Spectron Group Ltd. from market opening in the morning until 6pm for delivery on the next EFA day (11pm to 11pm), with minimum of 5 transactions.	~50 GWh	Data checked and index published at 9am on day after trading. Weekends often traded together, and individual Sat & Sun indices less reliable. Individual EFA blocks traded but volumes low and no index calculated.
		Month Ahead	Volume-weighted average of all trades executed through Spectron Group Ltd. from market opening in the morning until 6pm for delivery every day in the next EFA month.	~320 GWh	
		Cumulative Month Ahead	Volume-weighted average of all trades executed through Spectron Group Ltd. in an EFA month for delivery every day in the next EFA month.	1,300 – 8,400 GWh	
Heren	Price reporter	Day-ahead	Volume weighted average of baseload transactions, with minimum of 3 transactions	~ 4 – 6.5 GWh	
		Month ahead		~ 13-16 GWh	

[2] Note that the volume for an index for a month-ahead contract must be approximately 30 times that for a day-ahead contract to correspond to the same average MW level. Similarly the volume associated with a cumulative month-ahead index will encompass trades on every one of the days of a particular month, and hence should be expected to be greater than the daily month-ahead index by a similar factor.

Source		Index	Method	Contract Volumes (GWh)[2]	Comments
		Price Assessment	Close of day-ahead bid-offer ranges for EFA blocks	N/a	
Platts European Power Daily	Price reporter	GTMA Baseload	Days, Week ahead, Months, Quarters, Seasons and Years		
		GTMA Peak	Days, Week-ahead, Months, Quarters, Seasons and Years		
Energy Argus European Electricity Report	Price reporter	Day-ahead	Baseload	~20 GWh	
		Week-ahead	Baseload	~20 GWh	
		Month-ahead	Baseload	~175 GWh	
		Cumulative Month-ahead	Baseload	~6750 GWh	
		Cumulative Current Month	Baseload	~5500 GWh	
		Months	Baseload	-	
		Season-ahead	Baseload	~3,500 GWh	
		Cumulative Season-ahead	Baseload	~125,000 GWh	
		Season	Baseload, Peak, Off-peak, Load Shape 44	-	
		Annual	Baseload, Peak, Off-peak, Load Shape 44	-	

Source		Index	Method	Contract Volumes (GWh)[2]	Comments
UKPX	Exchange, using all on-UKPX trades	UKPX RPD 4HB & HH	Volume-weighted average of all trades for the relevant Settlement Period (including the Settlement Period trading as part of a relevant four hour block) over the lifetime of the contract from 22:15 on D-2 to four hours before Gate Closure	~ 0 - 0.75 GWh / Period ~ 7.5 – 15 GWh / Day	All trades monitored in accordance with FSA regulatory requirements. UKPX continues to calculate, but not publish, an index based on purely half-hour trades.
		Within-Day	Consulted upon, but nothing implemented as yet. Volume weighted average of last x hours trading of half-hour contract.		
APX	Exchange, using all on-APX trades	Four-hour EFA blocks	Weighted average of all APX trades	~ 0 - 4 GWh / Day	All trades monitored in accordance with FSA regulatory requirements.
		Day-ahead Baseload			
		Day-ahead Peak			

Figure 1 – Distribution of Exchange Half-Hourly Volumes

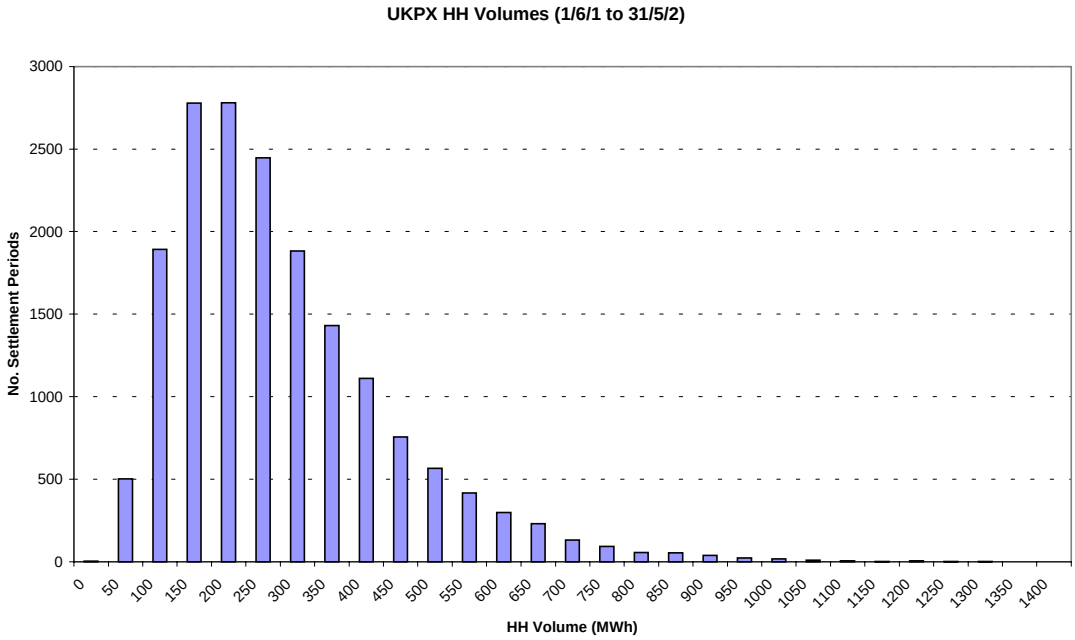


Figure 2a – Showing Number of Periods Below Any Given Volume

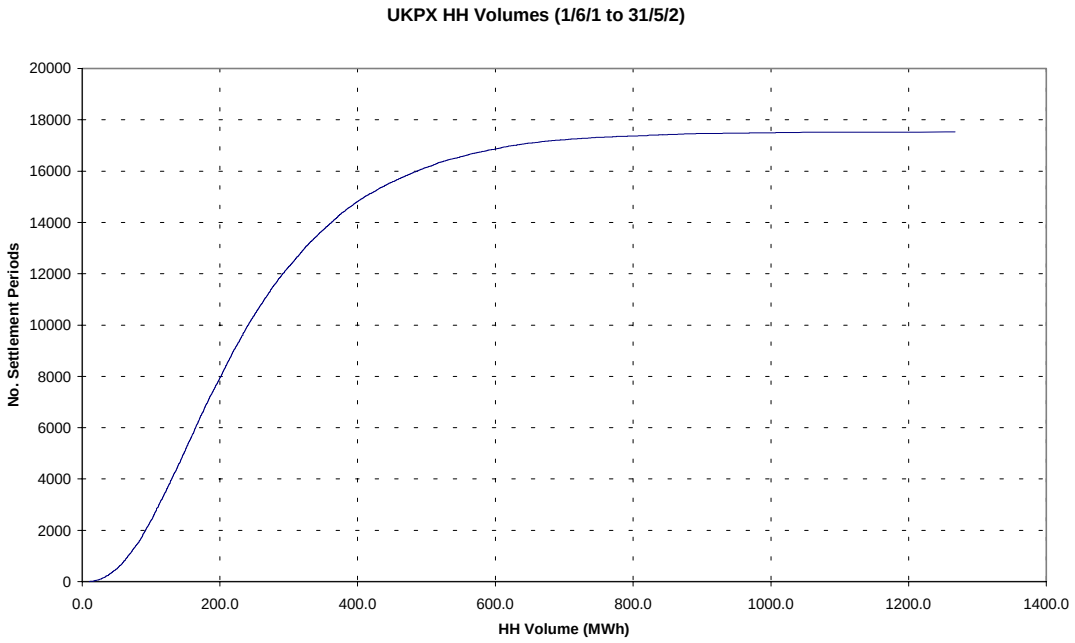
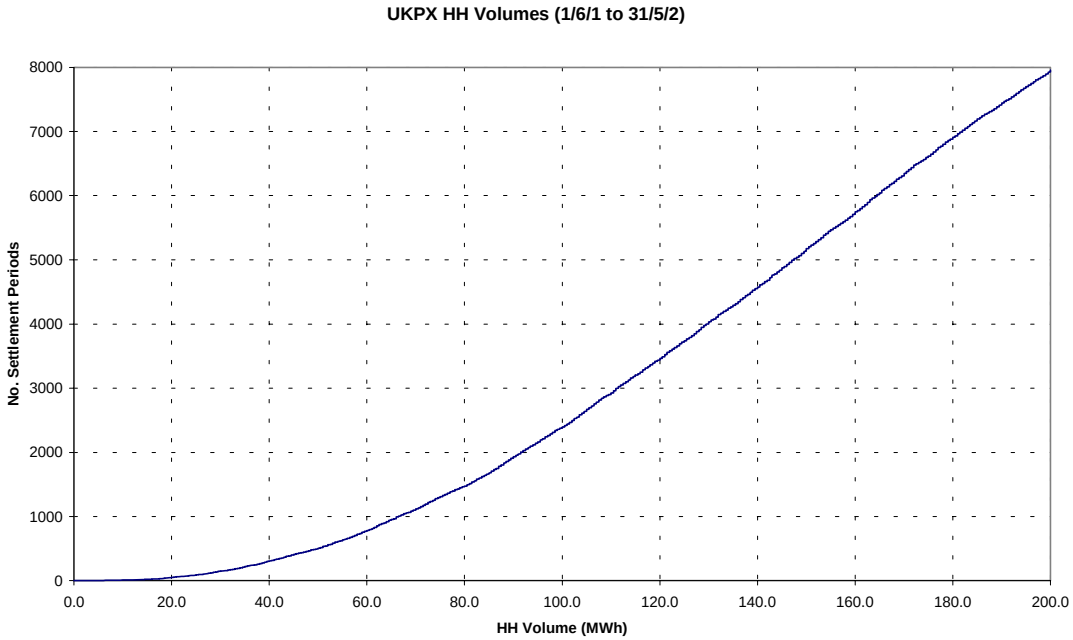


Figure 2b – Showing Number of Periods Below Any Given Volume (using an expanded scale to show low volumes)



4.2.2 Consideration of the Formulation for the Reverse Price

At its meeting of 8 May 2002, the PIMG suggested that the most appropriate market based reverse price would be a price derived from power exchange trading. However, the PIMG identified a number of criteria which would need to be addressed by any formulation of reverse price (the rationale behind this list or criteria is provided in Annex 9), as follows:

1. **Ability for prompt price reporting**;
2. **Robust against Predictability of the resulting Energy Imbalance Price**;
3. **Robust against Manipulation of the Energy Imbalance Price**;
4. **Robust against Volume Sensitivity**;
5. **Robust against Product Sensitivity**;
6. **Short term energy cost-reflective**[3];
7. **Transparent**; and
8. **Auditable and verifiable**.

The PIMG identified the potential candidates for the formulation of the reverse price, as follows:

– Settlement Period Net Imbalance Reference Price (SPNIRP);

[3] It should be noted that assessment against this criteria also included consideration of the incentives introduced by a reverse price, specifically on the incentive to participate in the Balancing Mechanism. This aspect is explored in more detail in Section 7.1.1.

- Market Indices Composite;
- Short term forwards and spot market based price;
- System Average Price;
- Rolling Average of historical reverse prices;
- Main price with a non arbitrary spread;
- Forwards and spot market based price with Balancing Mechanism component;
- BSAD trades in the reverse direction;
- First non-arbitraged Bid – Offer Acceptance on the reverse stack;
- First non-arbitraged Bid – Offer Acceptance on the main stack;
- Next available Bid – Offer on the main stack;
- Next available Bid – Offer on the reverse stack; and
- Price average of last non Arbitrage Bid Acceptance and Offer Acceptance in the Settlement Period.

The PIMG then applied the list of criteria to the proposed formulations of the reverse price.

Price:	Settlement Period based	Prompt Price Reporting	Robust against Predictability	Robust against Manipulability	Robust against Volume sensitivity	Robust against Product sensitivity	Short term energy cost-reflective	Transparent	Auditable / Verifiable
SPNIRP	✔	✘	✘	~	~	✘	✘	✔	✔
Market Indices Composite	✔	✘	✔	✔	✔	✘	✘	✔	✔
Short term exchange based price	✔	✔	✘	✘	✘	✘	✔	✔	✔
System Average Price	✔	✔	✔	✔	~	✔	✘	✔	✔
Rolling Average of historical reverse prices	✔	✔	✘	✔	✔	✔	✘	✔	✔
Main price with non arbitrary spread	✔	✔	✔	✔	✔	✔	✔	✔	✔
Exchange based price with BM	✔	✔	✔	~	~	✔	~	✔	✔

Price:	Settlement Period based	Prompt Price Reporting	Robust against Predictability	Robust against Manipulability	Robust against Volume sensitivity	Robust against Product sensitivity	Short term energy cost-reflective	Transparent	Auditable / Verifiable
component									
BSAD Trades in reverse direction	✓	✓	✓	✓	✗	✓	~	✓	✓
First non arbitrage BOA on reverse stack	✓	✓	✓	✓	~	✓	~	✓	✓
First non arbitrage BOA on main stack	✓	✓	✓	✓	✓	✓	✓	✓	✓
Next available Bid – Offer on reverse stack	✓	✓	✓	~	✓	✓	~	✓	✓
Next available Bid – Offer on main stack	✓	✓	✓	~	✓	✓	✓	✓	✓
Price average of last non-arbitraged Bid Acceptance and Offer Acceptance in the SP	✓	✓	✓	✓	✓	X	~	✓	✓

1. **SPNIRP**: This is an average of the Reference Prices published by APX and UKPX power exchanges. This is not available until some time after the Settlement Period to which it refers. Since the mechanism for the calculation of the reference price for each exchange is public, it may be that this enables some predictability of the resulting prices (through watching trades up to the Settlement Period), although this does support the transparency criteria. As the SPNIRP is a simple average of the Reference Prices, there may be some scope for manipulation by trading on the exchanges, noting the FSA influence in this area. It could be assumed that the price would be relatively robust against volumes, as a Reference Price is a composite of longer term trading, and therefore there should always be a reference price available. The reference prices are a composite of all the products traded over that exchange and therefore are not wholly representative of the costs of short term trading.

2. **Market Indices Composite**: This would be an average (weighted or simple) of the available indices published by all price reporters and exchanges. This is not available until some time after the Settlement Period to which it refers. Since the mechanism for the calculation of the index for

each reporter / exchange is public, this supports the transparency requirement. It is not expected that this price would be easy to manipulate, as the composition of the price would effectively dampen the price effects of individual exchanges. It could be assumed that the price would be relatively robust against volumes, as any index is a composite of longer term trading, and therefore there should always be a volume and price available. The reference prices are a composite of all the products traded and therefore are not wholly representative of the costs of short term trading.

3. **Short term forwards and spot market based price**: This would involve specifying to the relevant index providers the form of the data required to calculate the reverse price. It is expected that this data would then be utilised to calculate be an average (weighted or simple) price and volume of trades during a time constrained period of trading (for example, only two or three hours out from Gate Closure). This should be available at or just after Gate Closure for the Settlement Period to which it refers, and can therefore be published at the same time as the main price. Since the mechanism for the calculation of the resulting price would be public, it may be that this enables some predictability of the resulting prices (through watching trades up to the Settlement Period), although this does support the transparency criteria. As the price would result from trading close to real time on the forwards and spot markets, there may be some scope for manipulation by trading on them, noting the FSA influence in this area. It could be assumed that the price would not be entirely robust against volumes, as there may be periods of zero or low liquidity, and therefore there may not always be a (reasonable) volume and price available, this would require the definition of some robust default rules. The prices and volumes provided from the index providers may represent trades of differing products, however, this could be considered to be representative of the costs of short term trading.

4. **System Average Price**: This would be an average of all the balancing actions undertaken by the Transmission Company (System Operator) for a Settlement Period. This would be available just after the end of the Settlement Period to which it refers. Since the mechanism for the calculation of the System Average Price would be public, this supports the transparency requirement. It is not expected that this price would be open to manipulation, as the composition of the price is the actions taken by the Transmission Company. It could be assumed that the price would be relatively robust against volumes, as the number of Settlement Periods where there are zero balancing actions (BSAD and BOAs) should be low and therefore there should always be a volume and price available. However, it could be argued that an average price derived from all balancing actions is not wholly representative of the costs of short term trading.

5. **Rolling Average of historical reverse prices**: This would be a rolling average (weighted or simple) of the reverse prices over a specified period. This is available prior to the Settlement Period to which it refers, and is therefore entirely predictable. Since the mechanism for the calculation of the price would be public, this also supports the transparency requirement. It is not expected that this price would be easy to manipulate, as the composition of the price makes it robust in this respect. The price would also be robust against volumes, due to the formulation. However, such a formulation means that the resulting price is not representative of the costs of short term trading, as it is heavily dependent upon historical data. This also means that any perceived flaws in the calculation of the reverse price that the historical average is based are retained. Another consideration could be that unrepresentative price spikes could also have an undue influence on the resulting prices for a period of time until the average has rolled past.

6. **Main price with non arbitrary spread**: This would be the main price (calculated from the actions taken to alleviate the Net Imbalance Volume) with a non-arbitrary spread applied. This

would be available at the end of the Settlement Period to which it refers, at the same time as the main price. The mechanism for the calculation of the resulting price would be public, thus supporting the transparency criteria. However, it is not expected that this would result in a predictable price. As the price would result from actions taken by the Transmission Company for that Settlement Period, there is little scope for manipulation. It could be assumed that the price would be relatively robust against volumes / prices, as it would be based on the main price, and therefore there will always be a main price calculated (even if it is zero, although this should be very rare). The resulting price, depending upon the definition of the percentage spread could be considered to be relatively representative of the costs of short term trading. However, it is expected that there could be some difficulty in defining the non arbitrary spread to be applied, in order to make the reverse price cost-reflective.

7. **Forward and spot market based price with BM component**: This would involve specifying to the relevant index providers the form of the data required to calculate the reverse price. It is expected that this data would then be utilised to calculate be an average (weighted or simple) price and volume of trades during a time constrained period of trading (for example, only two or three hours out from Gate Closure). This should be available at or just after Gate Closure for the Settlement Period to which it refers. The Balancing Mechanism component, be it BSAD trades in the same direction, or a Bid – Offer Acceptance Price, could then be added in as appropriate. The resulting price can therefore be published at the same time as the main price.

   Since the mechanism for the calculation of the resulting price would be public, it may be that this enables some predictability of the resulting prices (through watching trades up to the Settlement Period) although it would be expected that this would be mitigated by the inclusion of the unknown quantity in the shape of the Balancing Mechanism component. The publication of the formulation supports the transparency criteria. As the price would result from trading close to real time on them, there may be some scope for manipulation by trading on the index providers, noting the FSA influence in this area, but again this would be mitigated by the inclusion of the unknown quantity in the shape of the Balancing Mechanism component. It could be assumed that the price would not be entirely robust against volumes, as there may be periods of zero or low liquidity, and therefore there may not always be a (reasonable) volume and price available, this would require the definition of some robust default rules. The prices and volumes provided from the index providers may represent trades of differing products, however, this could be considered to be representative of the costs of short term trading.

8. **BSAD Trades in reverse direction**: This would be the price derived from the BSAD trades undertaken by the Transmission Company (System Operator) for a Settlement Period, in the reverse direction to the main price. This would be available just after the end of the Settlement Period to which it refers. Since the mechanism for the derivation of the Price would be public, this supports the transparency requirement. It is not expected that this price would be open to manipulation, as the composition of the price is the trades taken by the Transmission Company. However, it could be assumed that the price would not be robust against volumes, as the number of Settlement Periods where there is zero BSAD in the reverse direction to the main price is relatively high and therefore there may not always be a volume and price available, thus requiring the definition of a set of robust default rules. It could also be argued that BSAD is not wholly representative of the costs of short term trading, as the majority of trades for BSAD are undertaken at day ahead.

9. **First non arbitraged BOA on reverse stack**: This would be the price derived from a Bid – Offer Acceptance taken by the Transmission Company (System Operator) in the Settlement

Period, in the reverse direction to the main price. This would be available just after the end of the Settlement Period to which it refers. Since the mechanism for the derivation of the Price would be public, this supports the transparency requirement. It is not expected that this price would be open to manipulation, as the composition of the price is an action taken by the Transmission Company. However, it could be assumed that the price would not be entirely robust against volumes, there may Settlement Periods where there are few balancing actions in the reverse direction to the main price and therefore there may not always be a volume and price available, thus requiring the definition of a set of robust default rules. It could also be argued that there is the potential for a system balancing action (as the price is derived from the reverse stack, which by definition in P78 comprises system balancing actions) to set the reverse price. Although this price could be considered to be representative of the costs of short term trading, as it is derived from a BM action. Conversely, the argument pertaining to a system balancing action not being representative of short term energy could be applied.

10. **First non arbitraged BOA on main stack**: This would be the price derived from a Bid – Offer Acceptance taken by the Transmission Company (System Operator) in the Settlement Period, in the same direction to the main price. This would be available just after the end of the Settlement Period to which it refers. Since the mechanism for the derivation of the Price would be public, this supports the transparency requirement. It is not expected that this price would be open to manipulation, as the composition of the price is an action taken by the Transmission Company. However, it could be assumed that the price would be fairly robust against volumes, as there should be few Settlement Periods where there are no non Arbitrage balancing actions in the same direction as the main price and therefore there should always be a volume and price available, thus requiring the definition of a set of robust default rules. This price could be considered to be representative of the costs of short term trading, as it is derived from a BM action.

11. **Next available Bid – offer on reverse stack**: This would be the price derived from Bid – Offer data, indicating the next available Bid – Offer Acceptance that could be taken by the Transmission Company (System Operator) in the Settlement Period in the reverse direction to the main price. This creates a similar effect to the current default rules (although it is expected that this will apply a check to ensure that there was available volume for the Transmission Company to have taken the Bid or Offer – i.e. addressing the issues raised by Modification Proposal P79).

    The resulting price would be available at the end of the Settlement Period to which it refers. Since the mechanism for the derivation of the Price would be public, this supports the transparency requirement. It is not expected that this price would be open to manipulation, as the composition of the price is an action that could have been taken by the Transmission Company. It could also be assumed that the price would be robust against volumes, as there should always be Bid – Offer data available. However, there may Settlement Periods where there are no available Bid - Offers in the reverse direction to the main price, thus requiring the definition of a set of robust default rules. This price could be considered to be representative of the costs of short term trading, as it is derived from a potential BM action, however, since it comes from the reverse stack, by definition, under Modification P78, it is a system balancing action.

12. **Next available Bid – Offer on main stack**: This would be the price derived from Bid – Offer data, indicating the next available Bid – Offer Acceptance that could be taken by the Transmission Company (System Operator) in the Settlement Period in the same direction as the main price. This creates a similar effect to the current default rules (although it is expected that this will apply a check to ensure that there was available volume for the Transmission Company to have taken the Bid or Offer – i.e. addressing the issues raised by Modification Proposal P79).

The resulting price would be available at the end of the Settlement Period to which it refers. Since the mechanism for the derivation of the Price would be public, this supports the transparency requirement. It is not expected that this price would be open to manipulation, as the composition of the price is an action that could have been taken by the Transmission Company. It could also be assumed that the price would be robust against volumes, as there should always be Bid – Offer data available. However, there may Settlement Periods where there are no available Bid - Offers other than those taken, thus requiring the definition of a set of robust default rules. This price could be considered to be representative of the costs of short term trading, as it is derived from a potential BM action in the same direction as the main stack.

13. **Price average of last non-arbitraged Bid Acceptance and Offer Acceptance in the Settlement Period**: This would be the price derived from the average of the last Bid – Offer Acceptances to be taken by the Transmission Company (System Operator) in the Settlement Period. The resulting price would be available just after the end of the Settlement Period to which it refers. Since the mechanism for the derivation of the Price would be public, this supports the transparency requirement. It is not expected that this price would be open to manipulation, as the composition of the price is an action taken by the Transmission Company. However, it could be assumed that the price would not be entirely robust against volumes, there may Settlement Periods where there are few balancing actions and therefore there may not always be a volume and price available, thus requiring the definition of a set of robust default rules. It could also be argued that there is the potential for a system balancing action (as the price is derived from an action on the reverse stack, which by definition in P78 comprises system balancing actions, as well as the last action in a Settlement Period on the main stack, which may well have been attributable to a system balancing action) to heavily influence the reverse price. Although this price could be considered to be representative of the costs of short term trading, as it is derived from BM actions. Conversely, the argument pertaining to a system balancing action not being representative of short term energy could be applied. Therefore on balance, this price can not be considered to be reflective of the costs of short term energy.

The PIMG determined that for an option for the reverse price to be considered as valid for setting the reverse price, it would have to be robust to the key criteria identified by the PIMG. Of the eight criteria listed, the PIMG determined that the most critical are:

- **Ability for prompt price reporting**;
- **Robust against Manipulation of the Energy Imbalance Price**;
- **Short term energy cost-reflective**;

Therefore it was agreed that any reverse price formulation which failed on these criteria would not be suitable for consideration. On this basis the majority of the options for consideration were disregarded, with only the following potential formulations remaining:

Main price with a non-arbitrary spread; and

First non-arbitrage Bid – Offer Acceptance on the main stack.

4.2.2.1 Main Price with Non Arbitrary Spread

The PIMG considered the derivation of the spread to be applied to the main price, and proposed the following option:

Main Price with BSAD Price Adjuster Spread:

This would be formulated as follows:

Where the Net Imbalance Volume comprises Offers, then the System Buy Price will be the main price, and the System Sell Price will be the System Buy Price minus the Buy Price Price Adjuster and where the Net Imbalance Volume comprises Bids, then the System Sell Price will be the main price, and the System Buy Price will be the System Sell Price plus the Sell Price Price Adjuster.

The PIMG considered this formulation and noted the following:

- The Price Price Adjusters (reflective of option fees) are not available for every Settlement Period, and therefore there may be relatively significant number of Settlement Periods where there would need to be a default;
- The Price Price Adjusters that are notified are relatively stable and amount to a very small differential, approximately £1 on the System Sell Price and £3 off the System Buy Price;
- Including option fees as a differential may have knock on impact on option contract prices, as Parties may negotiate their option contracts with a view to the effect on the differential applied to the Energy Imbalance Prices;
- It is difficult to argue that such a formulation of the reverse price results in an Energy Imbalance Price that is cost-reflective of short term energy; and
- It is difficult to argue that applying option fees as a differential is not arbitrary. It could be argued that reverse imbalances 'assist' the system operator, thus saving balancing costs, but still incurring option fees, such that it is appropriate to use the option fees as a differential. However, this is not a compelling argument for their use.

The PIMG agreed that similar arguments apply to all formulations, considered by the PIMG, for a non arbitrary spread, and the PIMG concluded that they did not believe there to be a formulation for a spread which would not be arbitrary, given the timescales for deriving a formulation of a non arbitrary spread. Therefore the PIMG agreed not to progress this option.

4.2.2.2 First Non – Arbitrage Bid – Offer Acceptance on the Main Stack

The PIMG agreed that, since BSAD is included in the stack for calculating the Net Imbalance Volume (as described in section 5), and represented contracts struck in an open market for the purposes of balancing the system, it would be appropriate for this formulation to include the £/MWh price derived from BSAD. Therefore the formulation is as follows:

Where the Net Imbalance Volume is negative, then the reverse price will be the maximum of the first non Arbitrage Bid Acceptance and the BSAD price, and where the Net Imbalance Volume is positive, then the reverse price will be the minimum of the first non Arbitrage Offer and the BSAD price.

The PIMG considered this formulation and noted the following:

- Given the composition of the Net Imbalance Volume stack, this formulation should always result in a reverse price which is reflective of the lowest price received / charged for participation in the

Balancing Mechanism. Thus it can be argued that this formulation provides the correct signals to Parties by rewarding spill at the smallest, in absolute terms, Bid / BSAD price in the Settlement Period, and charging top-up at the smallest, in absolute terms, Offer / BSAD in the Settlement Period. Thus offering no benefit over that Party having Bid – Offered into the Balancing Mechanism for that Settlement Period;

– Since this reverse price will be:

  - Derived from a balancing action taken to alleviate the energy imbalance for the Settlement Period:
  - Derived from an action taken by the system operator in the Balancing Mechanism in the Settlement Period, or from a contract struck in the open market; and
  - Valuing BSC Party actions as described in the above point.

  This formulation could be considered to be sufficiently cost-reflective of short term energy;

– This formulation of the reverse price also creates an appropriate spread between the two Energy Imbalance Prices. Where the first non-Arbitrage Bid – offer Acceptance (or BSAD) is used, then, given the formulation of the Net Imbalance Volume and resulting main price, the resulting reverse price must always be:

  - In the case of a positive Net Imbalance Volume (where the main price is the SBP) less than (or equal to, depending upon the depth of Offers) the SBP (Figure 4.2 (1) below) ; and
  - In the case of a negative Net Imbalance Volume (where the main price is the SSP) more than (or equal to, depending upon the depth of Bids) the SSP (Figure 4.2 (2) below).

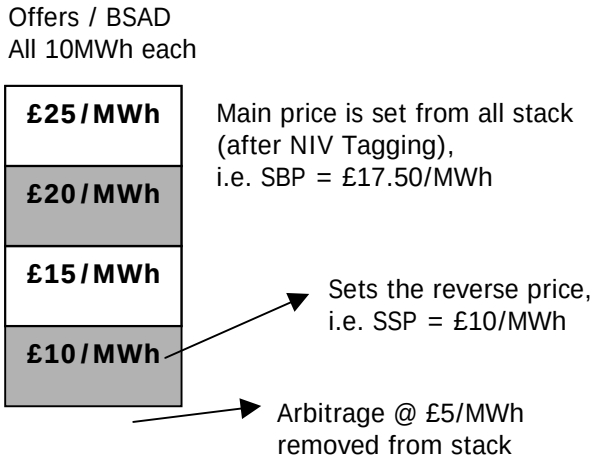


Figure 4.2 (1): Simplified derivation of Main and Reverse Price where the Net Imbalance Volume is Positive.

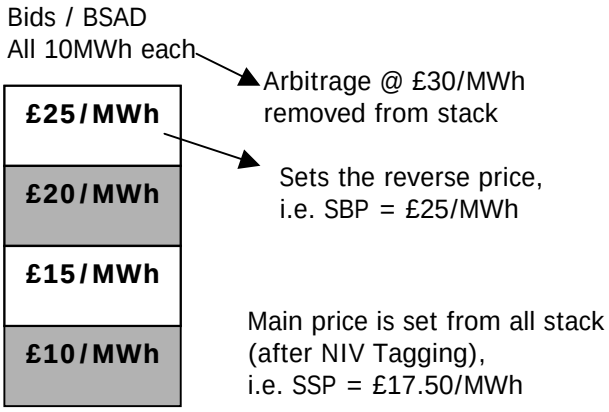


Figure 4.2 (2): Derivation of Main and Reverse Price where the Net Imbalance Volume is Negative.

Therefore the PIMG agreed that this formulation of the reverse price provides:

- Robustness against gaming / manipulation, as it is derived from an action actually taken by the Transmission Company, and it is difficult to see a party submitted a very low Offer Price, or high Bid Price for manipulating the resulting price, as there is the potential for arbitrage to remove these sort of Acceptance prices, and there is a high possibility that these will be accepted by the Transmission Company, therefore the party will be required to deliver against the prices submitted.

  However, it should be noted that some members of the PIMG believe this to be open to gaming by Parties, by tacit collusion when setting the Bid – Offer Prices.

  Some members of the PIMG noted that although the reverse price is set by a single Bid - Offer (or BSAD), any attempt to make the reverse price significantly more extreme than it should be by influencing the relevant Bid – Offer Price could result in that action no longer being the one setting the reverse price, i.e. what would be number two in the main stack would then set the reverse price. Thus the existence of the other Bid – Offers in the main stack should help to limit the extent to which the reverse price could be made more extreme by influencing one bid/offer, even though they do not directly set that reverse price.

  Conversely, an attempt to make the reverse price move significantly in the opposite direction could result in the original Bid – Offer, which would have set the reverse price, being Arbitraged out leading to a different Bid - Offer setting the reverse price. Again, the existence of the other Bid - Offers should help to limit the extent to which the reverse price could be made moved by influencing one Bid - Offer, even though they do not directly set that reverse price.

- The 'correct' value for imbalances in a Settlement Period, by valuing them at the lowest price available in the Balancing Mechanism, such that there is no benefit to Parties over offering into the Balancing Mechanism;

- The 'correct' cost-reflectivity, in that the reverse price is based on an energy balancing action for the Settlement Period; and

- The 'correct' spread between the System Buy Price and System Sell Price for each Settlement Period (explored further in section 7).

Given that this formulation of the reverse price meets all of the relevant criteria defined at the start of this section, the PIMG agreed that this is the most appropriate reverse price, and proposed that this option be taken forward in preference to the market based reverse price.

The Proposer of Modification P78 does not support the BOA based reverse price, as the Proposer believes that the Alternative Modification with the BOA based reverse price does not better facilitate the Applicable BSC Objectives than the Proposed Modification, with the market based reverse price, and, by definition, an Alternative Modification has to better facilitate Achievement of the Applicable BSC Objectives than the Proposed Modification (it should be noted that the Proposer believes that the Alternative Modification better facilitates achievement of the Applicable BSC Objectives than the current baseline).

The rationale for this preference is that the Proposer believes that the price associated with a Balancing Mechanism action / BSAD will unduly over reward imbalances in the opposite direction to the overall system imbalances, i.e. 'helpful' imbalances. However, it should be noted that a number of PIMG members do not support this rationale.

The PIMG therefore requested that comparative analysis be undertaken of the reverse Energy Imbalance Prices resulting from the Proposed and the Alternative Modification. This analysis is provided in Section 8 of this Assessment Report.

The PIMG compared the cost-reflectivity of the two reverse price formulations, the market based reverse price and the reverse price derived from the first non Arbitrage Bid – Offer Acceptance / BSAD (BOA based reverse price).

The majority of the PIMG believe that defining any reverse price is complex, on the grounds that the costs (to the system) of imbalances in the opposite direction to the system imbalance cannot be accurately assessed / quantified. Therefore this should be taken into consideration when determining the reverse price to be applied, and when considering the cost-reflectivity of such reverse price.

Therefore applying a market based reverse price was considered by some to be appropriate on the grounds that it values 'helpful' imbalances at a 'neutral price', i.e. the 'get out of imbalance' price, offering no benefit over having traded out of imbalance prior to the Settlement Period.

On this basis, some members of the PIMG believe that the market based reverse price could be considered to be a more cost-reflective option than the BOA based reverse price, on the grounds that a BOA based reverse price is reflective only of the cost of one balancing action in the same direction to the overall system imbalance.

This therefore may not be considered to be reflective of the costs of energy balancing the system, nor may it be considered to be targeting the costs of the System Operator energy balancing the system, as it is based on one balancing action in the opposite direction to the imbalances it is being levied on.

The majority of the PIMG do not support this rationale for the market based reverse price, as they believe that the BOA based reverse price is more cost-reflective of the actions taken to energy balance the system, as a consequence of it being derived from a balancing action (BOA or BSAD) taken to alleviate the energy imbalance for the Settlement Period and is also valuing BSC Party actions by rewarding spill at the smallest, in absolute terms, Bid / BSAD price in the Settlement Period, and charging top-up at the smallest, in absolute terms, Offer / BSAD in the Settlement Period. Thus offering no benefit over that Party having Bid – Offered into the Balancing Mechanism for that Settlement Period.

In considering the cost-reflectivity and cost targeting of the BOA based reverse price, the PIMG indicated that they believe that the incentives that such a reverse price would place on BSC Parties (as a number of PIMG members believe that the BOA based reverse price will incentivise participation in the Balancing Mechanism, the balancing of individual positions and bilateral forward contracting, although it should be noted that some PIMG members believe that Proposed Modification P78 incentivises these things as well) are more important than the cost – reflectivity and cost targeting aspects.

Therefore, the majority of the PIMG prefer the use of the first non Arbitrage Bid - Offer Acceptance / BSAD from the main stack over the market based reverse price, for the reasons set out above.

It should be noted that on balance, the PIMG have concerns over the potentially significant procurement risk, robustness and practicality, as some members of the PIMG believe that there is a significant risk that the market based reverse price is impracticable, or would be based on small, possibly zero, volumes which might not be adequately cost-reflective. The arguments as to why this is considered to be the case are set out in section 4.4 of this Assessment Report. Therefore these aspects of the Proposed Modification have lead to the Alternative being the preferred option of the majority of the PIMG.

It was also noted that use of the first non Arbitrage Bid - Offer Acceptance could be considered to result in a marginal price. The majority of PIMG members do not believe that the price associated with the first non Arbitrage Bid - Offer Acceptance / BSAD meets the definition of a marginal price understood by the majority of industry (i.e. the extreme Acceptances).

4.3 Alternative Modification

The PIMG recognised that the Proposer of Modification P78 (NGC) had not defined the formulation of the reverse price within the Modification Proposal, but referred to it as a "market price". Furthermore, NGC had proposed that it was more appropriate for the Modification Group to define the market price.

Therefore, following the definition and agreement of an appropriate market price by the PIMG, as described in section 4.2, it was not clear to the PIMG whether the agreed formulation could be considered to be sufficiently close to the intent of the Modification Proposal to be taken forward as the Proposed. Therefore, the PIMG requested ELEXON to investigate (with support from the Proposer) whether this was the case.

ELEXON reviewed the P78 Proposal (and supporting paper) and can confirm that the reverse price defined as "first non arbitraged BOA from main stack" would have to be considered as an **Alternative Modification**. This is based on view that the Modification Proposal is clear that the intention is that the reverse price be a "market" based price. The reasons for this view are as follows:

– The Modification Proposal refers to the reverse price as a market price through out; and

– The supporting paper to Modification P78 refers to the market price as a "commodity" price (see 2nd paragraph under Discussion). Additionally the start of this paragraph refers to Ofgem's determination in July 1999 as to whether a "commodity" price could be used as a basis for setting imbalance prices.

Additionally when the Panel considered P78 (at meeting 43 on 18 April 2002) it requested that the terms of reference for the PIMG contain a requirement for consideration of an Alternative using a formulaic approach as opposed to an external market reference price, confirming the assumption that a market price is forwards /spot market based. It should also be noted that the consultation responses

reflect this interpretation, as the majority of respondents associated the P78 market price with one derived from power exchange indices.

Therefore the PIMG agreed to proceed on the basis that:

– Proposed Modification Proposal P78 comprises the Net Imbalance Volume derived main price, and the market based reverse price; and

– The Alternative Modification P78 comprises the Net Imbalance Volume derived main price, and the first non Arbitrage Bid – Offer Acceptance reverse price.

4.4 Proposed Modification: Market Based Reverse Price

The PIMG considered a market based (i.e. based on the forwards and spot markets) reverse price at some length, and the preliminary considerations are provided in Annex 9 and in the preceding sections 4.1, 4.2 and 4.3.

The PIMG prefer the use of the first non Arbitrage Bid - Offer Acceptance as the reverse price, as a consequence of the issues outlined with the market based reverse price, as follows:

It should be noted that the information required to comprise the reverse Energy Imbalance Price can be obtained and received from any eligible source (as set out in section 5.3.2). Therefore, such sources are referred to as 'index providers'.

1. **Liquidity Drawbacks from the Market Based Reverse Price**: The analysis undertaken earlier in this section indicates that there are still periods where there is relatively low liquidity in the index providers and therefore the volumes traded are insufficient for derivation of a Energy Imbalance Price, as they cannot be considered to be representative (explored further in section 5.3.2). Default rules can be drafted which use index provider data for previous Settlement Periods for setting the Energy Imbalance Price where there is insufficient volume traded, however, this risks repetition of data across a number of Settlement Periods and it could be argued that this becomes unrepresentative of the costs of short-term trading. Therefore default rules for periods of low liquidity could comprise defaulting to the main price for these periods.

   The information on traded volumes currently available from the forwards and spot markets is based upon trading for a Settlement Period over long periods prior to the Settlement Period. Therefore it is difficult to determine the level of within day liquidity. It could be considered that if there are five Settlement Periods a day with insufficient liquidity based upon all trading, that this number may increase (perhaps significantly) if the window for trades being eligible to go forward into the Energy Imbalance Price is reduced. However, it is not possible to estimate the number of Settlement Periods for which the liquidity would be insufficient to set the reverse Energy Imbalance Price.

2. **Governance issues**: Governance for any forwards and spot market based information falls firmly outside of the BSC, and therefore use of information ungoverned by the BSC in the core part of the trading arrangements, namely the Energy Imbalance Price derivation and application, requires careful consideration and robust supporting arrangements.

   Contracts could be put in place with the index providers such that the (format for and timing of) provision of commercial forward and spot market information is controlled by BSCCo (ELEXON), via a commercial contract. However, this would be the extent of the jurisdiction of the BSC unless the index providers designated to provide information into the Balancing Mechanism became BSC Agents, (i.e. in the same way as the ECVAA).

Putting in place a commercial contract for provision of the information would be the limit of BSC control, and this does not address the more material problem of 'controlling' / governing the commercial trading that will comprise the traded volumes and prices going forward for the calculation of the Energy Imbalance Price. However, it could be argued that it is inappropriate to place further restriction on a commercial organisation.

Derivation of the information, i.e. the methodology for derivation of the resulting traded volumes and associated price, can be agreed and set out in a robust commercial contract for each index provider, such that it is clear how the resulting volume and price has been derived.

3. **Securing Provision of the Information**: Following on from the above point, it is expected that ELEXON would have to enter into commercial contracts with the index providers for provision of the information required, in terms of traded volumes and prices, and in terms of ensuring, via contract, that the index providers meet the obligations placed on them by the Code.

   This will require potentially a significant amount of effort to ensure that there are sufficient 'incentives' in place for the index provider to provide the requisite information for every Settlement Period within the time constraints set, and then to manage those incentives. It is expected that incentives would potentially include, but not be limited to, liquidated damages for non provision of the information in the requisite timescales, and compensation for erroneous price reporting.

4. **Potential for Manipulation of the Energy Imbalance Price**: The PIMG noted that utilisation of index providers to determine an Energy Imbalance Price could lead to trading on the index providers with the intent of impacting the resulting Energy Imbalance Price. For example, trades could be undertaken by parties over the index providers at the requisite price, and these trades could then be unwound using the self-notifying function of one of the parties, leaving both parties with effectively a zero position, but having affected the prices and volumes on the index provider. It would be extremely difficult to argue that this was a deliberate manipulation as the parties could argue that they were merely responding to signals in the market.

   This is a relatively extreme example, but it is highly likely that there will be trading on any designated index provider for the purposes of affecting the resulting Energy Imbalance Price, and proving that such trading is deliberate manipulation is unlikely.

   It could be argued that the FSA (Financial Services Authority) regulate such market abuse, and therefore this would prevent such manipulation. However, the same point as above could be raised. Electricity trading is undertaken in response to market signals, and therefore, it would be difficult to prove that a trade was done for the purposes of manipulation rather than for a legitimate response to the market at that time.

   An additional point with regards to FSA regulation is that it is believed that the regulation of market abuse only relates to financial markets, not physical markets, therefore the regulation may not cover policing of the Energy Imbalance Price, unless the intention to manipulate the Energy Imbalance Price feeds back into the financial market aspects.

   Given this aspect, consideration could be given to placing behavioural controls into the BSC. However, this sets a precedent which might not be entirely appropriate, as it introduces a 'grey area' into what is otherwise a 'mechanical' Code. Again the question has to be asked as to what constitutes the correct behavioural control (i.e. what constitutes manipulation as opposed to trading in response to market signals), and how would it be policed, and there is certainly no clear answer to this.

The PIMG concluded that although there is potential for manipulation, in reality, this would not be a material issue, on the grounds that:

- The opportunities for persistent arbitrage are not there;
- In an illiquid market, manipulation is obvious and the risks associated with such manipulation, such as FSA intervention and sanctions from the index provider affected, would outweigh the incentives to manipulate (although it could also be argued that an illiquid market is easier to manipulate and harder to prove); and
- In a liquid market, the effects of any manipulation would be lost, outweighed by the volumes of legitimate trades, and this coupled with the risks associated with the manipulation would outweigh incentives to manipulate.

5. **Predictability of the Energy Imbalance Price**: Given that (some of) the potential index providers operate screen based trading, open to all, trades can be followed and the potential Energy Imbalance Price determined prior to Gate Closure for the Settlement Period. Since there is no trading after Gate Closure, the potential price remains static from Gate Closure. If Parties believe that there is a favourable cash-out price, they may choose to deliberately go into imbalance to exploit such price. This has the potential to increase the volatility in the Balancing Mechanism.

   However, the PIMG believe that predictability is only an issue to the degree that it is 'gameable'. Following on from point 4, the PIMG believe that 'gameability' is not an issue, and therefore neither is predictability.

6. **Auditability and Verification**: Given that the index providers are external, commercial bodies providing information to be used in the calculation of Energy Imbalance Prices, it is expected that there would be a requirement to audit and verify the information so provided to ensure that it is reflective of the derivation of the information the index provider has been requested to provide, and that such information is an accurate representation of the composite trades.

   It is expected that the role of the BSC Auditor would have to be expanded to include such audit and verification, and it is envisaged that this would be a significant increase in effort, which in turn is reflected in BSCCo costs. It is also expected that the relevant index providers would seek to pass the costs incurred by themselves in terms of supporting such audit on to ELEXON. Therefore, as ELEXON would also be required to manage the audit / verification, use of a market based reverse price will have a substantial impact on ELEXON in terms of cost and resource in dealing with such audit and verification tasks.

7. **Impact on non-Designated Index Providers:** The discussion provided in ANNEX 9 details the PIMG deliberations regarding the impact of having (at least initially) a small number of designated index providers, on those index providers that are not designated. It is anticipated that Parties would seek to trade on the designated index providers in order to influence the resulting Energy Imbalance Price, and that therefore, may move their trades away from non-designated index providers. This is likely to have a detrimental affect on such index providers, which could be considered to be inevitable if a market based reverse price is utilised.

   The PIMG noted that trading across index providers is a commercial issue, and could be deemed to be out of scope of the PIMG, but it was suggested that consideration should be given to when defining a set of rules, to ensure that they do not adversely affect index providers unnecessarily.

8. **Risks from Designating Index Providers**: The PIMG noted that there could be a potential conflict of selection, whereby the selection of the index providers lead to cheap (in terms of obtaining and administrating the index) but unrepresentative indices, as opposed to inclusivity leading to 'hostage to cost' situation, which could be considered to be better in terms of representation of traded markets, but could lead to cost and governance issues.

   There is an associated risk that parties trade on the non Designated Index Providers, so that the Designated Index Providers are unrepresentative of the traded market.

The PIMG considered the procurement process for obtaining the market index information from the forwards and spot markets. The PIMG noted that no information is available from the potential providers of the data at this time, despite requests for indicative costs and timescales. Therefore the PIMG believe there to be a relatively high risk associated with the procurement of the data, as the costs of such procurement are currently unquantifiable and have the potential to be substantial.

An additional risk resulting from the unquantifiable procurement costs is the requirement to go through Official Journal of the European Community (OJEC) procurement process if the costs of procuring the entire service exceed £100,000. It is expected that this would take in the region of five to six months to procure the service before any development and implementation of the interfaces to the BSC Central Service Agent can be undertaken.

The PIMG also noted that a number of the responses to the first Assessment consultation raised concerns regarding the appropriateness of use of a market based reverse price in setting Energy Imbalance Prices, noting that this could introduce some perverse incentives, or introduce odd effects from the use of pre Gate Closure information for setting the Energy Imbalance Price.

It should be noted that on balance, the PIMG have concerns over the potentially significant procurement risk, robustness and practicality, as some members of the PIMG believe that there is a significant risk that the market based reverse price is impracticable, or would be based on small, possibly zero, volumes which might not be adequately cost-reflective. The arguments as to why this is considered to be the case are set out in section 4.4 of this Assessment Report. Therefore these aspects of the Proposed Modification have lead to the Alternative being the preferred option of the majority of the PIMG.

5 PROPOSED MODIFICATION

5.1 Proposed Modification Overview

Proposed Modification P78 requires that the single Energy Imbalance Price be calculated from those balancing actions (including BSAD) taken to alleviate the Net Imbalance Volume (NIV) of the overall system.

At a high level, the process required to support Proposed Modification P78 is as follows. It should be noted that both the BMRA and the SAA will utilise this process, BMRA for the calculation and publication of the Indicative Energy Imbalance Prices and SAA for calculation of the Energy Imbalance Prices used in Settlement Runs.

Firstly the Net Imbalance Volume is derived:

– Bid - Offer Acceptances have the Continuous Acceptance Duration Limit (CADL) applied in order to remove those Bid – Offer Acceptances deemed to have been taken for system balancing purposes;

– The remaining Priced Bid – Offer Acceptances have De-minimis volumes removed and are arbitraged;

– Then the remaining Priced Bid - Offer Acceptances are stacked in price order, with the Bid stack placing most expensive Bids first, and the Offer stack placing the cheapest Offers first;

– In order to derive a true Net Imbalance Volume, i.e. derive the energy imbalance volume for the Settlement Period, the stack should include BSAD, (including any volume deemed to have been for the purposes of system balancing[4]) and Bid – Offer Acceptance volumes attributable to system balancing (i.e. CADL'ed Acceptances):

  - The BSAD volume (which will include any volume attributable to system balancing) is added into the stack as if it were a Priced Bid – Offer Acceptance, i.e. slotted in, in price order, it should be noted that the BSAD will be provided such that there is no price associated with the volume attributable to system balancing, only a price for the energy balancing portion. Volume associated with sales into the Bid stack and the volume associated with purchases into the Offer stack; and

  - The Total System Un-priced Accepted Bid Volume (i.e. CADL'ed Bids) is added into the Bid stack as if it were the cheapest priced Bid and the Total System Un-priced Accepted Offer Volume (i.e. CADL'ed Offers) is added into the Offer stack as if it were the most expensive Offer. This places the CADL'ed Bid – Offer Acceptances in a position in the (relevant) stack such that they are the first volumes to be tagged out.

  This approach ensures that system balancing actions are represented in the Net Imbalance Volume derivation, but that the associated cost does not get carried forward into the Energy Imbalance Price calculation; and

– Once the Bid and Offer stack has been compiled, then the volume of the smaller stack is calculated (by tagging, referred to as Net Imbalance Volume, or NIV, Tagging), and the same

[4] Both the Original and the Alternative Modification P78 requires an amendment to the Balancing Services Adjustment Data Methodology, such that the BSAD volumes notified to the BSC Central Service Provider include volume attributable to system balancing, in order to derive a true Net Imbalance Volume. The proposed amendments to BSAD are explored in more detail in sections 5.2 and 12.3 of this Assessment report.

volume is removed from the larger stack (again, by tagging referred to as Net Imbalance Volume, or NIV, Tagging) such that the Net Imbalance Volume is the remaining volume.

Once the Net Imbalance Volume has been derived, the balancing actions that comprise it go forward to the Energy Imbalance Price calculation, for the calculation of the main price. The Energy Imbalance Price calculation is similar to that currently in use, but instead of the addition of BSAD after all the tagging of the Bid – Offer Acceptances (as is currently the case), the BSAD is included in the stack for NIV Tagging and therefore a proportion, or all of the BSAD may have been tagged out by the NIV Tagging Process, therefore only the untagged BSAD is included in the Energy Imbalance Price calculation.

Once the main price has been calculated, the market based reverse price is derived and calculated using information provided by the Designated Index Provider(s) (i.e. those index providers designated for the provision of traded volumes and prices for use in the Energy Imbalance Price calculation).

If the Net Imbalance Volume derived is zero, then the default Energy Imbalance Price rules are invoked, and this requires setting the Energy Imbalance Price to the market based reverse price.

This process requires a number of new variables, and therefore there is a requirement for them to be reported, such that the Settlement calculations can be verified. This requires amendment to the BMRA to report the requisite information utilised in the calculation of the Indicative Energy Imbalance Prices, and amendment to the Settlement Report (SAA-I014, S0141, S0142 and S0143) to report out the values utilised in the Energy Imbalance calculation.

The following sections describe and define the detailed functionality required to support the implementation of the Proposed Modification P78.

5.2 Balancing Services Adjustment Data Amendments

There are two options for reporting BSAD, net only, and net and gross, as follows:

5.2.1 Option 1 Net Reporting only

As proposed by the Transmission Company, BSAD could be reported as follows:

- Net Sell Price Cost Adjustment (SCA_j);
- Net Sell Price Volume Adjustment (SVA_j);
- Net Buy Price Cost Adjustment (BCA_j);
- Net Buy Price Volume Adjustment (BVA_j);
- Buy Price Price Adjustment (BPA_j); and
- Sell Price Price Adjustment (SPA_j).

This mechanism for reporting means that the definition of the SCA, SVA, BCA and BVA variables changes from the current definition.

It would be expected that this would require a level of validation on receipt to ensure that where a net buy is reported (i.e. values for either or both BVA and BCA), that the net sell variables, i.e. SCA and SVA, are zero, and vice versa.

5.2.2 Option 2 Gross and Net Reporting

In addition to the net reporting proposed by the Transmission Company, gross BSAD values (i.e. pre-netting by the Transmission Company) could also be reported. Therefore BSAD could be reported as follows:

- Gross Sell Price Cost Adjustment (SCA_j);
- Gross Sell Price Volume Adjustment (SVA_j);
- Gross Buy Price Cost Adjustment (BCA_j);
- Gross Buy Price Volume Adjustment (BVA_j);
- Net Sell Price Cost Adjustment ($NSCA_j$);
- Net Sell Price Volume Adjustment ($NSVA_j$);
- Net Buy Price Cost Adjustment ($NBCA_j$);
- Net Buy Price Volume Adjustment ($NBVA_j$);
- Buy Price Price Adjustment (BPA_j); and
- Sell Price Price Adjustment (SPA_j).

This mechanism for reporting means that the current definition of the SCA, SVA, BCA and BVA variables remains the same as the current definition, and four new variables are created which report the net position.

It would be expected that this would also require a level of validation on receipt to ensure, for the net reported variables, that where a net buy is reported (i.e. values for either or both BVA and BCA), that the net sell variables, i.e. SCA and SVA, are zero, and vice versa. It is not envisaged that any further validation (for example, validation that the net reported figures are correct for the provided gross figures) will be required.

5.2.3 Amendments to the BSC: Section Q 6.3

The amendments detailed in 5.2.1 and 5.2.3 will require changes to Section Q 6.3 of the BSC, the exact nature of which cannot be determined until the BSAD changes and associated consultation is released by the Transmission Company. However, the amendments resulting from the implementation of either option 1 (net reporting only) or option 2 (net and gross reporting) would require a change to Section Q 6.3.2 to amend the list of BSAD variables as defined for each of the options.

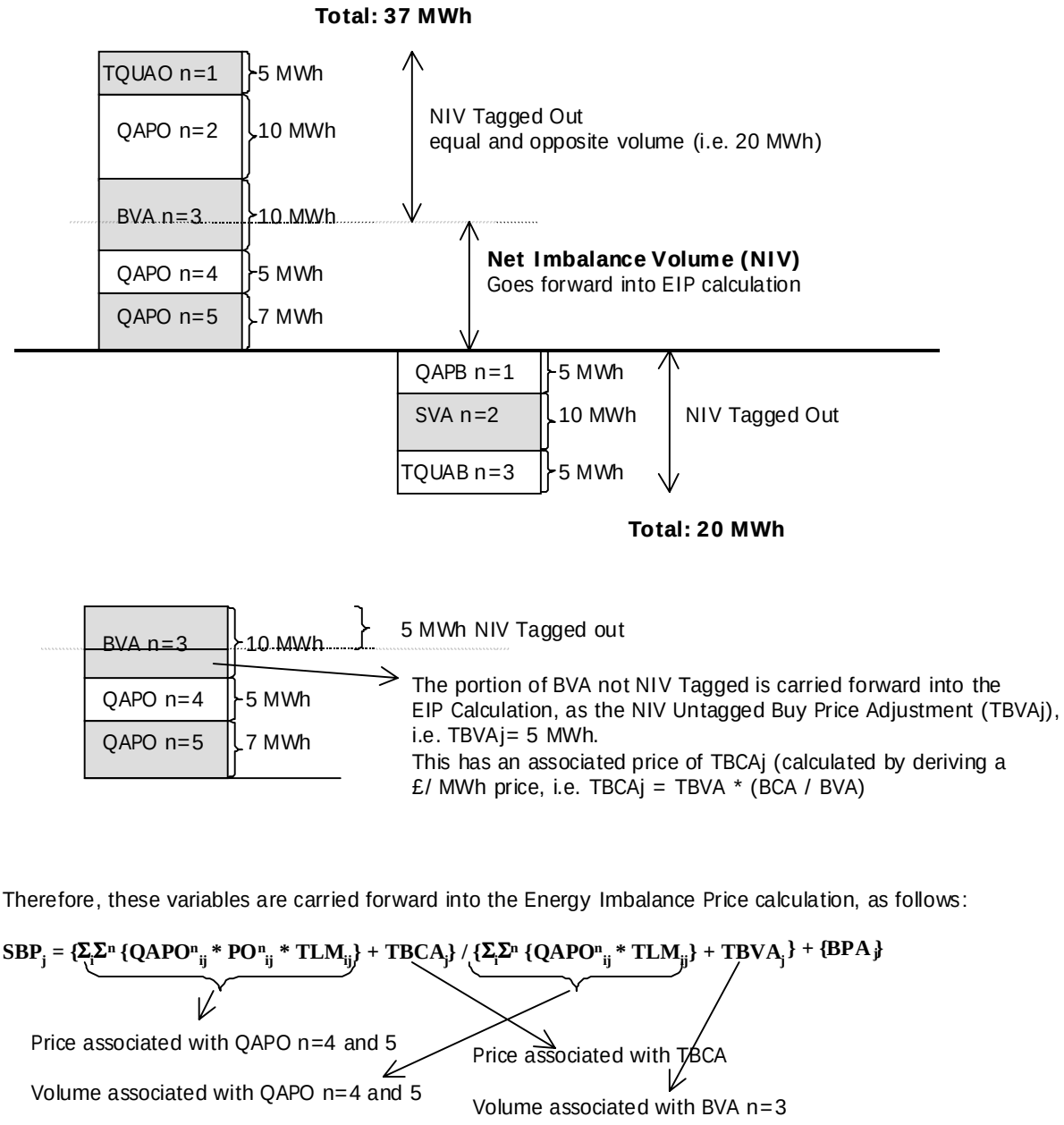
5.3 Amendments to the Calculation of Energy Imbalance Prices

It should be noted that this section applies to the calculation of the Indicative Energy Imbalance Price by the BMRA and to the calculation of the Energy Imbalance Price by the SAA. The mechanisms and calculations undertaken by both BSC Systems is the same, and therefore the following section applies to both BSC Systems, unless specifically stated otherwise.

5.3.1 Calculation of the Net Imbalance Volume

Proposed Modification P78 requires that the definition of the Energy Imbalance Prices be revised such that the Net Imbalance Volume of the overall system is determined and the main Energy Imbalance

Price calculated from those balancing actions taken to alleviate the Net Imbalance Volume, Figure 5.3.1 (1).



Therefore, these variables are carried forward into the Energy Imbalance Price calculation, as follows:

$$SBP_j = \{\Sigma_i\Sigma^n \{QAPO^n_{ij} * PO^n_{ij} * TLM_{ij}\} + TBCA_j\} / \{\Sigma_i\Sigma^n \{QAPO^n_{ij} * TLM_{ij}\} + TBVA_j\} + \{BPA_j\}$$

Price associated with QAPO n=4 and 5

Volume associated with QAPO n=4 and 5

Price associated with TBCA

Volume associated with BVA n=3

Figure 5.3 (1): Simplified Schematic of the Net Imbalance Volume Tagging and Energy Imbalance Price Calculation

The Net Imbalance Volume, for a Settlement Period, is determined as follows:

- Acceptances are stacked, Offers on one stack and Bids on another, ordered according to price (as is done currently);
- CADL tagging will be undertaken, as currently defined;
- De-minimis tagging will be undertaken on both stacks, as currently defined;
- Arbitrage will be undertaken on both stacks, as currently defined;
- The System Total Un-priced Accepted Offer Volume ($TQUAO_j$) will be determined (as defined in the BSC Section 4.4.2B) and this will be added into the Offer stack as if it were the highest priced Offer;
- The System Total Un-priced Accepted Bid Volume ($TQUAB_j$) will be determined (as defined in the BSC Section 4.4.2C) and this will be added into the Bid stack as if it were the lowest priced Bid;

  These two steps are a change to the existing mechanism and is required in order to retain the volumes associated with Bid – Offer Acceptances deemed to have been taken for system purposes, and therefore CADL'ed out of the Bid – Offer stacks, (to enable the calculation of a 'true' Net Imbalance Volume, and to retain consistency with the approach utilised for BSAD, but remove any 'system pollution' from the CADL'ed Bid – Offer Acceptance price).
- Then the net BSAD is added into the relevant stack – sales into the Bid stack and purchases into the Offer stack, placed within the stack in order of price (by an associated £/MWh price calculated by (BCA_j / BVA_j), or (SCA_j / SVA_j)), i.e. as if it were a Bid – Offer Acceptance;

Once this is completed, the volume of each of the stacks should be calculated. Once the total volume of each stack is known, then comparison of the absolute volume of each of the stacks should be undertaken to determine whether the Net Imbalance Volume is zero, i.e. where the absolute volume of the total Bid stack is equal to the absolute volume of the total Offer stack. If the Net Imbalance Volume is zero, then the default rules for calculating the Energy Imbalance Price will be invoked.

If the Net Imbalance is not zero, then tagging of the stacks is undertaken to remove all of the balancing actions from the smaller stack, and remove an equal amount from the larger stack to give the Net Imbalance Volume. This is referred to as 'NIV Tagging'. Figure 5.3 (1) (above) provides a simplified indication of the tagging undertaken to determine the Net Imbalance Volume.

It should be noted that the NIV Tagging is equivalent to the Trade Tagging that would be undertaken if the Balancing Reserve Limit (BRL) were set to zero. However, it should be noted that the concept of BRL and the associated 'Trade Tagging' are not relevant under Modification P78, as it is replaced with the Net Imbalance Volume determination – the NIV Tagging.

Once the NIV Tagging is completed, only those balancing actions taken to alleviate the Net Imbalance Volume are retained in the larger stack, and these set the main Energy Imbalance Price. The intent is that the remaining balancing actions (including BSAD) can be deemed to be attributable to energy balancing, as system balancing actions are deemed to have been removed by the NIV Tagging. The Net Imbalance Volume should be calculated and reported.

It should also be noted that the NIV Tagging is applied to the BSAD volume (and to the Total System Un-priced Bid – Offer Volume), therefore, the BSAD volumes and the associated price, or parts of these volumes should be carried forward into the Energy Imbalance Price calculation and / or reported.

Therefore, in order to carry these forward / report them, the volume, or part of, and associated price needs to be calculated, as follows:

For BSAD:

New variables are required to be created to carry forward the volume and associated price of the BSAD into the Energy Imbalance Price calculation, in order to support the tagging out of all or part of the volumes during the NIV Tagging process. These will be referred to as follows (for both options of BSAD reporting):

- NIV Untagged Sell Price Cost Adjustment ($TSCA_j$);
- NIV Untagged Sell Price Volume Adjustment ($TSVA_j$);
- NIV Untagged Buy Price Cost Adjustment ($TBCA_j$);
- NIV Untagged Buy Price Volume Adjustment ($TBVA_j$);

Calculating TSCA and TSVA:

- Where all the volume is tagged out by the NIV Tagging, then both $TSCA_j$ and $TSVA_j$ will be set to zero;
- Where none of the volume is tagged out by the NIV Tagging, then $TSCA_j = SCA_j$, and $TSVA_j = SVA_j$;
- Where a part of the volume is tagged out by the NIV Tagging, then the volume and the cost associated with the portion of volume going forward, i.e. the untagged volume, is required:

  $TSVA_j$ = the volume to be carried forward into the Energy Imbalance Price calculation, as calculated by the NIV Tagging process; and

  $TSCA_j = TSVA_j * (SCA_j / SVA_j)$.

Calculating TBCA and TBVA:

- Where all the volume is tagged out by the NIV Tagging, then both $TBCA_j$ and $TBVA_j$ will be set to zero;
- Where none of the volume is tagged out by the NIV Tagging, then $TBCA_j = BCA_j$, and $TBVA_j = BVA_j$;
- Where a part of the volume is tagged out by the NIV Tagging, then the volume and cost associated with the portion of volume going forward, i.e. the untagged volume, is required:

  $TBVA_j$ = the volume to be carried forward into the Energy Imbalance Price calculation, as calculated by the NIV Tagging process; and

  $TBCA_j = TBVA_j * (BCA_j / BVA_j)$.

For Total System Un-priced Bid – Offer Volume:

New variables are required to be created to report the volume of the CADL'ed Acceptances, i.e. the Total System Un-priced Bid Volume or Total System Un-priced Offer Volume which have remained untagged after the NIV Tagging process. It should be noted that these volumes will not be carried forward into the Energy Imbalance Price calculation.

Therefore these Un-priced Acceptances are used in the calculation of the Net Imbalance Volume in order to get a 'true' Net Imbalance Volume, but are not carried into the Energy Imbalance Price

calculation, if any such volume remains untagged, to avoid 'pollution' of the Energy Imbalance Price with balancing actions deemed to have been attributable to system balancing.

Even if the untagged volume were to be associated with a zero price, any volume going forward would have an (untoward) effect on the resulting Energy Imbalance Price, as there is no appropriate associated price (as a consequence of the Bid – Offer Acceptance being deemed to be for system balancing purposes, the associated Bid- Offer price would be a system balancing price, and it could be argued that it is therefore not appropriate to include any such price in the Energy Imbalance calculation).

Therefore these values will be calculated and reported, in order that their contribution to the Net Imbalance Volume can be seen. These will be referred to as follows:

- NIV Untagged Total System Un-priced Bid Volume ($NTQUAB_j$);
- NIV Untagged Total System Un-priced Offer Volume ($NTQUAO_j$).

Calculating NTQUAB:

- Where all the volume is tagged out by the NIV Tagging, then $NTQUAB_j$ will be set to zero;
- Where none of the volume is tagged out by the NIV Tagging, then $NTQUAB_j = TQUAB_j$;
- Where a part of the volume is tagged out by the NIV Tagging, then the portion of volume going forward, i.e. the untagged volume, is as calculated by the NIV Tagging process.

Calculating NTQUAO:

- Where all the volume is tagged out by the NIV Tagging, then $NTQUAO_j$ will be set to zero;
- Where none of the volume is tagged out by the NIV Tagging, then $NTQUAO_j = TQUAO_j$;
- Where a part of the volume is tagged out by the NIV Tagging, then the portion of volume going forward, i.e. the untagged volume, is as calculated by the NIV Tagging process.

5.3.2 Market Based Reverse Price

A weighted average of all the Index Provider traded prices for a specified period will be utilised to set the market based reverse price. The following sections set out the definition, receipt and usage of the Index Provider information used in the determination of the reverse price.

5.3.2.1 Information Required from the Index Providers

The intent of the market based reverse price is that it is reflective of the costs of short - term energy. Therefore it could be considered to be inappropriate for the traded volumes and prices used in the calculation of the reverse Energy Imbalance Price to be from day ahead trading. Thus it is expected that only within day, time constrained trades would be used in the calculation of the reverse price.

The relevant Index Providers would be required to provide Traded Volumes and Traded Price for only those trades undertaken within a specified number of hours of Gate Closure for the relevant Settlement Period.

It is expected that the number of hours out from Gate Closure would be referenced and approved in the Index Provider methodology referenced in the amendments to the BSC Section T 1.5A. However, the PIMG recommend, at least initially, that the trades going forward be limited to the twenty-four hours prior to the Settlement Period.

The high level principles surrounding the objective / aim of the market based reverse price should be set out in the Code, such that all Parties are aware of the principles that the market based reverse price is to meet.

It is then expected that each Index Provider will propose a methodology for the derivation of the information to be provided for use in the Energy Imbalance Prices. Such methodology is to be approved by the Panel, in accordance with the principles set out in the Code, and once approved by the Panel, the methodology will be incorporated into a Definition Statement under the Code (such that it can be amended from time to time through normal change control procedure, without requiring a Modification to be raised).

The Definition Statement will contain the methodology for the derivation of the traded volumes and traded prices from each Index Provider, as well as the definition of the liquidity criteria the Index Provider is required to meet to be able to provide a traded volume and price to the BSC Central Service Agent. For example, a certain volume has to have been traded within the time constraint, or a certain number of transactions have to have been made.

A draft Definition Statement is provided in Annex 1(b) in order to provide a firm idea of the intent and scope of such a statement.

5.3.2.2 Receipt of the Information from the Index Providers

It is expected that the relevant Index Providers would provide the information to the BMRA by the start, but no later than the end, of the Settlement Period to which the data pertains, i.e. BMRA will receive a report for each Settlement Period from each relevant Index Provider, in time for BMRA to use it in the calculation of the Indicative Energy Imbalance Prices.

For the avoidance of doubt, where data is amended by the Index Provider following the Settlement Period, such amendments will not be reported to the BMRA (as the BMRA will not recalculate the Indicative Energy Imbalance Prices), but will be reflected in the report to the SAA.

It is expected that on the next Business Day following the Settlement Day, each Index Provider will provide a report to the SAA containing the information for each Settlement Period in the Settlement Day. This allows corrections of errors in the data provided to the BMRA through the day. However, corrections to data, once the daily report has been generated and provided to the SAA, should be supported, but only for the circumstances of amending the data in the case of a Trading Dispute.

This is intended to provide a level of certainty in the reverse price. Given the nature of the information being used, i.e. forward contract information (i.e. concluded by Gate Closure), the data should not be subject to change post Gate Closure, unless there is an error in the calculation by the Index Provider, or a problem which meant that the data could not be calculated.

Therefore enabling correction of the data by Settlement Day + 1 WD, or in extreme cases, by the Initial Interim Settlement Run, means that the data is static from that point, unless there is a trading dispute relating directly to the calculation of the reverse price.

It is expected that the interface could be as follows (for both BMRA and SAA, but with the BMRA containing data for Only one Settlement Period, and the SAA containing data for an entire Settlement Day):

Sending Index Provider (derived from the Header)

1-*Settlement Day (date)

1-* Settlement Period (1-50)

1-* Traded Volume (QPX_{sj}) (MWh)

1-* Traded Price (PPX_{sj}) (£/MWh)

It is expected that the information would be provided by the Index Provider electronically, and therefore any contract between ELEXON and the Index Providers for provision of this information would need to take this into consideration.

For this formulation, the information to be received from the relevant Index Providers will be as follows:

QPX_{sj} - the Traded Volume from Index Provider 's' in Settlement Period j; and

PPX_{sj} - the Traded Price from Index Provider 's' in Settlement Period j.

It is expected that the Panel would be required to determine and designate the Index Providers to be requested to provide information for inclusion in the Energy Imbalance Price calculation. The Panel would be required to review the liquidity and performance of each Index Provider, and therefore its relevance for Energy Imbalance Price setting, at a minimum on an annual basis, but 'from time to time' as it becomes aware of any changes to the Index Providers (for example, entry of a new Index Provider with sufficient liquidity, or reduction in liquidity of an existing Index Provider to a point where there is insufficient liquidity) which would require a change to the list of Designated Index Providers.

It is also envisaged that the Panel should be required to respond to requests from BSC Parties for the consideration of designating a new Index Provider.

The Designated Index Provider list should be made public on implementation of the Modification and then as and when its composition changes.

5.3.2.3 Default Provisions:

It should be noted that if no information, or inappropriate information, is received from the Index Provider, then provisions would need to be put in place for the calculation of the reverse price, taking into consideration the balance between the requirement for prompt price reporting, and the requirement to have accurate prices reported.

Some circumstances that the default rules would have to cater for are as follows:

1. Insufficient traded volume or transactions on the Index Provider. Where there has been little trading on the Index Provider and the resulting traded volume is low, then the associated prices may be unrepresentative of the costs of trading, and therefore should be disregarded.

   It is proposed that the Panel set the minimum Liquidity Threshold that has to be met by the Index Provider for the Settlement Period to be considered as having sufficient liquidity to set the Energy Imbalance Prices. The Liquidity Threshold could be a volume, or a number of transactions that have to be reached before the Index Provider is able to send the information forward into the

Energy Imbalance Price calculation. However, the Panel should review the Liquidity Threshold to be applied from time to time, but at least annually (when it is considering the Index Providers to designate).

The PIMG believe that, at least initially, a Liquidity Threshold based on a minimum traded volume would be the most appropriate measure of liquidity, as currently, price reporters generally will not produce an index where there have been less than three trades. Assuming that, in OTC markets these trades will be for no less than 25 MW, this places a lower bound of 75 MW or 37.5 MWh on the acceptable volume in a half-hour.

Therefore, it is envisaged that this Liquidity Threshold will form a part of the contract with the Index Provider and be reflected in the Definition Statement

2. Where there is no information received from an Index Provider by the deadline set for BMRA, i.e. at an individual Settlement Period level;

3. Where there is no information received from an Index Provider by the deadline set for SAA, i.e. at a daily report level;

The following default rules would be required:

1. Where the Index Provider falls below the Liquidity Threshold determined by the Panel (for example, as recommended above, 37.5 MWh), then the Index Provider will set the data for that Settlement Period (i.e. Traded Volume and Traded Price) to zero when sending to the BSC Central Service Agent.

2. Where a zero Traded Volume and Traded Price is received from an Index Provider for a Settlement Period, then BMRA and SAA will use it. However, if the information from all Index Providers is set to zero for a Settlement Period, then the BMRA and SAA will calculate a reverse price of zero and will default the reverse price to the main price, i.e. there has to be non zero information from at least one Index Provider for a reverse price to be calculated and used.

3. Where no information is received from an Index Provider by the deadline set for BMRA, then a warning will be set on BMRA against the relevant Index Provider and the reverse Energy Imbalance Price will be calculated when the information is received.

4. Where no information is received from an Index Provider by the deadline set for SAA, then:

   The daily report for the previous Settlement Day should be received from the relevant Index Provider(s) by Settlement Day +1 Business Day. On Settlement Day +2 Business Days, the SAA will check receipt of the report. If no report has been received, then the SAA will request the report from the relevant Index Provider and notify ELEXON that such request has been made;

   The Index Provider should provide the requested daily report to the SAA by Settlement Day + 3 Business Days, and should notify ELEXON that it has done so. If the Index Provider, for whatever reason, is unable to provide the report, then a proposed timetable for provision should be provided to the SAA and ELEXON.

   If the daily report has still not been received by the SAA by the Initial Interim Settlement Run minus 1 Business Day, the SAA will contact ELEXON and ELEXON will determine the appropriate course of action. It is likely that this will be either:

   – A manual loading of the values held by BMRA for the relevant day; or

– The data for that Settlement Day (i.e. Traded Volume and Traded Price) and Index Provider will default to zero for all Settlement Periods on that Settlement Day.

For the avoidance of doubt, it should be noted that the default rules outlined above (at 2 and 3) apply to the data so loaded.

It would be expected that the SAA would be required to report on the performance of the Designated Index Providers, via a monthly (manual) report detailing the number of Settlement Periods where the Liquidity Threshold was not met for each Designated Index Provider (i.e. where zeroes were provided), and the number of Settlement Periods / Settlement Days where data was not notified by any Designated Index Provider.

5.3.3 Calculation of the Energy Imbalance Price

Once the Net Imbalance Volume has been determined, as defined in section 5.3.1, and the information has been received from the relevant Index Providers, the Energy Imbalance Prices can be calculated for the Settlement Period.

If the Net Imbalance Volume comprises the Bid stack, then the main price will be the System Sell Price (and the reverse price will be the System Buy Price, which will be set to the market based price).

Therefore if the Net Imbalance Volume is negative, then:

The System Sell Price will be determined as follows:

$SSP_j = \{\Sigma_i \Sigma^n \{QAPB^n_{ij} * PB^n_{ij} * TLM_{ij}\} + TSCA_j\} / \{\Sigma_i \Sigma^n \{QAPB^n_{ij} * TLM_{ij}\} + TSVA_j\} + \{SPA_j\}$

The System Buy Price will be determined as follows:

$SBP_j = \Sigma_s \{PPX_{sj} * QPX_{sj}\} / \Sigma_s QPX_{sj}$

Where Σ_s represents the sum over all Index Providers.

If SBP < SSP, i.e. there is a negative spread, then the default rules will be invoked.

If SBP_j = zero, then $SBP_j = SSP_j$

If the Net Imbalance Volume comprises the Offer stack, then the main price will be the System Buy Price (and the reverse price will be the System Sell Price, which will be set to the market based price).

Therefore if the Net Imbalance Volume is positive, then:

The System Buy Price will be determined as follows:

$SBP_j = \{\Sigma_i \Sigma^n \{QAPO^n_{ij} * PO^n_{ij} * TLM_{ij}\} + TBCA_j\} / \{\Sigma_i \Sigma^n \{QAPO^n_{ij} * TLM_{ij}\} + TBVA_j\} + \{BPA_j\}$

The System Sell Price will be determined as follows:

$SSP_j = \Sigma_s \{PPX_{sj} * QPX_{sj}\} / \Sigma_s QPX_{sj}$

Where Σ_s represents the sum over all Index Providers.

If SBP < SSP, i.e. there is a negative spread, then the default rules will be invoked.

If SSP_j = zero, then $SSP_j = SBP_j$

5.3.4 Default Rules for Calculation of Energy Imbalance Prices

1. If the Net Imbalance Volume is zero, then both the System Buy Price and the System Sell Price will default to the reverse price.

2. If there is a negative spread, i.e. SBP < SSP, then where:

   – The Net Imbalance Volume is negative, then SBP = SSP; and

   – The Net Imbalance Volume is positive, then SSP = SBP.

5.4 Amendments to the Settlement Report (SAA-I014)

The following details the potential amendments required to the relevant sub-flows of the Settlement Report (SAA-I014 / S0141, S0142 and S0143) as a consequence of the amendments to the Energy Imbalance Price calculation.

The following reporting requirements / amendments have been identified against the Interface Design Definition (IDD) document, in order to provide clarity for the BSC Central Service Provider.

5.4.1.1 Amendments to the Transmission Company subflow (S0142)

The Transmission Company sub-flow of the Settlement Report (S0142) requires amendment as follows:

Group SPI 'Settlement Period Information':

– Remove N0316 'Notional Reserve Limit' data item, and replace with a new data item 'Net Imbalance Volume' (MWh, can be positive or negative);

– If the net only option for BSAD reporting (option 1 in section 5.2.1) is implemented, then there is no change to the BSAD data items listed;

– If the net and gross options for BSAD reporting (option 2 in section 5.2.2) is implemented, then there is a requirement to add in the new BSAD variables, as listed;

– New variables, and therefore new data items, should be included and reported in this group, as follows:

  - NIV Untagged Buy Price Cost Adjustment ($TSCA_j$) (£);
  - NIV Untagged Buy Price Volume Adjustment ($TSVA_j$) (MWh);
  - NIV Untagged Sell Price Cost Adjustment ($TBCA_j$) (£);
  - NIV Untagged Sell Price Volume Adjustment ($TBVA_j$) (MWh);
  - NIV Untagged Total System Un-priced Bid Volume ($NTQUAB_j$) (MWh);
  - NIV Untagged Total System Un-priced Offer Volume ($NTQUAO_j$) (MWh);

– For reporting the information relating to the market based price, a new sub-group within the SPI group would be required, an example of which follows:

  1-* Sub group 'Reverse Price Information':

    1-* Index Provider Name

      1-* Traded Volume (QPX_{sj}) (MWh)

1-* Traded Price (PPX_{sj}) (£ / MWh)

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) would need to be included in the 'System Period Data' group.

5.4.1.2 Amendments to the BSC Party subflow (S0141)

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) under the Transmission Company sub-flow (S0142) would need to be included in the 'System Period Data' group in this subflow.

5.4.1.3 Amendments to the ELEXON subflow (S0143)

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) under the Transmission Company sub-flow (S0142) would need to be included in the 'System Period Data' group in this subflow.

5.5 Changes to the BSC: Section T

The amendments detailed will require changes to Section T of the BSC. The following provides a relatively high level summary of the amendments required to Section T of the BSC. The legal drafting encompassing the amendments to the BSC is provided in ANNEX 1(a) of this Assessment Report.

5.5.1 Section T General

Replace '**Trade Tagging**' with '**NIV Tagging**' throughout Section T.

5.5.2 Section T 1.3

A new clause at 1.3.8 will be required to indicate receipt of the Traded Price and Traded Volume from each of the relevant Designated Index Providers.

5.5.3 Section T 1.5

Clause 1.5 should be deleted / removed from the BSC in entirety, as it refers to the Balancing Reserve Level. Under this Proposed Modification P78, the determination of the Net Imbalance Volume supersedes the use of BRL and therefore makes it redundant, requiring its removal from the Code.

5.5.4 Section T 1.5A

A new clause is required to describe the obligations in respect of the provision of the reverse price, as well as the defaulting rules, as set out in ANNEX 1(a) of this Assessment Report.

5.5.5 Section T 4.4

5.5.5.1 T 4.4.4

Clause 4.4.4 should be reworded to reflect that the NIV Tagging process also includes the Buy Price Volume Adjuster (BVA), Sell Price Volume Adjuster (SVA), Total System Un-priced Bid Volume (TQUAB) and Total System Un-priced Offer Volume (TQUAO), and that there may therefore be NIV Tagged portions of these volumes which, as a consequence of being NIV Tagged, are disregarded for the purposes of the Energy Imbalance Price calculation.

5.5.5.2 T 4.4.4A

A new clause is required to reflect the calculation of the Net Imbalance Volume (required to determine the Energy Imbalance Price formulation to be applied).

5.5.5.3 Section T 4.4.5

Clause 4.4.5 should be reworded as defined in section 5.3.3 of this Assessment Report to reflect the requisite amendments to the Energy Imbalance Price calculation.

5.5.5.4 Section T 4.4.6

Clause 4.4.6 should be reworded as defined in section 5.3.3 of this Assessment Report to reflect the requisite amendments to the Energy Imbalance Price calculation.

5.5.5.5 Section T 4.4.6B

A new clause is required to set out the default rules, as laid out in section 5.3.4 of this Assessment Report.

5.5.5.6 Section T 4.4.10

Clause 4.4.10 should be amended to reflect the amendment to the calculation, such that it is the NIV Tagged Volume being calculated.

5.5.6 Section T 5.2.3

T 5.2.3 requires amendment to reflect receipt of the information required to calculate the reverse price.

5.5.7 Section T ANNEX T-1

Section T Annex T-1, Clause 3 requires amendment to reflect the NIV Tagging of the ranked accepted Bids and Offers, BSAD Volumes and Total System Un-priced Bid – Offer Volume.

It should be noted that the basis for the proposed amendments is Section T Annex T-1, V4.0, overlaid by the amendments proposed by Modification Proposal P72 'Correction of a Minor Inconsistency in the BSC Arbitrage and Trade Tagging Methodology' (Reference 7), which was submitted to the Authority on 16 May 2002, and approved by the Authority for implementation on 12 July 2002.

5.6 Definitions Required to Support Modification P78

The Proposed Modification P78 requires new definitions to support the implementation of the amendments to the settlement calculations.

Therefore Section X ANNEX X-2 Table X-1 'Use of Subscripts and Superscripts Applying Except in Relation to Section S' requires amendment to include the new subscript 's' 'Designated Index Provider' introduced by Proposed Modification P78.

Section X ANNEX X-2 Table X-2 'Technical Glossary' requires amendment to include the requisite new and amended definitions, as follows:

It should be noted that the following assumes the adoption of Option 2 with regards to BSAD reporting (i.e. net and gross reporting).

- Balancing Reserve Level (BRL_j) should be removed from the definitions, as it is no longer required;
- Buy Price Cost Adjustment (BCA_j), the definition should be amended to reflect that this is the gross variable;
- Buy Price Volume Adjustment (BVA_j), the definition should be amended to reflect that this is the gross variable;
- Index Provider(s), a new variable and definition required for the reverse price calculation;
- Liquidity Threshold (LT), a new variable and definition required for the Definition Statement for the reverse price;
- Net Buy Price Cost Adjustment ($NBCA_j$), a new variable and definition required for the net reporting of BSAD;
- Net Buy Price Volume Adjustment ($NBVA_j$) a new variable and definition required for the net reporting of BSAD;
- Net Imbalance Volume (NIV_j), a new variable and definition;
- Net Sell Price Cost Adjustment ($NSCA_j$) a new variable and definition required for the net reporting of BSAD;
- Net Sell Price Volume Adjustment ($NSVA_j$) a new variable and definition required for the net reporting of BSAD;
- NIV Tagged Bids, revised definition of Trade Tagged Bids, to reflect the NIV Tagging process;
- NIV Tagged Buy Price Volume Adjustment, new definition to reflect the NIV Tagging process;
- NIV Tagged Offers, revised definition of Trade Tagged Bids, to reflect the NIV Tagging process;
- NIV Tagged Sell Price Volume Adjustment, new definition to reflect the NIV Tagging process;
- NIV Tagged Total System Un-priced Bid Volume, new definition to reflect the NIV Tagging process;
- NIV Tagged Total System Un-priced Offer Volume, new definition to reflect the NIV Tagging process;
- NIV Untagged Buy Price Cost Adjustment ($TBCA_j$), new definition to reflect the NIV Tagging process;

- NIV Untagged Buy Price Volume Adjustment ($TBVA_j$), new definition to reflect the NIV Tagging process;
- NIV Untagged Sell Price Cost Adjustment ($TSCA_j$), new definition to reflect the NIV Tagging process;
- NIV Untagged Sell Price Volume Adjustment ($TSVA_j$), new definition to reflect the NIV Tagging process;
- NIV Untagged Total System Un-priced Bid Volume ($NTQUAB_j$), new definition to reflect the NIV Tagging process;
- NIV Untagged Total System Un-priced Offer Volume ($NTQUAO_j$), new definition to reflect the NIV Tagging process;
- Sell Price Cost Adjustment (SCA_j), the definition should be amended to reflect that this is the gross variable;
- Sell Price Volume Adjustment (SVA_j), the definition should be amended to reflect that this is the gross variable;
- Total NIV Tagged Volume (TCQ_j), revised definition of Total Trade Tagged Volume, to reflect the NIV Tagging process;
- Traded Volume (QPX_{sj}), new definition to reflect the calculation of the reverse price; and
- Traded Volume (PPX_{sj}), new definition to reflect the calculation of the reverse price.

Section X ANNEX X-2 Table X-3 'Glossary of Acronyms Applying Except in Relation to Section S' requires amendment to include the requisite new and amended definitions, as listed above.

5.7 Potential Changes to External Systems

The impacts on BSC Parties, ELEXON and the Transmission Company are explored in more detail in sections 14, 13 and 17, respectively.

5.7.1 Receipt of the Amended Settlement Report

All Parties, the Transmission Company and ELEXON (as they also receive the Transmission Company variant of the Settlement Report) are impacted by the amendments to the Settlement Report, as set out in section 5.4.

However, it should be noted that Parties can determine whether they wish to continue receiving the old version of the report (i.e. without the amendments and therefore reducing the ability to accurately verify their trading charges), or the new report, with the amendments. This enables them to determine the timeframes for implementation of an amended interface independently of its development within the Central Services (unlike a 'big bang' approach). However, the impact from the implementation of amendments to the Settlement Report is still likely to be significant.

5.7.2 Verification of the Settlement Calculations

It is believed that the majority of BSC Parties recreate, to some degree, the Settlement Calculations in order to verify their Trading Charges. Therefore any amendment to the mechanism for calculating and applying the Energy Imbalance Prices will have an impact. The changes proposed by Proposed

Modification P78 are significant and potentially have a large impact on system used in such verification.

5.8 Potential Changes to Industry Documentation

The following lists the documentation (other than the documentation specific to the BSC Central Service Agent and therefore 'owned' by the Central Services, such as the URSs) that requires amendment as a result of the implementation of the Modification with a brief summary of the potential change. The documentation listed is believed to represent the full set of impacted documents at this time.

5.8.1 Code Subsidiary Documents - The Reporting Catalogue

The Reporting Catalogue (v2.0) requires amendment to reflect the amendments to the Settlement Report, as detailed in section 5.4.

Section 3.1 Interim Information Settlement Report

3.1.1 Report sent to the Transmission Company (TC)

(b) Settlement Period Information …

(h) Settlement Period Information

- System Period Data

The amendments listed in section 5.4 should be applied to these sections of the Reporting Catalogue.

3.1.2 Report sent to BSCCo

(c) Settlement Period Information

- System Period Data

The amendments listed in section 5.4 should be applied to this section of the Reporting Catalogue.

3.1.3 Reports sent to Parties

(b) Settlement Period Information

- System Period Data

The amendments listed in section 5.4 should be applied to this section of the Reporting Catalogue.

5.8.2 Code Subsidiary Documents – BSCP01 'Overview of Trading Arrangements'

The following sections of BSCP01 'Overview of the Trading Arrangements' would require amendment to reflect receipt of the information relating to the reverse price. The potential changes are as follows:

- **Section 3.1 Trading Arrangements Context Diagram:** Schematic amended to include the source of the reverse price information and the provision of this information, by the start of the Settlement Period to which it pertains, to BMRA and daily to SAA;
- **Section 3.3 Interim Information and Initial Volume Allocation / Settlement Runs:** Schematic amended to include the source of the reverse price information and the provision of

this information, by the start of the Settlement Period to which it pertains to BMRA, and subsequently daily, and where it changes between Settlement Runs (for disputes), to SAA;

- **Section 3.4 Reconciliation and Final Reconciliation Volume Allocation / Settlement Runs:** Schematic amended to include the source of the reverse price information and the provision of this information, by the start of the Settlement Period to which it pertains, and subsequently daily, and where it changes between Settlement Runs (for disputes), to SAA;
- **Section 4.1 Interim Information and Initial Settlement Timetable and Settlement Reports:** Table amended to add in (between entry 3 and entry 4) and include the source of the reverse price information and the provision of this information, by the start of the Settlement Period to which it pertains, to BMRA and daily to SAA;
- **Section 5.1 Interim Information Run:** Table amended to add in the obligation to identify missing and invalid data, and the course of action required to be taken, with regards to the reverse price information (see section 5.3.2).

5.8.3 Service Description for the Balancing Mechanism Reporting Agent

The following amendments are required to support the implementation of Proposed Modification P78:

- New clause after clause 8 and before clause 9, to reflect the receipt of reverse price information; and
- Clause 8.1 (d), remove, as this refers to Notional Reserve Limit (equivalent to BRL), which is no longer required under Proposed Modification Proposal P78. The other bullets in this clause will require consequential renumbering.

It should be noted that the Service Description for the BMRA, Section 9.21 Calculation of Energy Imbalance Prices, refers to the calculation undertaken by the SAA. Therefore no amendments to the Service Description for the BMRA are required for the implementation of this Proposed Modification P78.

5.8.4 Service Description for the Settlement Administration Agent

The following amendments are required to support the implementation of Proposed Modification P78:

- New bullet point added at 1.4(ii), between b and c, reflecting receipt of reverse price information. The other bullets in this clause will require consequential renumbering;
- The list of BSAD variables at 2.1.2 may require amendment depending upon the nature of the changes to BSAD (see section 5.2.1 and 5.2.2);
- A new clause is required after 2.1, but before 2.2 (2.1A), which describes the receipt of reverse price information, and the format the data will take;
- Clause 3.26.1 requires amendment to:
  - Remove the third bullet point (which refers to Notional Reserve Limit);
  - Add in a new bullet point after the fourth bullet, but before the fifth (which refers to the application of TLM), which states 'modifying the calculation to include BSAD and the volumes associated with Un-priced Bid and Offer Acceptances, prior to Net Imbalance Volume (NIV) determination;';

- Add in a new bullet point after the above new bullet, but before the fifth (which refers to the application of TLM), which states 'modifying the calculation to determine the Net Imbalance Volume;';
- Amend the sixth bullet point to read 'For each Settlement Period, the Net Imbalance Volume will be derived as the volume by which the total volume of Bids accepted and volume of BSAD sales exceed the total volume of Offers accepted and volume of BSAD purchases (or vice versa);
- Amend the seventh bullet point to read 'For each Settlement Period, any accepted Bid or Offer Volumes that have been identified and tagged as being of short duration according to section 3.10 will be have their volume included in the calculation of the Net Imbalance Volume, but will be disregarded for the purposes of the calculation of the Energy Imbalance Price. This bullet point should be removed from seventh in the list and placed after the ninth bullet point (which refers to arbitrage). But before the tenth (which refers to trade tagging);
- Amend the tenth bullet point to split it into two bullets and to read:
  - 'The remaining price ordered stacks of BSAD sales or purchases, Un-priced Bid or Offer Acceptance volumes and Offers and Bids (which may include part of any of these volumes) are then tagged – un-priced Offer Acceptance volumes first then most expensive Offers / BSAD volume, un-priced Bid Acceptance volumes first, then least expensive Bids / BSAD volume, until all of the volume associated with the smaller stack (and an equivalent volume on the larger stack) has been tagged.'
  - This resulting list of tagged BSAD sales or purchases, Un-priced Bid or Offer Acceptance volumes and Offers and Bids then represents the most expensive un-priced Offer Acceptance volumes, Offers and BSAD volume, and the least expensive un-priced Bid Acceptance volumes, Bids and BSAD volumes, and hence represents the constraint related volumes to be removed from the calculation of the Energy Imbalance Price.'

– Section 3.31 of the service description should be amended to reflect the new Energy Imbalance Price calculations, as defined in section 5.3.3;

– Clause 4.1.2(c) should be amended to include a reference to the reverse price information provider; and

– The table at Appendix A, 1. SAA Inputs, requires new entry of 'Reverse price data'.

5.8.5 NETA Data File Catalogue

The NETA Data File Catalogue requires amendment to include the new and amended reports, as defined in Section 5.4 of this Assessment Report.

No other amendments to the NETA Data File Catalogue are identified at this time.

6 ALTERNATIVE MODIFICATION P78

6.1 Alternative Modification Overview

Alternative Modification P78 requires that the single Energy Imbalance Price be calculated from those balancing actions (including BSAD) taken to alleviate the Net Imbalance Volume (NIV) of the overall system, as set out in section 5 of this Assessment Report.

Once the main price has been calculated, the market based reverse price is derived from the first non Arbitrage Bid – Offer Acceptance.

If the Net Imbalance Volume derived is zero, then the default Energy Imbalance Price rules are invoked.

This process requires a number of new variables, and therefore there is a requirement for them to be reported, such that the Settlement calculations can be verified. This requires amendment to the BMRA to report the requisite information utilised in the calculation of the Indicative Energy Imbalance Prices, and amendment to the Settlement Report (SAA-I014, S0141, S0142 and S0143) to report out the values utilised in the Energy Imbalance calculation.

The following sections describe and define only the detailed functionality **different** from that set out in Section 5, required to support the implementation of the Alternative Modification P78. On this basis, it should be noted that the aspects pertaining to the market based reverse price are not required for the Alternative, and this is reflected in the legal drafting.

The legal drafting for the Alternative is provided in ANNEX 1(c) of this Assessment Report.

6.2 Calculation of the Energy Imbalance Price

Once the Net Imbalance Volume has been determined, as defined in section 5.3.1, the Energy Imbalance Prices can be calculated for the Settlement Period.

The Buy Price Cost Adjustment Price ($BCAP_j$) is determined as follows:

$BCAP_j = BCA_j / BVA_j$

The Sell Price Cost Adjustment Price ($SCAP_j$) is determined as follows:

$SCAP_j = SCA_j / SVA_j$

If the Net Imbalance Volume comprises the Bid stack, then the main price will be the System Sell Price (and the reverse price will be the System Buy Price).

Therefore if the Net Imbalance Volume is negative, then:

The System Sell Price will be determined as follows:

$SSP_j = \{\Sigma_i\Sigma^n \{QAPB^n_{ij} * PB^n_{ij} * TLM_{ij}\} + TSCA_j\} / \{\Sigma_i\Sigma^n \{QAPB^n_{ij} * TLM_{ij}\} + TSVA_j\} + \{SPA_j\}$

The System Buy Price will be determined as follows:

SBP_j will be the maximum of the Bid Price of the most expensive non Arbitrage Accepted Bid, which has a negative Bid – Offer pair number, in the Settlement Period and the Sell Price Cost Adjustment Price ($SCAP_j$) for the Settlement Period.

If SBP < SSP, i.e. there is a negative spread, then the default rules will be invoked.

If the Net Imbalance Volume comprises the Offer stack, then the main price will be the System Buy Price (and the reverse price will be the System Sell Price).

Therefore if the Net Imbalance Volume is positive, then:

The System Buy Price will be determined as follows:

$SBP_j = \{\Sigma_i\Sigma^n \{QAPO^n_{ij} * PO^n_{ij} * TLM_{ij}\} + TBCA_j\} / \{\Sigma_i\Sigma^n \{QAPO^n_{ij} * TLM_{ij}\} + TBVA_j\} + \{BPA_j\}$

The System Sell Price will be determined as follows:

SSP_j will be the minimum of the Offer Price of the cheapest non Arbitrage Accepted Offer, which has a positive Bid – Offer Pair number, in the Settlement Period and the Buy Price Cost Adjustment Price ($BCAP_j$) for the Settlement Period.

If SBP < SSP, i.e. there is a negative spread, then the default rules will be invoked.

6.2.1 Default Rules for Calculation of Energy Imbalance Prices

1. If there is a negative spread, i.e. SBP < SSP, then where:
   - The Net Imbalance Volume is negative, then SBP = SSP; and
   - The Net Imbalance Volume is positive, then SSP = SBP.
2. If the Net Imbalance Volume is zero, then the System Buy Price will default to the minimum of:
   - The cheapest non Arbitraged Accepted Offer which has a positive Bid – Offer Pair number, and
   - The Buy Price Cost Adjustment Price ($BCAP_j$),
   - Or where there is no such Offer or Buy Price Cost Adjustment, zero.
3. If the Net Imbalance Volume is zero, then the System Sell Price will default to the maximum of:
   - The most expensive non Arbitrage Accepted Bid which has a negative Bid – Offer Pair number, and
   - The Sell Price Cost Adjustment Price ($SCAP_j$),
   - Or where there is no such Bid or Sell Price Cost Adjustment, zero.

6.3 Amendments to the Settlement Report (SAA-I014)

The following details the potential amendments required to the relevant sub-flows of the Settlement Report (SAA-I014 / S0141, S0142 and S0143) as a consequence of the amendments to the Energy Imbalance Price calculation.

The following reporting requirements / amendments have been identified against the Interface Design Definition (IDD) document, in order to provide clarity for the BSC Central Service Provider.

6.3.1.1 Amendments to the Transmission Company subflow (S0142)

The Transmission Company sub-flow of the Settlement Report (S0142) requires amendment as follows:

Group SPI 'Settlement Period Information':

- Remove N0316 'Notional Reserve Limit' data item, and replace with a new data item 'Net Imbalance Volume' (MWh, can be positive or negative);
- If the net only option for BSAD reporting (option 1 in section 5.2.1) is implemented, then there is no change to the BSAD data items listed;
- If the net and gross options for BSAD reporting (option 2 in section 5.2.2) is implemented, then there is a requirement to add in the new BSAD variables, as listed;
- New variables, and therefore new data items, should be included and reported in this group, as follows:
  - NIV Untagged Buy Price Cost Adjustment ($TSCA_j$) (£);
  - NIV Untagged Buy Price Volume Adjustment ($TSVA_j$) (MWh);
  - NIV Untagged Sell Price Cost Adjustment ($TBCA_j$) (£);
  - NIV Untagged Sell Price Volume Adjustment ($TBVA_j$) (MWh);
  - NIV Untagged Total System Un-priced Bid Volume ($NTQUAB_j$) (MWh);
  - NIV Untagged Total System Un-priced Offer Volume ($NTQUAO_j$) (MWh);

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) would need to be included in the 'System Period Data' group.

6.3.1.2 Amendments to the BSC Party subflow (S0141)

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) under the Transmission Company sub-flow (S0142) would need to be included in the 'System Period Data' group in this subflow.

6.3.1.3 Amendments to the ELEXON subflow (S0143)

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) under the Transmission Company sub-flow (S0142) would need to be included in the 'System Period Data' group in this subflow.

6.4 Changes to the BSC: Section T

The amendments detailed will require changes to Section T of the BSC. The following provides a relatively high level summary of the amendments required to Section T of the BSC. The legal drafting encompassing the amendments to the BSC is provided in ANNEX 1(c) of this Assessment Report.

6.4.1 Section T General

Replace '**Trade Tagging**' with '**NIV Tagging**' throughout Section T.

6.4.2 Section T 1.5

Clause 1.5 should be deleted / removed from the BSC in entirety, as it refers to the Balancing Reserve Level. Under this Alternative Modification P78, the determination of the Net Imbalance Volume supersedes the use of BRL and therefore makes it redundant, requiring its removal from the Code.

6.4.3 Section T 4.4

6.4.3.1 T 4.4.4

Clause 4.4.4 should be reworded to reflect that the NIV Tagging process also includes the Buy Price Volume Adjuster (BVA), Sell Price Volume Adjuster (SVA), Total System Un-priced Bid Volume (TQUAB) and Total System Un-priced Offer Volume (TQUAO), and that there may therefore be NIV Tagged portions of these volumes which, as a consequence of being NIV Tagged, are disregarded for the purposes of the Energy Imbalance Price calculation.

6.4.3.2 T 4.4.4A

A new clause is required to reflect the calculation of the Net Imbalance Volume (required to determine the Energy Imbalance Price formulation to be applied).

6.4.3.3 Section T 4.4.4B

A new clause is required to reflect the calculation of the Buy Price Cost Adjustment Price and Sell Price Cost Adjustment Price, for use in the Energy Imbalance Price calculation.

6.4.3.4 Section T 4.4.5

Clause 4.4.5 should be reworded as defined in section 6.2 of this Assessment Report to reflect the requisite amendments to the Energy Imbalance Price calculation.

6.4.3.5 Section T 4.4.6

Clause 4.4.6 should be reworded as defined in section 6.2 of this Assessment Report to reflect the requisite amendments to the Energy Imbalance Price calculation.

6.4.3.6 Section T 4.4.6B

A new clause is required to set out the default rules, as laid out in section 6.2.1 of this Assessment Report.

6.4.3.7 Section T 4.4.10

Clause 4.4.10 should be amended to reflect the amendment to the calculation, such that it is the NIV Tagged Volume being calculated.

6.4.4 Section T ANNEX T-1

Section T Annex T-1, Clause 3 requires amendment to reflect the NIV Tagging of the ranked accepted Bids and Offers, BSAD Volumes and Total System Un-priced Bid – Offer Volume.

It should be noted that the basis for the proposed amendments is Section T Annex T-1, V4.0, overlaid by the amendments proposed by Modification Proposal P72 'Correction of a Minor Inconsistency in the

BSC Arbitrage and Trade Tagging Methodology' (Reference 7), which was submitted to the Authority on 16 May 2002, and approved by the Authority for implementation on 12 July 2002.

6.5 Definitions Required to Support Alternative Modification P78

Alternative Modification P78 requires new definitions to support the implementation of the amendments to the settlement calculations.

Therefore Section X ANNEX X-2 Table X-1 'Use of Subscripts and Superscripts Applying Except in Relation to Section S' requires amendment to include the new subscript 's' 'Designated Index Provider' introduced by Alternative Modification P78.

Section X ANNEX X-2 Table X-2 'Technical Glossary' requires amendment to include the requisite new and amended definitions, as follows:

- Buy Price Cost Adjustment Price ($BCAP_j$), a new variable and definition required to support the amendments to the Energy Imbalance Price calculation; and
- Sell Price Cost Adjustment Price ($SCAP_j$), a new variable and definition required to support the amendments to the Energy Imbalance Price calculation.

Section X ANNEX X-2 Table X-3 'Glossary of Acronyms Applying Except in Relation to Section S' requires amendment to include the requisite new and amended definitions, as listed above.

7 ASSESSMENT CRITERIA

The PIMG identified a set of issues and / or criteria that it considered to be the key issues / criteria to be considered in the Assessment of both Modification Proposal P74 and Modification Proposal P78. The PIMG considered each issue and a summary of the discussion and considerations of the PIMG on each of the issues is provided in ANNEX 10 of this Assessment Report.

The following reflect the conclusions of the PIMG with regards to the Proposed Modification P78 and its Alternative.

7.1.1 Cost-reflectivity

Modification Proposal P78 states that cost reflectivity in terms of P78 is that "Imbalance prices are calculated from the actions National Grid has taken to balance the system and are designed to reflect the cost that the Parties have imposed on the system by being out of balance". This is a reasonable definition of cost-reflectivity in terms of the Energy Imbalance Prices.

It could be considered that energy prices in the Balancing Mechanism should fairly reflect the cost of the Transmission Company's (System Operator) balancing actions (BSAD, PGBTs and BOAs) required to correct energy imbalance. Energy prices in the Balancing Mechanism incur a 'premium' for flexibility and therefore it is expected that the Energy Imbalance Prices SBP and SSP will be higher and lower, respectively, than the forwards / spot market prices (PXP), i.e. SBP>PXP and SSP<PXP.

While the Energy Imbalance Price calculation has the potential to include system balancing actions, the resulting Energy Imbalance Prices could be considered not to be cost-reflective of energy balancing. However, the differentiation between what constitutes energy as opposed to system balancing cannot be undertaken in all circumstances and the inclusion of system balancing actions in setting the Energy Imbalance Prices could be considered to be inevitable.

It could be considered that it is the extent to which system balancing actions move the Energy Imbalance Price which is the relevant criterion, not the extent to which system balancing actions pollute the cost.

The Proposer of Modification Proposal P78 believes the methodology proposed under P78 to be relatively robust against the inclusion of system balancing actions, on the basis that the Energy Imbalance Price is calculated from those balancing actions taken to alleviate the Net Imbalance Volume (i.e. main stack less the shorter stack), and therefore this method would deem all other balancing actions to be attributable to system balancing.

Conversely, it could be argued that this mechanism for setting the Energy Imbalance Price removes too many energy balancing actions by tagging out all of the balancing actions in the reverse stack and an equal and opposite volume from the main stack (as defined in section 5).

The majority of the PIMG concluded that the calculation of the main price used by Modification Proposal P78 and its Alternative, improves cost-reflectivity over the current baseline, by better reflecting the split between energy and system balancing actions, which results in an Energy Imbalance Price which is more reflective of the costs of energy balancing than the current Energy Imbalance Price.

The PIMG considered the reverse price for both the Proposed and the Alternative Modification in terms of cost-reflectivity and the majority of the PIMG believe that the reverse price associated with the Proposed and the Alternative Modification is more cost-reflective than the current Energy Imbalance

Prices, as the reverse price for both the Proposed and the Alternative Modification removes the influence from system balancing actions inherent from the current Energy Imbalance Price regime (as the smaller stack, which effectively sets the reverse price under the current regime, is more likely to be influenced by system balancing actions).

However, the majority of the PIMG believe that the reverse price for the Alternative Modification is more cost-reflective of the costs of the system operator in (energy) balancing the system, as it is based upon either the BSAD traded by the Transmission Operator prior to Gate Closure, or a Bid – Offer Acceptance taken by the Transmission Company in the Settlement Period, whereas the reverse price for the Proposed Modification is forward and spot market based and therefore reflective of the costs of trading out any imbalance prior to the Settlement Period.

The Proposer for Modification P78 asserted that a reverse price based upon a Balancing Mechanism action would over reward imbalances in the reverse direction to the overall system imbalance, i.e. those imbalances 'helping' the system, by cashing them out at a premium, on the grounds that any Bid – Offer Accepted in the Balancing Mechanism represents a premium price for flexibility.

The Proposer believes that a reverse price based on trading through the forwards and spot markets prior to Gate Closure does not have such a flexibility premium and is therefore neutral, as it provides no benefit over having traded out of imbalance, therefore providing the 'correct' reward to imbalances 'helping' the system, and therefore reflective of the costs of trading out of imbalance. However, it could be argued that an incorrectly specified market based reverse price could be considered not to be cost-reflective and could penalise 'helpful' imbalances, as it cannot be considered to be neutral.

In summary, the majority of the PIMG believe that both the Proposed and the Alternative Modification Proposal are more cost-reflective than the current baseline, with the Alternative Modification being the most cost-reflective.

7.1.2 Implications on Balancing Services Use of System (BSUoS) Charges

The PIMG noted that any assessment of BSUoS would be outside of the vires of the Group. However, the PIMG agreed that the effects on BSUoS from the implementation of Modification Proposal P78 should be noted in order to provide a complete view of the impacts from the Modifications.

The PIMG noted that any reduction in the length of the market, a potential outcome from the implementation of both the Proposed Modification and its Alternative, could increase BSUoS charges. However, the PIMG believe, for the reasons given in the discussion document, that changes to BSUoS levels are not a relevant consideration.

7.1.3 Implications on Residual Cashflow Reallocation

The PIMG noted that any reduction in the spread of the Energy Imbalance Prices (a likely outcome of the implementation of the Proposed Modification P78 and its Alternative, section 8 Analysis) would reduce the magnitude of the Residual Cashflow Reallocation, and that this could be considered to be beneficial. However, the PIMG believe, for the reasons given in the discussion document, that changes to RCRC level is not a relevant consideration.

7.1.4 Value of Actions in the Balancing Mechanism and Targeting of the Costs of System Operator Actions

This is a similar issue to the cost-reflectivity explored at 7.1.1 (and in the discussion document in ANNEX 10). The Proposer of P78 asserts that the Proposed Modification values passive (uninstructed

spill / top-up) and active (deliberate spill / top-up against contract position) actions by parties at a (reverse) price derived from the forwards and spot markets, such that parties with 'helpful' imbalance positions (i.e. those with imbalances in the opposite direction to the overall system length) are not unduly rewarded, nor are they unduly penalised. The application of a market based reverse price to such imbalances values them at the 'get out of imbalance' price from the forwards and spot markets, and therefore offers no benefit over trading out of the imbalance ahead of Gate Closure. However, there is a clear dis-benefit if the market based reverse price is incorrectly defined. It also assumes that it is possible to trade out of imbalance.

With regards to the Alternative Modification, the majority of the PIMG believe that placing a value of BSAD or the cheapest Offer / most expensive Bid (non Arbitrage) (from the same direction as the overall system imbalance) values imbalances helping the system at a price which reflects the minimum 'reward' for bidding into the Balancing Mechanism, therefore adding no benefit over having bid into the Balancing Mechanism.

The majority of the PIMG believe that both the Proposed and the Alternative Modification better value both passive and active imbalances than the current baseline, as follows.

The Proposed Modification:

– Values imbalances in the same direction as the overall system imbalance (i.e. those causing it) at the main price, comprised of energy balancing actions taken to alleviate the imbalance; and

– Values imbalances in the opposite direction to the overall system imbalance (i.e. those 'helping' it) at the market based reverse price, which offers no benefit to having traded out of imbalance ahead of Gate Closure.

The Alternative Modification:

– Values imbalances in the same direction as the overall system imbalance (i.e. those causing it) at the main price, comprised of energy balancing actions taken to alleviate the imbalance; and

– Values imbalances in the opposite direction to the overall system imbalance (i.e. those 'helping' it) at the Balancing Mechanism based reverse price, which offers no benefit to having traded with the Transmission Company, ahead of Gate Closure, or participated in the Balancing Mechanism.

7.1.5 Implications on Participation in the Balancing Mechanism

The PIMG believe that the level and nature of participation in the Balancing Mechanism will change, but cannot determine in which manner, as it is difficult to quantify potential changes without some experience of the implementation of the reduced Gate Closure and the Balancing Reserve Limit of 5 MWh, both of which have the potential to change participant behaviour.

7.1.6 Implications on the Level of Part Loading

The PIMG agreed that part loading plant is a commercial decision and therefore agreed that it is not a relevant consideration.

7.1.7 Incentives to Deviate from Final Physical Notification (FPN)

The PIMG agreed that the Grid Code obligations are sufficient to prevent (deliberate) deviation from FPN for the purposes of self-balancing or in response to favourable cash-out prices.

7.1.8 Effect on Asymmetric Risk

The PIMG agreed that asymmetric risk would be reduced under both the Proposed Modification and the Alternative, as a consequence of the reduction in spread and associated volatility of the Energy Imbalance Prices. However, the PIMG noted that asymmetry is an inherent consequence of risk averse strategies and therefore will not be eliminated.

7.1.9 Incentives to Balance and the Implications for the Balance of the System and System Stability

The PIMG agreed that both the Proposed and the Alternative Modification would better incentivise parties to balance their individual positions, over the current baseline. The perceived volatility in the current Energy Imbalance Prices has had the effect of driving the market considerably long, as a consequence of parties seeking to avoid exposure to the System Buy Price. Therefore by reducing the perceived volatility, parties would seek to come closer to balance, thus bringing the market closer to balance.

Since the perceived volatility in the Energy Imbalance Prices would be mitigated by both the Proposed and the Alternative Modification, it is expected that some types of parties would be more willing to take the risk of imbalance, and therefore this may cause the market to be more closely balanced, as there may be more imbalances on both sides of the market (whereas currently, the majority of imbalances are on the spill side of the market in order to go long and protect from exposure to the System Buy price).

The PIMG indicated that it was unlikely that price hunting behaviour (as explored in the discussion document) would emerge under either the Proposed or the Alternative Modification, as such behaviour would be reliant upon 'perfect' knowledge of the market, determining which way the market would end up, in terms of system length, in order to take a position. The PIMG thought it likely that the cost-reflective Energy Imbalance Pricing (explored at 7.1.1 and 7.1.4) would not make such behaviour worthwhile, in terms of imbalance reward. Therefore the PIMG had no undue concern over system stability under the implementation of the Proposed or the Alternative Modification.

7.1.10 Effect on the Energy Imbalance Prices and Traded Market Prices

The PIMG believe that the level and nature of prices in the traded market (forward and spot markets) will change, but cannot determine in which manner, as it is difficult to quantify potential changes without some experience of the implementation of the reduced Gate Closure which has the potential to change participant behaviour.

7.1.11 Implications for Efficiency of the Forwards and Spot Markets

The majority of the PIMG believe that both the Proposed and the Alternative Modification will have the effect of increasing efficiency in the forwards markets as parties seek to trade out their imbalances. The potential reduction in the perceived volatility and spread of the Energy Imbalance Prices may have the effect of reducing notification risk, therefore encouraging more trading, closer to real time. More risk management tools may also develop as a consequence of the potential decrease in spread and volatility of the Energy Imbalance Prices, again having the effect of increasing efficiency.

The PIMG believe that use of a market based reverse price will have a bigger effect on liquidity and efficiency in the forwards and spot markets (at least those utilised for the provision of the information used in calculating the market based reverse price) that the Alternative Modification, as parties will seek to trade on the forwards and spot markets in order influence the Energy Imbalance Price with

their trading. This may increase liquidity on those forwards and spot markets that contribute to the Energy Imbalance Price.

7.1.12 Implications on Incentives to Forward Contract and the Impact on the Forward and Spot Markets

As for 7.1.11.

7.1.13 Impact on the Risk Profiles of Different Classes of Party

The PIMG considered the consultation responses made in respect of this issue, but noted that, as a consequence of the lack of modelling, the impact on risk profiles for different classes of party could not be gauged / assessed. The PIMG agreed that the implementation of either the Proposed or the Alternative Modification could have the effect of reducing risk profiles of parties, as a consequence of all of the points made previously in this section. However, the PIMG believe that there is no effect from either the Proposed or the Alternative on the relative risk profiles of parties.

7.1.14 Affect on Prompt Price Reporting and Market Transparency

The PIMG do not believe that there is a direct effect on prompt price reporting or market transparency from the implementation of either the Proposed or the Alternative Modification. However, the PIMG did note that this was dependent upon the supporting changes to BSAD (for the reasons noted in the discussion document), which are beyond the vires of the PIMG and this Assessment Report.

7.1.15 Facilitation of Achievement of the Applicable BSC Objectives

This is explored in full in Section 9 of this Assessment Report.

8 ANALYSIS REQUIRED TO SUPPORT THE ASSESSMENT OF MODIFICATION PROPOSAL P78

As detailed in section 1.2 of this Assessment Report, an extension to the three month Assessment Procedure for Modification Proposal P78 was sought at the Panel meeting of 13 June 2002. The key driver behind the request for an extension was the requirement to undertaken the analysis and modelling detailed in this section. As noted in section 1.2, the Authority issued a notice directing that the three month Assessment Procedure be adhered to.

Consequently it should be noted that very limited analysis was undertaken for Modification Proposal P78 and its Alternative. It should also be noted that no modelling was performed.

This section sets out the proposed analysis and the actual analysis undertaken.

8.1 Proposed Analysis and Modelling

8.1.1 Proposer's Analysis

The Proposer of Modification Proposal P78 provided an Annex to Modification Proposal P78 (attached in ANNEX 6).

The first annex was provided with the Modification Proposal and provides a discussion of the rationale behind the Modification Proposal and explores the issues that the Modification Proposal is attempting to address. This formed the basis for the Terms of Reference and Assessment Criteria for Modification

Proposal P78, and, as such, has been subsumed / superseded by the discussions in Section 6 of this Assessment Report.

8.1.2 Proposed Analysis

The PIMG identified a set of analysis required to support its assessment of Modification Proposals P74 and P78. The following list represents the analysis Proposedly required by the PIMG. This list was provided to Parties as part of the supporting documentation for the first assessment consultation (Reference 5), in order to provide Parties with an indication of the analysis being undertaken, and to seek a view from Parties as to whether there was additional analysis that could be considered for Modification Proposals P74 and P78.

1. The mechanisms proposed for Modification Proposal P74 and P78 can be applied to the current Settlement BSAD and Bid - Offer Acceptance stack in order to obtain an idea of the prices resulting from these Modifications and the consequential impact on the Settlement Calculations (for example RCRC).

   For Modification Proposal P78 it may be appropriate to obtain from the Transmission Company (System Operator) an assessment of the additional volumes of BSAD required for system balancing to undertake the most appropriate analysis.

   For Modification Proposal P78 it may be appropriate to define an appropriate market based reverse price to enable calculation and application in the Settlement Calculations.

   It should be noted that both of these Modifications will change the behaviour of Parties, however, an idea of the consequential prices resulting from the Modification Proposals will enable an assessment of the relative cost-reflectivity of each Modification Proposal (both in terms of system vs energy balancing actions in the 'main' price and in terms of the cost-reflectivity of the reserve price) and will enable additional consideration of some of the other assessment criteria detailed.

   It should be noted that some analysis was undertaken to support Modification Proposal P18A, with regards to the incorporation of system balancing actions in the Energy Imbalance Price calculation. This may be useful to consider.

2. An indication of the likely Energy Imbalance Prices, as undertaken above, will enable an indicative view of the likely buy - sell spread and the likely volatility of the buy - sell spread, which will assist in an assessment of the likely incentives to balance / take a (contractual) position before Gate Closure.

3. An indication of the likely Energy Imbalance Prices will enable an assessment of the likely incentives introduced by Modification Proposal P74 / P78. Analysis of the opportunity cost of deviation from FPN may also be undertaken, i.e. if there is a value of spill far in excess of the spot price then the likely incentive is to deviate from FPN, but if the spot price is high then the incentive to spill rather than contract ahead is reduced. Similar arguments can be applied to shortfall.

4. An indication of the likely Energy Imbalance Prices will enable further analysis to be undertaken to determine if amendments to variables used in the existing Energy Imbalance Price calculation gives materially the same effect as either Modification Proposal P74 or P78.

5. An analysis of the source of imbalances can be undertaken by analysis of the composition, shape and direction of Information Imbalances for demand and generation.

6. An historical analysis of 'player behaviour' vs Energy Imbalance Price, i.e. a comparison of net imbalance volumes against Energy Imbalance Prices could be used to give an indication of likely behaviour.

7. An historical comparison of contract volume vs FPN could be used to provide an indication of whether there is a link between contracted volume and FPNs. However, this may be difficult, as FPNs are at BM Unit level (and are not mandated for all types of BM Unit) and contract volumes are at Energy Account level.

8. A historical comparison of the Total System Energy Imbalance Volume (TQEI) to the Net Imbalance Volume (NIV) could be undertaken to determine whether they are different and why.

9. The extent of self balancing reserve held could be assessed by analysis of Maximum Export Limit (MEL) vs Final Physical Notification (FPN) pre Gate Closure, to determine what level of reserve is being taken into the Balancing Mechanism by Parties.

   A comparison of MEL vs actual metered volume (QM_{ij}) could be undertaken to determine what the level of reserve is after Transmission Company (System Operator) actions.

8.1.3 Proposed Modelling

The PIMG considered the complexity of the interactions, incentives and implications from the implementation of Modification Proposal P78 on the trading arrangements and agreed that using current market operation as a basis for analysis would be flawed to some degree, as a consequence of the significant potential for the way in which parties operate to change under the implementation of Modification Proposal P78.

The PIMG considered that the analysis listed under section 7.1 would provide a reasonable indication as to the likely signals and incentives on BSC Parties, but a number of members of the PIMG considered that this would not be sufficient to gauge true incentives and implications, as the analysis would be based on current market behaviour.

Therefore, more significant modelling was considered by the PIMG as an appropriate mechanism for determining the potential behaviour resulting from the implementation of Modification Proposal P78. The PIMG The PIMG considered entering into discussions with Professor Bunn (of the London School of Economics) as Professor Bunn has a simulation model of NETA which attempts to determine the potential behaviour from classes of Party under specific circumstances, and thus determines the likely behaviour, and the implications of such behaviour.

The PIMG recognised that this would potentially carry a not insignificant cost, and take a considerable amount of time and effort, in order to ensure that the assumptions and goals underlying the model were known and were considered to be representative of the underlying strategies and goals of Parties during market operation. Therefore the PIMG agreed to request a view from the Panel, at the meeting of 13 June 2002, as to whether the Panel believed there to be any benefit in seeking to commission such modelling and analysis.

8.2 Analysis Undertaken

As detailed in section 1.2 of this Assessment Report, an extension to the three month Assessment Procedure for Modification Proposal P78 was sought at the Panel meeting of 13 June 2002. The key driver behind the request for an extension was the requirement to undertaken the analysis and modelling detailed above. As noted in section 1.2, the Authority issued a notice directing that the three month Assessment Procedure be adhered to.

The PIMG acknowledged that the remaining time allowed for the Assessment Procedure would be (vastly) insufficient to undertake the analysis and modelling detailed at 7.1.2 and 7.1.3, therefore the PIMG looked at potential ways of limiting the analysis. The PIMG acknowledged that there was a trade off between added value of the analysis and the time constraint. Therefore, the PIMG agreed that the most beneficial analysis in the time available would be an analysis of the resultant Energy Imbalance Price from the implementation of Modification Proposal P78.

8.2.1 Modification Proposal P78 Analysis

The analysis undertaken is provided in ANNEX 7.

As a consequence of the constrained timetable, a complete replication of the Settlement calculations required for implementation of the Modification and its Alternative could not be undertaken. Therefore the analysis was undertaken on the closest approximation to the calculations in order to get an indication of the resulting Energy Imbalance Prices. The key aspect was to be able to undertake analysis based on the current mechanism for the calculation of the Energy Imbalance Prices, applied to historic data.

The following provides a description the analysis (provided in graph format) and provides the supporting rationale and assumptions:

Graphs 1 to 5 are based upon weekly averages of data since 30 September 2001 (thus only utilising historical data since Modification P18A (CADL) was implemented).

Graph 1: Balancing Volume (without BSAD);

Graph 2: Balancing Volume (with BSAD);

Both the variation on the Proposed Modification, proposed in section 4.2.1, (namely utilisation of the current mechanism for calculating the Energy Imbalance Prices, and then applying one price dependent upon the system length, derived from all the Accepted Bid – Offers and BSAD trades) and the Alternative Modification (the Energy Imbalance Price derived from the Net Imbalance Volume) require that BSAD be included in the calculation of the system length.

Graph 1 shows the system length, based on the total volume of Accepted Bid – Offers, but without BSAD volumes.

Graph 2 shows the same, but with BSAD volumes included.

It can be seen from these graphs that the system is predominantly long, and that BSAD does not materially affect the system length.

Therefore it appears to be valid to assume that representative results would be obtained without including the effects of BSAD in the modelling of the Net Imbalance Volume, and the associated price.

Graph 3: Market Length

Graph 3 builds on the first two graphs by comparing the market length for each of:

1. Total volume of Bid – Offer Acceptances;
2. Total volume of Bid – Offer Acceptances plus BSAD; and
3. Total volume of Priced Bid – Offer Acceptances plus BSAD.

This graph is intended to verify whether there is any material difference between market length depending upon the formulation for it. This enables an assessment of whether any modelling of the

Net Imbalance Volume will be inaccurate, as it enables an understanding of the affect that BSAD and CADL'ed Acceptances have on the market length.

Graph 3 indicates that really, there is not a material difference between the formulation used in determining the market length and that the calculations / analysis on the Energy Imbalance Prices will be equally as representative for each of the formulations.

Graph 4: Switches in Market Length;

This graph shows the number of times that the market has switched from long to short, or vice versa, based upon the Bid – Offer Acceptance volumes. This is intended to show, for Modification P78, how often the main Energy Imbalance Price would change. For Modification P78 it shows the switch between Bids setting the Energy Imbalance Price, and Offers. Therefore, it can be seen that there are approximately five switches a day (based on the rough average of thirty-five per week, divided by seven days).

Graph 5: BSAD Mixture;

This graph is intended to provide an indication of the effect of net BSAD reporting / use in the Settlement Calculations. It can be seen that there are very few Settlement Periods (historically) where there are both sales and purchases notified, although this is increasing in the period 28 April 2002 onwards (the dark area in the top right corner). This seems to indicate that, at least historically, net BSAD reporting would have little implication, as trades are being made in only one direction.

However, it is recognised that this may change, both with the reduced Gate Closure implementation, and with the implementation of this Modification, if approved, therefore making any assessment of the extent to which net BSAD reporting would make a difference to the Energy Imbalance Price calculation (and market transparency) difficult.

The next set of graphs represent the resulting main Energy Imbalance Price that would result from the calculation of the Net Imbalance Volume and the derived main Energy Imbalance Price. It should be noted that this applies to the main price for both the Proposed and the Alternative Modification P78.

The System Buy Price and System Sell Price was calculated using the current mechanism (i.e that for the historical data), and then the trace for the main price was overlaid in order to provide a comparison against the current mechanism. It should also be noted that the single price calculated under the original variation of Modification Proposal P74 (at BRL 180) was also overlaid to enable a comparison against the single price resulting from Modification P74.

A Balancing Reserve Limit of zero was used to derive the main price, as this could be considered (following the verification undertaken at graphs 1 through 5, i.e. an indication that BSAD and CADL volumes are relatively immaterial, thus indicating that use of BRL zero would provide a relatively close approximation of the NIV tagging process) to provide an Energy Imbalance Price representative of that which would be obtained via the Net Imbalance Volume calculation (section 5.3). It should also be noted that the System Buy Price and System Sell Price represented on the graphs are that which would be calculated under the current cash-out mechanism for BRL 0.

Graph 6: Weekly Average Prices (BRL 0);

It can be seen that the average single price has been smoothed somewhat, but is still relatively similar to that obtained under BRL 180.

Graph 7: Average Prices Per Period (BRL 0);

The graph looks at all the Settlement Days in the period analysed (30 September 2001 to 26 May 2002) and provides an average price for each Settlement Period in this period. Again, the same effect, as noted for graph 14, can be seen for the within day trace.

Graph 8: Example Day – 17 Dec 2001 (BRL 0);

Here, an example day was chosen (17 December 2001 was chosen as an extreme day where there were a relatively high number of switches in the market length throughout the Settlement Day, and the System Buy Price was quite high for a number of Settlement Periods. The graph shows that the main price has been smoothed somewhat, but is still relatively similar to that obtained under BRL 180, with the more extreme prices smoothed away.

Graph 9: Price Frequency (BRL 0);

This graph shows the number of occurrences where the main price would have been set by Offers (System Buy Price) or by Bids (the System Sell Price) under Modification P78, against the price that would have been set. From this graph it can be seen that the vast majority of Settlement Periods would have been cashed out at between £10/MWh and £20/MWh, set, in the main, by the System Sell Price. However, it can also be seen that the influence of the System Buy Price would have set a number of Settlement Periods to cash-out prices in excess of £30/MWh, up to £340/MWh.

The following graphs relate only to the Alternative Modification P78, and are intended to show the reverse price calculated by reference to the first non Arbitrage Bid – Offer Acceptance on the main stack (as described in section 5), in relation to the main price (calculated from the Net Imbalance Volume).

Graph 10: Weekly Average Prices (P78A);

Graph 10 is intended to reflect the average Energy Imbalance Prices that would have resulted from Alternative Modification P78, as a weekly averaged SSP and SBP for the main and reverse price. As well as reflecting the average Energy Imbalance Prices, this graph also represents the spread between the two resulting prices. This graph appears to indicate that the formulation of the reverse price using the first non Arbitrage Acceptance gives a relatively consistent spread in the right direction.

Graph 11: Price Spread

This graph is intended to show the price spreads resulting from Energy Imbalance Prices calculated from BRL 180, 5 and 0 (under the current mechanism) in order to compare them to the spread resulting from Alternative Modification P78 (i.e. the main price derived from BRL=0, and the reverse price from the first non Arbitrage Bid - Offer Acceptance on the main stack). It can be seen that this graph indicates that the spread is less than for the BRL 180 and 5, but as expected, is higher than BRL 0 (as a consequence of the current default rules). It can also be seen that the 'peakiness' of the spread for BRL 180 and 5 is materially flattened by Alternative Modification P78.

Graph 12: Spread Frequency

Graph 12 is intended to show the spread frequency, i.e. what the spread is and how often it occurs, for a comparison of BRL = 180, 5 and 0 against the Alternative Modification P78 main and reverse spread. Again a similar trend to that seen in graph 11 is evident.

The following graphs relate only to the Proposed (Original) Modification P78, and are intended to show the reverse price calculated by reference to the UKPX Reference Price (a currently available market index source) in relation to the main price (calculated from the Net Imbalance Volume).

Graph 13: Weekly Average Prices (P78 Original);

Graph 13 is intended to reflect the average Energy Imbalance Prices that would have resulted from the Proposed Modification P78, as a weekly averaged SSP and SBP for the main and reverse price. As well as reflecting the average Energy Imbalance Prices, this graph also represents the spread between the two resulting prices. This graph appears to indicate that the formulation of the reverse price using a market index gives a relatively consistent spread in the right direction. Although it should be noted that it appears that the spread resulting from use of the market index is generally higher than for the reverse price under the Alternative Modification.

Graph 14: Price Spread (P78 Original)

Graph 14 is intended to show the price spreads resulting from Energy Imbalance Prices calculated from BRL 180, 5 and 0 (under the current mechanism) in order to compare them to the spread resulting from Proposed Modification P78 (i.e. the main price derived from BRL=0, and the reverse price from the market index). It can be seen that this graph indicates that the spread is less than for the BRL 180 and 5, but as expected, is higher than BRL 0 (as a consequence of the current default rules). It can also be seen that the 'peakiness' of the spread for BRL 180 and 5 is materially flattened by Proposed Modification P78.

Graph 15: Spread Frequency (P78 Original)

Graph 15 is intended to show the spread frequency, i.e. what the spread is and how often it occurs, for a comparison of BRL = 180, 5 and 0 against the Proposed Modification P78 main and reverse spread. Again a similar trend to that seen in graph 11 is evident.

9 APPLICABLE BSC OBJECTIVES

The Applicable BSC Objectives are set out in paragraph 3 of Condition C3 of the Transmission Licence, as follows:

(a) The efficient discharge by the Transmission Company of the obligations imposed under the Transmission Licence;

(b) The efficient, economic and co-ordinated operation by the Transmission Company of the 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;

(d) Promoting efficiency in the implementation and administration of the balancing and settlement arrangements.

The PIMG, having reached a conclusion on each of the Assessment Criteria (see section 7 and ANNEX 10), considered how the conclusions on the impacts and incentives of the Proposed and the Alternative Modification would lead to the Proposed and the Alternative Modification better facilitating achievement of each of the Applicable BSC Objectives, and the extent to which this is the case.

On balance, the majority of the PIMG believe that the Alternative Modification is better than the Proposed in the overall facilitation of the Applicable BSC Objectives. The PIMG believe this to be the consequence of the utilisation of a market based reverse price, as the majority view is that such

market based reverse price is not as cost-reflective of the energy balancing actions of the system operator as a Balancing Mechanism based reverse price (i.e. the Alternative Modification).

The majority of the PIMG agreed that in all other respects, the Proposed and the Alternative Modification were equal in better facilitating the Applicable BSC Objectives.

9.1.1 Objective 3(a)

The PIMG believe that both the Proposed and the Alternative Modification are neutral to this objective.

9.1.2 Objective 3(b)

The majority of the PIMG believe that both the Proposed and the Alternative Modification better facilitate achievement of the Applicable Objective pertaining to the economic and efficient operation of the Transmission Network as follows:

- A proposed outcome of both the Proposed and the Alternative Modification is that the market will come closer to balance, and consequently parties will not hold so much self reserve. On this basis, the system operator should be able to balance the market more efficiently and effectively;
- The increased incentive for parties to balance their individual positions ahead of Gate Closure should result in increased accuracy of information provided to the system operator ahead of Gate Closure, thus enabling it to make informed decisions about balancing the system, improving efficiency and economic operation; and
- Improving the cost-reflectivity of the Energy Imbalance Prices should promote this Objective by providing more accurate signals to the system operator of the costs of balancing the system.

9.1.3 Objective 3(c)

The majority of the PIMG believe that both the Proposed and the Alternative Modification better facilitate achievement of the Applicable BSC Objective pertaining to the promotion of effective competition in the sale and purchase of electricity, for the following reasons:

- A proposed outcome of both the Proposed and the Alternative Modification is that the buy – sell spread of the Energy Imbalance Prices will be reduced, thus reducing the risks of exposure to imbalance, thus improving competition in the sale and purchase of electricity;
- The Proposed and the Alternative Modification value 'uninstructed assistance' to the system (i.e. imbalances in the opposite direction to the overall system imbalance) at the same or a lower price than if they had been fully contracted, to reflect that they may be imposing costs on the system. Both the Proposed and the Alternative Modification could be considered to be more cost-reflective than the current baseline;
- Improving the cost-reflectivity of the Energy Imbalance Prices means that the cost of energy balancing is more correctly targeted at those causing the imbalance, and therefore this improves competition by preventing cross-subsidies;
- The implementation of a more cost-reflective dual cash-out price regime incentivises participants to balance their individual positions ahead of Gate Closure, therefore minimising the actions that the system operator has to take to correct the system energy imbalance. Thus, this assists in minimising the role of centrally administered mechanisms and facilitates the bilateral trading of energy; and

– Reduction in the risk of exposure to imbalance, whilst maintaining the incentives to balance, and therefore trade bilaterally, ahead of Gate Closure, may have the effect of encouraging participants to trade closer to real-time, with the associated effect of improving liquidity in the forwards and spot markets, thus increasing competition.

9.1.4 Objective 3(d)

The PIMG believe that both the Proposed and the Alternative Modification are neutral to this objective.

10 IMPACT ON BSC SYSTEMS

The Detailed Level Impact Assessment is provided in ANNEX 3 of this Assessment Report.

10.1 Proposed Modification

Development and implementation of all changes to support the Original Modification:

– Development and Implementation costs: **£614,500**

– Ongoing Operate and Maintain costs: **£7,169 per month**

– Development Timescales: **21 weeks**

10.2 Alternative Modification

Development and implementation of all changes to support the Alternative Modification:

– Development and Implementation costs: **£362,000**

– Ongoing Operate and Maintain costs: **£4,223 per month**

– Development Timescales: **15 weeks**

11 IMPACT ON CORE INDUSTRY DOCUMENTS AND SUPPORTING ARRANGEMENTS

11.1 Supplemental Agreements: Balancing Services Adjustment Data Methodology Statement

11.1.1 Amendments to BSAD Reporting

The following amendments to BSAD were proposed by the Transmission Company in support of Modification Proposal P78.

The following figure, (figure 11.3 (1)) taken from the Transmission Company document 'Modification Proposal P78: Revised SBP & SSP' (an expanded annex to Modification Proposal P78, provided in Annex 6), reflects how the Transmission Company perceive any effect from gross reporting to be ameliorated by the incorporation of net BSAD.

In support of Figure 11.3 (1) the Transmission Company asserts that in the gross reporting of BSAD the Energy Imbalance Price would reflect only BSAD trades, despite them resolving only a proportion of the Net Imbalance Volume, therefore this would not be robust against the Transmission Company (System Operator) having to unwind its pre-Gate Closure trades in the Balancing Mechanism.

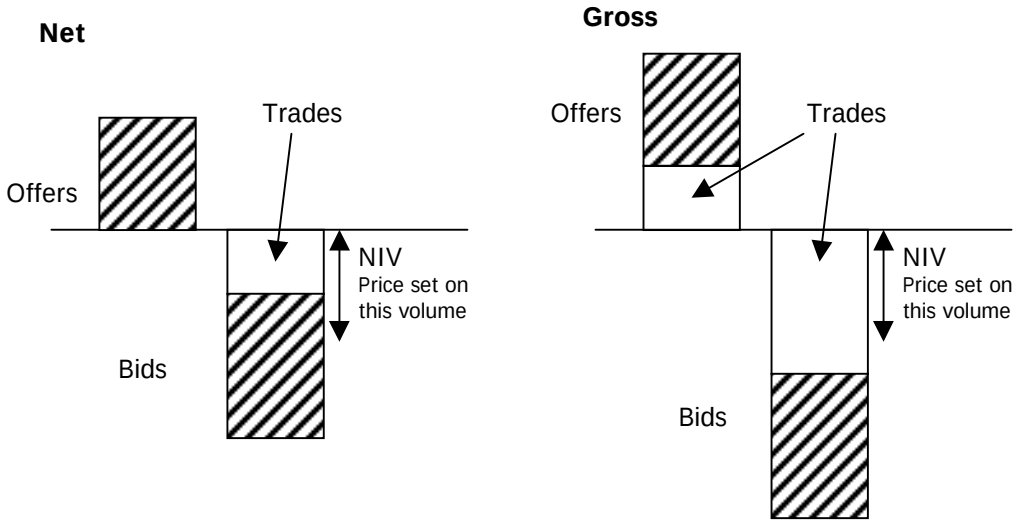


Figure 11.3 (1): Net vs Gross Reporting / Usage of BSAD in the Energy Imbalance Price calculation.

The Transmission Company proposed, in the expanded annex to Modification Proposal P78, that BSAD be reported as follows:

	Net Purchase Pre-Gate Closure	**Net Sale Pre-Gate Closure**
Buy Price Volume Adjustment (BVA)	Net purchase volume	0
Sell Price Volume Adjustment (SVA)	0	Net sale volume
Buy Price Cost Adjustment (BCA)	(BVA) * (weighted average price of energy trades)	0
Sell Price Cost Adjustment (SCA)	0	(SVA) * (weighted average price of energy trades)
Buy Price Price Adjustment (BPA)	No change from existing methodology	No change from existing methodology
Sell Price Price Adjustment (SPA)	No change from existing methodology	No change from existing methodology

The exact amendments to BSAD are yet to be defined / agreed by the Transmission Company, however, it is believed that there are two options, option 1, net reporting only (set out in 5.2.1) and option 2, net and gross reporting (set out in 5.2.2)

11.1.2 BSAD and System Balancing Trades

The current BSAD Methodology requires that only those trades, (or part of), deemed to be attributable to energy balancing are reported in BSAD.

This alternative option for Modification P74 seeks to amend the BSAD Methodology such that volumes deemed to have been traded by the Transmission Company for system balancing purposes are

included in the net reported volumes (Net SVA / Net BVA). It should be noted that the intent is that only the volumes feed into the net BSAD figures, with the associated price being disregarded, and consequently not reported / included in the net price reported. The intent of this is to ensure that the Net Imbalance Volume calculation provides a 'true' reflection of the overall system imbalance, without the cost of system balancing actions 'polluting' the associated Energy Imbalance Price.

Although this is beyond the scope of this Assessment Report, it is referenced for completeness and clarity, as it has some effect upon the mechanism for calculating the Energy Imbalance Prices, specifically with regards to the application of CADL (Continuous Acceptance Duration Limit) on Bid – Offer Acceptances.

11.2 Settlement Agreement for Scotland (SAS)

The Scottish Administered Wholesale Pricing Arrangements, namely the Scottish trading arrangements for dealing with imbalance volumes, use a component of the England and Wales Energy Imbalance Prices for calculating the imbalance cash-out prices. Therefore any amendment to the mechanism used in England and Wales, such as that proposed for this Modification, may require a consequential amendment to the Scottish arrangements. However, this is outside of the vires of this Modification and Assessment Report, but is noted for completeness.

12 IMPACT ON ELEXON

The ELEXON Detailed Level Impact Assessment is provided in ANNEX 4 of this Assessment Report.

12.1 Proposed Modification

It is expected that ELEXON would incur effort in the region of **300 man days** for the implementation and development of the Proposed Modification P78, require an **additional 4 weeks** at the end of the development and implementation of the BSC Central Service Agent for Participant testing and regression testing.

ELEXON is impacted by the amendment to the Settlement calculations and by the consequential changes to the Settlement Report. It is believed that the amendments to TOMAS required to support the Alternative Modification are significant and will require a material amount of time and resource to implement. It is expected that this will incur **100 man days** of effort for the amendment and subsequent testing of TOMAS.

12.2 Alternative Modification

It is expected that ELEXON would incur effort in the region of **200 man days** for the implementation and development of the Proposed Modification P78, require an **additional 3 weeks** at the end of the development and implementation of the BSC Central Service Agent for Participant testing and regression testing.

ELEXON is impacted by the amendment to the Settlement calculations and by the consequential changes to the Settlement Report. It is believed that the amendments to TOMAS required to support the Alternative Modification are significant and will require a material amount of time and resource to implement. It is expected that this will incur **100 man days** of effort for the amendment and subsequent testing of TOMAS.

13 IMPACT ON PARTIES AND PARTY AGENTS

13.1.1 Amendments to the Settlement Report

All Parties, the Transmission Company and ELEXON (as they also receive the Transmission Company variant of the Settlement Report) are impacted by the amendments to the Settlement Report, as set out in section 5.4.

However, it should be noted that Parties can determine whether they wish to continue receiving the old version of the report (i.e. without the amendments and therefore reducing the ability to accurately verify their trading charges), or the new report, with the amendments. This enables them to determine the timeframes for implementation of an amended interface independently of its development within the Central Services (unlike a 'big bang' approach). However, the impact from the implementation of amendments to the Settlement Report is still likely to be significant.

13.1.2 Verification of the Settlement Calculations

It is believed that the majority of BSC Parties recreate, to some degree, the Settlement Calculations in order to verify their Trading Charges. Therefore any amendment to the mechanism for calculating and applying the Energy Imbalance Prices will have an impact. The changes proposed by Modification P78 are significant and potentially have a large impact on system used in such verification.

The impact assessment responses from Parties indicate that this is a material change for the majority of Parties responding, with the highest indication of impact being reported from one Party as 3 to 6 months development costing around £145,000.

14 LEGAL ISSUES

None identified at this time.

15 SUMMARY OF REPRESENTATIONS

15.1 First Assessment Consultation Responses

The first assessment consultation comprised a set of nineteen questions posed by the PIMG in order to obtain industry opinion on the key assessment criteria (as set out in section 6). Each question is listed, following by a high level summary of the responses.

The full set of consultation responses is provided in ANNEX 2 (a).

The PIMG considered the responses to this assessment consultation at their meeting of 19 June 2002. The PIMG believed that all the issues raised by the consultation responses have already been identified and discussed, as part of the consideration of the assessment criteria (section 6), and that therefore there are no new and substantive issues raised by the consultation responses.

Twenty-one responses, on behalf of sixty-nine Parties, were received in response to the Modification Proposal P78 Assessment Consultation.

The following represents a high level summary of the responses.

Q1 In your opinion, does Modification Proposal P78 give a better separation of balancing actions (i.e. system vs energy) used in setting the Energy Imbalance Price(s), if so, how?

At a high level:

- Fourteen responses (thirty-four Parties, responses 003, 006, 007, 009, 010, 011, 012, 013, 015, 016, 017, 018, 019 and 021) believe that Modification Proposal P78 does give a better separation of balancing actions;
- Four responses (thirty Parties, responses 001, 002, 008 and 014) do not believe that Modification Proposal P78 gives a better separation of balancing actions;
- One response (three Parties, response 005) does not express a (clear) view either way; and
- Two responses (two Parties, responses 004 and 020) made no comment.

Positive comments:

- The proposed mechanism for calculating the main price (i.e. from the larger stack) is an improvement on the current use of BRL, especially when Ofgem seem unwilling to set BRL at the appropriately low level;
- Modification P78 deems all the actions in the opposite direction to the market to have been taken for system balancing, and removes these along with an equal and opposite amount from the main price, thus setting a lower price, thus the main price is likely to be a better reflection of the cost of energy needed for pure energy balancing reasons;
- The reverse price for Modification P78 is an approximate spot market price and this is a significantly better reflection of the value of reverse actions than is currently the case at present; and
- Modification P78 proposes a less arbitrary approach than the current arrangements, as the Net Imbalance Volume will change for each Settlement Period, whereas BRL is a constant. Since the Modification P78 methodology applies to the stack in the direction of system imbalance, it is likely to lead to results that are more cost-reflective than the current approach.

Negative comments:

- P78, in removing the whole of the reverse stack and in using Net Imbalance Volume for setting the forward stack (main price) will change the separation of balancing actions by removing some of these acceptances which were taken for both system and energy reasons;
- Modification P78 does not improve the discrimination of system and energy related acceptances. It would, if approved, effectively set BRL to zero and therefore set "in aspic" that none of the acceptances are energy-related, regardless of future circumstances. The fact that, further, this approach then, under P78, influences one imbalance cash-out price, the other being set by power exchange prices, is also undesirable, as it is not believed that any measure of forward trading prices should directly influence energy imbalance cash-out prices, because of the circularity involved;
- The Balancing Mechanism balances on a real time basis. Modification P78 makes the assumption that only the Net Imbalance Volume is attributable to energy balancing with all other actions having been taken for system balancing. Intra half hour actions could be taken for system and energy purposes in a Settlement Period on both sides of the market yet energy trades on the shorter stack will be ignored. This is fine if a large majority of actions on the smaller stack are for system balancing, if however, there are a substantial volume of energy actions included in the smaller stack then these need to be reflected in cash-out prices (as highlighted by Ofgem in many

of its Modification decision letters). The degree to which reverse actions are being taken for energy needs requires further investigation;

Q2 In your opinion, is Modification Proposal P78 valuing actions more correctly, if so, why and if not, why not?

At a high level:

- Twelve responses (twenty-seven Parties, responses 003, 006, 007, 009, 010, 011, 012, 013, 016, 017, 018 and 021) believe that Modification Proposal P78 does value actions more correctly;
- Four responses (ten Parties, responses 001, 008, 014 and 019) do not believe that Modification Proposal P78 values actions more correctly;
- On response (three Parties, response 005) believes that the main price for Modification P78 values actions more correctly, but that the reverse price does not; and
- Four responses (twenty-nine Parties, responses 002, 004, 015 and 020) made no comment, or expressed no opinion in support or otherwise.

Positive comments:

- Modification P78 better values those participants who are helping the system into balance via their contractual imbalance, for example, if the system is long, those who are short are better rewarded than under the current arrangements;
- It could be argued that it leads to actions being more accurately valued in as much as it reflects the actions the Transmission Company has to take to deal with the net imbalance;
- The market price used for the reverse price is definitely more cost-reflective than the current Energy Imbalance Prices; and
- The main imbalance price will continue to reflect those actions but the reverse price will reflect the market value of the energy uncontaminated by system balancing actions. Also, as the BRL is effectively set to zero the more extreme bids and offers will be netted off making imbalance prices (in the direction of the system imbalance) less extreme.

Negative comments:

- It is inappropriate for a Party to be cashed out at a favourable price as a consequence of being out of balance but in the opposite direction of the system. It is believed that this will cause participants to give more consideration to the overall system in balance rather than their own position;
- As the reverse price is based on a market index, it is not reflective of the balancing actions the Transmission Company has had to take;
- Modification P78 will dampen prices due to the inclusion of the net volume of NGC's forward trades. The main price will be less reflective than at present of the actions taken by the Transmission Company in the Balancing Mechanism. The reverse price will not be reflective of Balancing Mechanism actions at all.
- Modification P78 proposes tagging from the larger stack the total volume of trades on the smaller stack. Where actions have been taken on both sides of the market to create reserve (a cost that

Ofgem in its P8 decision considered should be signalled through energy imbalance prices), those that cause this reserve to be called upon should pay for it;

- Whilst P78 retains the dual cash-out mechanism, it will better reward parties that are out of balance in the opposite direction to the market than the current mechanism. If parties are able to correctly predict the overall market direction in advance of gate closure and are out of balance in the opposite direction, dependent on the derivation of the 'market price' they will indifferent as to whether they contract to balance.

Q3 In your opinion, how does Modification Proposal P78 change the relative reward for notified and instructed actions and how do you believe this to impact on the Transmission Company's balancing of the system, and do you believe this is appropriate?

Comments:

- As a general principle, a greater value, and hence reward, should be placed on instructed actions over notified and un-notified actions. It is likely that Modification P78 will change the relative reward for notified and instructed actions because cash-out prices are likely to become less penal than they are at present and this will inevitably reduce the incentive on parties to match FPN and contracted volumes;
- Notified actions, where beneficial to the balance of the system, will be relatively better rewarded than now. This should lead to the Transmission Company having to take less actions to achieve balancing of the system which is consistent with NETA objectives;
- Bid – Offer Acceptances give the Transmission Company more control over balancing the market than relying on FPNs being delivered. Therefore these should be valued more highly than uninstructed actions to balance;
- Modification P78 asserts that the value of an uninstructed action that helps the system is worth no more than the market price but offers no justification for this view. It is certainly a better valuation than the current arrangement, which punishes such "accidental" help regardless but this is still not a proper reflection of the value of the offsetting volumes, which allow the Transmission Company to take less balancing actions than they would otherwise have taken;
- In terms of account imbalances, whether from "instructed" or "notified" actions, Modification P78 would substitute a measure of forward trading prices for the existing "shorter stack"-derived cash-out price. The use of forward prices in this way is inherently wrong. Insofar as the forward price is less deleterious, from the participant's point of view, than the existing "shorter stack"-derived cash-out price, this change also reduces incentives to balance;
- The consequence of notified actions would be less penal, but instructed actions would continue to have greater value, and this is appropriate;
- Because the reverse price will be more attractive than under the current mechanism, the reward for notified actions in the opposite direction to the market will improve. The Balancing Mechanism was intended to be the market of last resort. It is not appropriate that Parties that are out of balance in the opposite direction to the market receive/pay the same price as those that have balanced their positions prior to Gate Closure;
- The use of a market price for the "reverse imbalance" is an arbitrary approach that will incorrectly value the benefit of parties that are out of balance in the reverse direction to the system

imbalance. It is noted that the Transmission Company argue that the use of such a market price may better reflect the true cost of the reverse imbalance. However, the Modification P78 methodology may result in movements in the market price that reflect the expected out turn of the system (long or short). This feedback and linkage may result in market prices for reverse imbalances that distort the relative value of notified and instructed actions; and

– The imbalance charge potentially seen by an individual participant who goes short would vary between SBP (or SSP) and a market derived figure dependent on the Net Imbalance Volume. The exposure to potential punitive dual cash-out prices would be reduced, although the price volatility would increase for being out of balance in a particular direction. Participants taking notified actions would be exposed to more favourable imbalance charges. As there is less risk in taking notified actions, it follows that more notified actions may be taken to reduce the potential risk of exposure to SBP. Failure to deliver instructed actions would also expose participants to less punitive non delivery charges.

Q4 In your opinion, does Modification Proposal P78 more correctly target the cost of energy balancing actions to those causing the imbalance over the current baseline?

At a high level:

– Ten responses (twenty-two Parties, responses 003, 006, 007, 009, 010, 011, 012, 013, 017 and 021) believe that Modification Proposal P78 does target the costs of actions more correctly; and

– Seven responses (twenty Parties, responses 001, 005, 008, 014, 015, 016 and 019) do not believe that Modification Proposal P78 targets the costs of actions more correctly; and

– Four responses (twenty- seven Parties, responses 002, 004, 018 and 020) made no comment, or expressed no support or otherwise).

Positive comments:

– Modification P78 targets the cost of net imbalance on those who are in imbalance in the same direction as the system. It values contractual imbalances that help the system better than the current mechanism, but does not offer the full reward for that help;

– Modification P78 targets the net cost of imbalance on those who caused it and holds those participants with a 'helpful' position neutral;

– Those participants that are out of balance in the same direction as the system are targeted. Those participants that are out of balance in the opposite direction will receive, in principle, market price for their actions. This is an improvement on the present arrangements;

Negative comments:

– If a more appropriate split of system and energy is achieved under this proposal, then it will deliver a more appropriate targeting of the cost of energy balancing. However, this cannot be the case for the reverse price;

– Forward prices are not correct for use in energy imbalance cash-out. Nor is there a case for fixing BRL forever at zero, which this Modification effectively does. Discrimination issues in the "main" price as between energy and system balancing actions will remain.

– A dual cash out process inevitably requires the construction of an "artificial" price for imbalances that are in the opposite direction to system balance (the so-called "reverse" direction). Therefore

the use of a dual price system will not more accurately reflect the costs of ensuring energy balance; and

- The cost of imbalance faced by individual participants is not cost reflective or directly related to the corresponding energy balancing action.
- For participants out of balance in the opposite direction to the market, costs will not be properly targeted as a better price will be achieved that if trading had taken place on the exchanges. It is inappropriate that parties that are out of balance receive / pay a better price that have balanced their positions before Gate Closure;

Q5 In your opinion, how does Modification Proposal P78 change the perceived risk of Bid - Offer submission, how would it change the level of participation seen in the Balancing Mechanism under the current baseline and how do you believe it would affect system balancing?

At a high level:

- Eleven responses (twenty Parties, responses 003, 006, 007, 009, 010, 012, 013, 016, 017, 019 and 021) believe that Modification Proposal P78 will increase the level of participation in the Balancing Mechanism;
- One response (two Parties, response 014) believes that Modification Proposal P78 will reduce the level of participation in the Balancing Mechanism;
- Four responses (thirty-four Parties, responses 001, 002, 008 and 015) believe that Modification Proposal P78 will not effect the level of participation in the Balancing Mechanism;
- Two responses (seven Parties, responses 005 and 011) did not indicate whether participation in the Balancing Mechanism would increase or decrease under Modification P78, but response 005 expressed concerns regarding gaming if the reverse price is predictable, and response 011 expressed a view that no assessment could be made until the reduction in Gate Closure has been implemented and the consequences seen; and
- Three responses (six Parties, responses 004, 018 and 020) made no comment.

Positive comments:

- By reducing unfairly penal aspects of cash-out prices, the risk-reward balance for generators should shift somewhat such that there may be greater participation from a greater variety of participants;
- Modification P78 reduces the risk of Bid - Offer submission because if an acceptance is made that cannot be delivered then the cost of that failure is not necessarily changed. Given that self-reserve is offered to the Transmission Company as Offers at present, the main expected change will be in the price at which such Offers are made which should be lower if the cost of failure is lower;
- The impact of fewer balancing actions to back off excess generation needs to be taken into account, and this should increase options available to the Transmission Company through the Balancing Mechanism;
- Assuming there are less strong incentives to over contract under Modification P78, participants may see more opportunities for offering marginal supply into the Balancing Mechanism, and they may be less inclined to hold plant in reserve to self balance; and

– Modification P78 should bring the market to a position nearer balance therefore increasing the need for the Transmission Company to accept Offers to increase generation or reduce demand so more participants should be encouraged to participate in the Balancing Mechanism especially in the mid to high price range thus reducing the cost of any extreme situations and increasing available plant in the Balancing Mechanism. In addition the reduction in the difference between SSP and SBP and the market price will reduce the cost of failure and therefore the risk thus increasing participation.

Negative comments:

– Difficult to quantify, but likely that Bid – Offer submission will become more volatile, as some participants may hold back plant for Balancing Mechanism participation, while some may forward contract the bulk of it. This effect will be exacerbated by the reduction in Gate Closure, as participants have longer in which to make the decision; and

– Parties are able to hold reserve for legitimate self balancing whilst still being able to offer into the Balancing Mechanism. Modification P78 will not therefore increase the level of Bid - Offer submission as generators are able to both hold reserve and participate in the Balancing Mechanism. In fact, if players choose not to hold reserve, then Balancing Mechanism volumes may effectively reduce.

Other comments:

– It would be anticipated that the same level of participation would be seen in the Balancing Mechanism, but there should be greater symmetry between the stacks. However, it is conceivable that the Offers could be at more expensive prices than currently seen.

Q6 In your opinion, how do you believe Modification Proposal P78 would affect the level of part loading seen under the current arrangements and in what way do you believe it would be more or less efficient for participants and for the system as a whole?

At a high level:

– Six responses (fifteen Parties, responses 003, 007, 009, 012, 015 and 021) believe that Modification P78 will reduce part loading;

– One response (three Parties, response 001) believes that Modification P78 will reduce part loading, but that this is not efficient for the market;

– Five responses, (thirty-two Parties, responses 002, 008, 010, 011 and 014) believe that Modification P78 will have no effect on the level of part loading;

– Two responses (six Parties, responses 007 and 013) believe that Modification P78 has the potential to have both a beneficial and detrimental effect on part loading;

– One response (three Parties, response 005) believes that no assessment of any incremental effect of Modification P78 on the level of part loading can be made until the reduced Gate Closure has been implemented;

– One response (two Parties, response 017) does not believe that the level of part loading is a relevant consideration for Modification P78; and

– Four responses (seven Parties, responses 004, 016, 018 and 020) made no comment or assessment.

Positive comments:

- Whilst the level of part loading is affected by a number of factors, the commercial incentives to part load would be reduced by Modification P78 and thus in general there ought to be somewhat less. This, by definition, would reflect that it is more efficient operationally and commercially for participants;
- Modification P78 should reduce part loading as a consequence of a more balanced market requiring fewer bids to be taken, thus reducing the possible commercial upside of part loading on pulled back plant;
- Modification P78 should reduce part loading as a consequence of the reduction in the cost of generator trip reducing the requirement for self reserve, with fewer plant then operating at fuller load; and
- Balancing action taken by the Transmission Company should be on a more efficient basis in terms of the system as a whole rather than, for example, through the provision of free reserve by long positions taken into the Balancing Mechanism.

Negative comments:

- Potentially there would be some reduction in part loading if Modification P78 did lead to a reduction in the imbalance prices. This could be seen as being less efficient for the market as a whole although possibly not for individual participants;
- Modification P78 could increase part loading as a consequence of a more balanced market increasing the probability of an offer being taken, increasing the reward for part loading; and
- With fewer plant scheduled by participants under Modification P78, the Transmission Company may need to schedule more part loaded plant via reserve contracts.

Other comments:

- Modification P78 may change part loading such that you would see it in order to give flexibility for offering into the market, however, reduction in Gate Closure is a significant factor and until the effects of P12 have been implemented and has settled down, incremental effects of P78 cannot be gauged;
- Energy Imbalance Prices are not the prime driver for part loading, therefore it is unlikely that there will be a change to part loading in response to Modification P78; and
- The imbalance price should reflect the costs of imbalances on both sides of the market. Market participants are then best placed to respond to this dynamic price signal and judge whether part-loading is an appropriate commercial response.

Q7 In your opinion, does Modification Proposal P78 change the incentives to deviate from FPN over the current baseline, if so, how and why?

- Nine responses (forty-two Parties, responses 002, 007, 008, 009, 010, 014, 015, 016 and 017) believe that Modification P78 will have no affect on the incentives to deviate from FPN;
- Four responses (eleven Parties, responses 001, 005, 011 and 019) believe that Modification P78 will increase the incentives to deviate from FPN;

- Five responses, (ten Parties, responses 003, 006, 012, 013 and 021) believe that Modification P78 will decrease the incentives to deviate from FPN, thus providing greater incentive to adhere to FPN;
- Three responses (six Parties, responses 004, 018 and 020) have no comment;

Positive comments:

- Modification P78 reduces the incentive to deviate from FPN, as on balance, there is less commercial incentive provided by the cash out spread to do so;
- Modification P78 reduces the incentive for generators to deviate from FPN in the case of unforced outages as the SBP will be less penal; and
- Adequate arrangements are already in place through the Grid Code to ensure accurate FPN submission. The Transmission Company has not reported significant problems to date and the Authority has powers to fine where breaches take place.

Negative comments:

- Modification P78 may increase incentives to deviate from FPN, as the price may be more easily predicted;
- If the obligation of adherence to the Grid Code is insufficient and deviation from FPN becomes a problem this could be countered by a non-zero Information Imbalance Charge; and
- Generators who believe that they may obtain the market derived price (rather than SSP) through increasing the load from FPN (without instruction from the Transmission Company) will have a greater incentive over the current position and payment at SSP.

Q8 In your opinion, (noting the forthcoming implementation of Modification P12 to reduce Gate Closure to one hour), does Modification Proposal P78 increase the incentive on parties to change Physical Notifications shortly before Gate Closure and do you believe this to be a good or bad thing?

- Seven responses (nineteen Parties, responses 003, 006, 012, 013, 014, 015 and 017) believe that Modification P78 will incentivise the changing of PNs close to Gate Closure, and that this is a good thing;
- Two responses (five Parties, responses 011 and 019) believe that Modification P78 will incentivise the changing of PNs close to Gate Closure, and that this is a bad thing;
- Six responses, (twenty-nine Parties, responses 002, 007, 008, 010, 016 and 021) believe that Modification P78 will not affect the frequency of changing PNs;
- One response (three Parties, response 001) believe that the benefits or otherwise of any change introduced by Modification P78 is dependent upon Transmission Company activity and circumstances;
- One response (three Parties, response 005) believe that any change introduced by Modification P78 cannot be assessed until the reduction in Gate Closure has been implemented and the affects of that seen; and
- Four responses (ten Parties, responses 004, 009, 018 and 020) have no comment;

A number of responses indicated that they perceived the reduction in Gate Closure to have a material affect on the incentive to change PNs close to Gate Closure.

Positive comments:

- Likely greater trading activity close to Gate Closure reflects a competitive, liquid, efficient, dynamic market working effectively right up to Gate Closure;
- Opportunities for late changes to PN under Modification P78 may arise, because an expectation of a more balanced market will change Parties perceptions of optimal position (if the spot price is rising, it suggests the system might be short, which increases the risk-adjusted value of spill so that other participants might seek to go longer);
- Modification P78 may make system management more difficult for the Transmission Company but the big change in difficulty arose from P12 (reduced Gate Closure) and the difficulty was thought to be outweighed by the improvements due to parties being able to balance more closely;
- IPNs usually represent the contracted position at a point in time, rather than an expectation of striking contracts. Therefore it would be expected that changes up to FPN will be more frequent, as parties trade closer to real time. There remains, however, the need to safeguard against the provision of mis-information to the System Operator;
- Any restriction on changes to FPN close to gate closure would discriminate against flexible plant who will be trading closer to real time and also discourage investment in systems that allow trading close to Gate Closure;
- For Modification P78,creating an imbalance position in the opposite direction to the market would only result in saving on the transaction costs of trading. This would be a small benefit compared to the risk and cost of incorrectly predicting market direction. Modification P78 is therefore unlikely to encourage speculation ver market direction;
- In so much as P78 encourages liquidity in the prompt market and thus the ability to trade it will increase the incentive on parties to change PNs to better reflect their operating intentions after Gate Closure. This will allow the Transmission Operator to balance the system based on those FPNs with greater confidence and at lower cost; and
- Parties changing Physical Notifications shortly before Gate Closure could be 'good' or 'bad' depending on the circumstances. If changes in PNs are the result of Parties seeking to trade out imbalances within day and more accurately reflect actual metered generation and demand in the relevant settlement period then this would reduce the role and costs of the Transmission Company's system balancing actions. This would be a 'good' thing. If changes in PNs reflected the attempts of Parties to go long or short into imbalance and the cash-out price was not cost-reflective and was less costly than trading out the imbalance then this would be a 'bad' thing. By leading to more cost-reflective cash-out prices, Modification P78 should lead to changes in PNs only in the former case.

Negative comments:

- The introduction of P12 gives more time for parties to change PN submissions and also more time to monitor market conditions and make PN adjustments accordingly. This will not necessarily mean that more accurate PN submissions will be made – it could provide opportunities for certain larger players to influence the market thus providing potential 'gaming opportunities'.

Other Comments:

- There will be an incentive for Parties to change their PNs shortly before Gate Closure assuming that participants will face a greater incentive to follow the system balance rather than their own position. The relative merits of this will depend on the Transmission Company's actions pre Gate Closure and also the potential for expensive Balancing Mechanism actions being taken; and
- If Modification P78 brings participants positions, and the system, into energy balance then there should only be system actions that are required in the Balancing Mechanism. If there is a requirement for energy balancing within a half hour, for example due to the loss of a station, then this may result in an extreme price spike due to an expensive action being taken;

Q9 In your opinion, to what extent will Modification Proposal P78 address the issue of asymmetric risk?

- Fifteen responses (fifty-six Parties, responses 001, 002, 003, 005, 006, 007, 009, 010, 011, 012, 013, 014, 015, 016 and 021) believe that Modification P78 (directly or indirectly) will reduce asymmetric risk;
- Three responses (seven Parties, responses 008, 017 and 019) believe that Modification P78 will not address the issue of asymmetric risk; and
- Three responses (six Parties, responses 004, 018 and 020) made no comment.

Positive comments:

- Modification P78 reduces natural asymmetric risk to a more reasonable level (i.e. the market will be less lop-sided);
- There will always be some asymmetric risk as this is the reality of the market as the risk of tripping is the main risk to generators. However, it is to be expected that Modification P78 would dampen the effects of this;
- Modification P78 seeks to more directly address price pollution from systems actions by extensive tagging out and as such will produce a less volatile main price although the underlying relative volatility inherent in short-notice incrementing will remain;
- Modification P78 will raise the opportunity cost of spilling because, as generators have the opportunity to spill at a potentially higher price, they will not offer power to suppliers at a prompt price that does not reflect this opportunity. This raises the spot price and makes the risks more symmetrical. Modification P78 therefore addresses the causes of the observed (i.e. ex post) asymmetry in prices;
- Modification P78 should significantly reduce the asymmetric nature of the present cash-out regime but will probably retain a small incentive to hold length as the weighted average cash-out price for a short position is likely to be slightly more penal than the weighted average long price; and
- With a dual cash-out mechanism the preference is for a relatively constant buy-sell spread, that is, energy price symmetry. Modification P78 will not remove the present energy price asymmetry. However, removal of 'polluting' system actions from the imbalance prices should dampen volatility in the buy-sell spread.

Negative comments:

- The asymmetry may be less insofar as using BRL=0 for the "longer" price, for example SBP in a short market, would appear to lessen (make less extreme, less positive) System Buy Prices.

However, the use of a forward price for the counterposing cash-out price is not theoretically justified, is not related to the Transmission Company's cost of balancing actions, and could have perverse effects during unusual forward trading conditions;

- Modification P78 does not change the asymmetric risk associated with electricity prices, but it will change the cost of accommodating this risk as the imbalance price better reflects the value of the energy. However, this may not be the optimal solution; and
- If the asymmetry is cost reflective (and there are good reasons why it might be given the relative costs associated with flexing up and down) then it should not be addressed. Any asymmetry under this Modification should be cost-reflective.

Q10 In your opinion, do you believe that Modification Proposal P78 will change the incentives on parties to balance their individual (contractual) trading positions before Gate Closure, if so, how and why?

- Eleven responses (twenty-eight Parties, responses 003, 006, 007, 009, 011, 012, 013, 015, 016, 017 and 020) believe that Modification P78 will increase the incentive on Parties to balance their individual positions before Gate Closure;
- Five responses (thirteen Parties, responses 001, 005, 008, 014 and 019) believe that Modification P78 will decrease the incentive on Parties to balance their individual positions before Gate Closure;
- Two responses (twenty-two Parties, responses 002 and 010) believe that Modification P78 will not change the incentive on Parties to balance their individual positions before Gate Closure; and
- Three responses (six Parties, responses 004, 018 and 020) had no comment;

Positive comments:

- Modification P78 reduces the current incentive to over contract, due to less asymmetric cash-out prices;
- Modification P78 will raise the cost of excessive spill, which will thereby reduce, leading to a more balanced market. Similarly, as the cost of going short remains a high price (although relatively reduced), the incentive on all parties with uncertainty about their ex post physical position remains to balance;
- Modification P78 reduces the risk of imbalance to all parties. Therefore, the incentive for parties to balance their contractual positions prior to Gate Closure, rather than go long should be greater; and
- Modification P78 is likely to encourage parties to be closer to balance when compared to the existing dual cash-out pricing methodology which encourages parties to be consistently long.

Negative comments:

- Modification P78 will reduce incentives on parties to balance their individual trading positions and introduces the potential for hunting behaviour to develop as participants look to the most favourable imbalance price;
- If Modification P78 is more easily gamed, then it would be expected to reduce the incentive for parties to self balance;

- Since Modification P78 reduces the buy- sell spread, it will reduce incentives to balance. the Transmission Company will have to take more pre Gate Closure actions to create reserve capability in both directions. However, since the system will tend to be long, the net volume of the Transmission Company's forward trades will usually be added onto the sell stack. This will ensure that the main price based will almost always be based on bids. As is recognised in the Modification Proposal, it is in the Transmission Company's interest to have a long system as it benefits their incentive scheme; and
- The incentives on Parties to self balance before Gate Closure will be reduced as the exposure to punitive dual cash out prices is reduced. Furthermore, parties (with for instance those with large volumes of excess and flexible generating capacity) will have the capability of manipulating the market position by changing between IPN to FPN positions. A variance in IPN to FPN may increase the volume of balancing mechanism activity, thus further incentivising owners of excess flexible generating capacity to manipulate the mechanism and realise enhanced income from balancing mechanism activity.

Q11 In your opinion, do you believe that Modification Proposal P78 will change the incentives for parties as a whole (i.e. in total, even if not balanced on an individual basis) to balance the market as a whole before Gate Closure, if so, how and why?

- Eleven responses (twenty-five Parties, responses 003, 005, 006, 007, 009, 011, 012, 013, 016, 017 and 020) believe that Modification P78 will increase the incentive to balance the market as a whole;
- Four responses (fourteen Parties, responses 001, 008, 015 and 019) believe that Modification P78 will decrease the incentive to balance the market as a whole;
- Three responses (twenty-four Parties, responses 002, 010 and 014) believe that Modification P78 will not change the incentive to balance the market as a whole; and
- Three responses (six Parties, responses 004, 018 and 020) had no comment;

Positive comments:

- Modification P78 will lead to a more balanced market because balancing decisions will be informed by expected market balance, which is not the case at present. Also, if suppliers seek to be closer to balance individually (by going less long), the market will be closer to balance;
- Modification P78 should significantly improve the overall system balance. Under the current regime, all participants tend to adopt a similar position at Gate Closure, i.e. long. This sums to a considerable overall system imbalance. P78 should reduce this incentive on individuals, introducing an element of diversity whereby some participants may adopt a short position at Gate Closure. The overall system imbalance should therefore be greatly reduced; and
- Modification P78 should encourage parties to 'read' the market and if appropriate trade in the short term markets and such activity should assist in balancing the market as a whole.

Negative comments:

- The current pricing methodology in the BSC uses dual pricing to encourage individual parties to balance and thereby ensure that the system is in balance. However, this has not proven to be the case. Although Modification P78 may weaken the current incentives to a certain extent, it does not fundamentally change this approach.

Q12 In your opinion, does Modification Proposal P78 lead Parties to anticipate the 'direction' of the market, and therefore the Energy Imbalance Price. Could this lead to volume volatility and consequential price instability in the market?

- Eleven responses (twenty-seven Parties, responses 003, 005, 006, 009, 010, 012, 013, 014, 015, 016 and 021) believe that Modification P78 will not lead Parties to anticipate the direction of the market, and thus will not lead to volume and price instability;
- Five responses (thirty Parties, responses 001, 002, 007, 008 and 019) believe that Modification P78 will lead Parties to anticipate the direction of the market, leading to volume and price instability;
- Two responses (six Parties, responses 011 and 017) believes that the effect of Modification P78 could not be assessed until the effects of P12 have been seen (response 011), or believes that any instability is appropriate if it is cost-reflective (response 017); and
- Three responses, (six Parties, responses 004, 018 and 020) have no comment.

Positive comments:

- Parties will only price-seek under Modification P78 to the extent that they have good information about the direction of market imbalance;
- Improved competition and liquidity in the market should tend towards rational market behaviour on the part of the players. The extent to which players' actions may lead to volume volatility and price instability will be dependent on the quality of market imbalance information; and
- Parties may wish to anticipate the direction of system balance and therefore the main price. However, in the absence of perfect information it will be difficult to systematically ensure that parties are on the "right side" of the market (which ever side this is). As a result parties may seek to balance to mitigate exposure on either side of the market.

Negative comments:

- Use of forward prices for imbalance cash-out may lead to unintended effects including price instability; and
- Parties with the correct profile (i.e. Large volumes of flexible, low utilisation excess generating capacity) may also attempt to manipulate the "direction" of the market, especially at peak periods when the SBP- SSP margin is most pronounced. Plants with load restrictions due to environmental constraints could also be used to manipulate the market in this way.

Other comments:

- All participants will try and anticipate the 'direction' of the market and adjust their position accordingly. This will be enhanced by the forthcoming P12 modification as there is an additional 2½ hours to monitor market conditions and change submissions accordingly. It is impossible to say that Modification P78 would be responsible for leading participants to act in this manner; and
- All participants are likely, to some extent, to try and anticipate the direction of the market and the energy imbalance price. Any decision to go long or short based on this expectation is not problematic as long as imbalance cash out prices reflect the costs that participants impose in being out of balance. Any resulting volume and price instability would, by definition, be efficient

as it would represent the markets view on the relative costs associated with trading out imbalances relative to the costs imposed in not balancing.

Q13 What effect do you think Modification Proposal P78 will have on liquidity and prices in the forwards and spot markets, the interrelation of forwards and spot markets with Energy Imbalance Prices and also the level of Energy Imbalance Prices themselves?

- Nine responses (eighteen Parties, responses 003, 006, 011, 012, 013, 016, 017, 019 and 021) believe that Modification P78 will increase liquidity and have a positive effect on the forwards and spot markets;
  - However, response 019 (one party) indicates that although liquidity will increase, the Modification will distort the forwards and spot markets.
- Two responses (three Parties, responses 014 and 019) believe that Modification P78 will decrease liquidity and have a detrimental effect on the forwards and spot markets;
- One response (one Party, response 010) believes that Modification P78 will have no effect on the forwards and spot markets;
- Five responses (thirty-seven Parties, responses 001, 002, 005, 008 and 015) do not know what effect Modification P78 will have on liquidity in the forwards and spot markets; and
- Four responses (ten Parties, responses 004, 009, 018 and 020) have no comment.

Positive comments:

- It is arguable whether there is or should be any interrelation between the forwards and spot market and imbalance prices. Whatever the view, it is not believed that Modification P78 would have any great impact on forwards and spot markets. There would be some mitigation in Energy Imbalance Price volatility;
- Modification P78 may go some way in persuading participants to be more accurate in PN submissions, therefore freeing up more capacity to participate in the forwards and spot markets. This would help increase market liquidity and could potentially help reduce energy imbalance costs;
- Modification P78 should not significantly weaken incentives to balance and therefore should continue to encourage forward trading, thereby encouraging liquidity in prompt and forward markets; and
- Modification P78 would lower imbalance prices by preventing the application of the default rules and/or problems with the tagging mechanism leading to artificially high imbalance prices that do not reflect costs.

Negative comments:

- Modification P78 will reduce the magnitude of exposure when the main price is SBP as far more of the higher prices trades will be tagged than under the current mechanism. The buy-sell spread will reduce due to the increased amount of tagging. This will result in less liquidity in the short term markets as the price exposure will be far less onerous. This is likely to reduce the efficiency of these markets and so maintain discontinuity between spot markets and the energy imbalance prices; and

– Modification P78 has the effect of reducing the incentives to self balance. Portfolio players and vertically integrated players who currently retain flexible capacity to manage their own delivery and supply risk may be more willing to offer such capacity in the day ahead markets, hence increasing liquidity. This will be due to the lower risk of exposure to the dual cash out prices and potential guaranteed benefits of power revenues in the day ahead market.

  However, the bid offer spread in the day ahead market will be more distorted than at present. Power sales at short notice prior to Gate Closure would still need to be fulfilled by flexible plant. This plant could obtain high prices in the Balancing Mechanisms and hence parties would be unwilling to sell volumes from such plant at prices significantly lower than that they may obtain in the Balancing Mechanism. Parties seeking power may choose to take their chances on the direction of the single imbalance charge rather than pay such prices prior to Gate Closure and enter gate closure in Balanced position. Plants that are able to respond within one hour are the most flexible and generally the most expensive, hence, the overall "system" cost of fulfilling the imbalance will be increased due to a later balancing action being required.

  Modification P78 would make the short term markets more imperfect than the status quo as the price transparency will be more opaque and parties responsible for an imbalance in a direction will not be responsible for the costs of actions to rectify the imbalance.

Other comments:

– The use of "market price" derived from the forwards and or spot markets for imbalance settlement raises a number of issues, particularly related to the interaction between the forward price and the imbalance price. It is possible that changes in the power exchange price could have consequent effects in the balancing mechanism (and vice versa).

Q14 Do you believe that the implementation of Modification Proposal P78 will encourage the development of risk management products and new types of contracts, and what effect do you think this will have on competition and the efficiency of the forwards and spot markets?

– Twelve responses (fifty Parties, responses 002, 003, 005, 006, 008, 010, 011, 013, 014, 015, 019 and 021) believe that Modification P78 will not encourage the development of new types of contract / risk management products;

– Four responses (eight Parties, responses 001, 007, 012 and 017) believe that Modification P78 encourages the development of new types of contract / risk management products; and

– Five responses, (eleven Parties, responses 004, 009, 016, 018 and 020) made no comment.

Positive comments:

– It would be reasonable to assume that there would be some development of new risk management products and contracts if the demand in the market develops for them. For example, more consolidation services could be developed if imbalance prices were lower and less volatile. But this is based on the assumption that Modification P78 has the effect of reducing the imbalance prices we have seen and increases market symmetry; and

– By making energy imbalance prices better reflect costs, parties will be more willing to forecast prices and develop risk management products and contract types. This will increase competition and efficiency in all markets.

Negative comments:

- It is possible that the use of a power exchange price for the short-stack-price may facilitate development of risk management products, however it is not clear how a party could determine the quantity to hedge when hedging against exposure to cash-out penalties; so in practice, no;
- Modification P78 would actively discourage the development of risk management products and new types of contracts for third parties. It allows portfolio players and vertically integrated players to strengthen their influence over short term power markets, and increases their income from such activity at the overall expense of the system and eventually the customer. They have more perfect information and greater price transparency due to their internal position;
- Such portfolio players currently are able to enjoy the benefits of internal risk management products. Reducing the perceived margins in providing risk management services such as Consolidation will discourage market entry by Independent Service Providers; and
- Influence of short term power prices allows a party a trading advantage in the forward markets. An imperfect short term market distorts the forward market as parties seek to maximise their income and mitigate risk. Modification P78 makes the short term market more imperfect and makes price transparency more opaque.

Q15 In your opinion what would be the impact on the risk profile of different categories of party from the implementation of Modification Proposal P78?

The following lists the points made in respect of this question:

- All risk profiles should be reduced, though portfolio, large or vertically integrated players will continue to enjoy a real advantage. The Transmission Company's risk profile should also reduce;
- Small suppliers will benefit because the artificial penalty applied to small portfolios (with a statistically greater imbalance risk) is reduced;
- Larger suppliers benefit like smaller ones in not needing to over-contract – and they can buy better risk management across the system. However, they benefit less than small suppliers because their artificial relative advantage in portfolio size is removed;
- Licence Exempt Generators (LEGs) are significant winners from Modification P78. This is because the value of spill – the price that many embedded generators have been offered in contracts – has increased to incorporate a possibility of earning either from a market price. Suppliers will therefore be able to offer prices to embedded generators at a price reflecting this. In addition, in a more balanced market, the Transmission Company will provide more of the reserve (rather than suppliers doing so via over-contracting) and so embedded benefits will improve. For LEGs in CVA, the cost of consolidation will be reduced by P78;
- Unpredictable generators will benefit by being able to contract to their average expected output rather than to the minimum because shortfalls will not always be punished at SBP. They will therefore spill less;
- Non-portfolio generators face lower trip risk and so will earn at a higher rate. To the extent that the average spot price increases, they may be able to strike better contracts, but if the forward market does not move then this will not be the case;
- Portfolio generators will lose market power and so will be slightly worse off, but to the extent that their effective trip insurance cost will be lower, they will benefit;

- Vertically integrated parties will similarly lose market power but will still operate in a more efficient, lower cost, market;
- Non-physical traders not benefit;
- The Transmission Company will not be directly financially affected because it passes through costs anyway. Longer term it stands to lose out to the extent that the growth of embedded generation will no longer be stunted by the current penal pricing system;

The Consultation document fails to mention the following relevant parties:

- Flexible plant will benefit from a balanced market where the Transmission Company contracts for rapid reserve when needed rather than only varying the extent to which excessive plant is pulled back;
- Consumers will benefit from a more efficient market whereby suppliers are not over-contracting and generators are not self-reserving. The spot market may move up but, to the extent that forward prices are driven by Europe through arbitrage across both the gas and electricity interconnectors, it is far from certain that consumer contract prices will move to any great degree. Longer term, consumers can only benefit from a rational market in which the risk of a "California" scenario – where uneconomic generating plant is excessively mothballed because market returns are so depressed so that the market is rapidly tipped into shortage – is reduced;
- All parties will continue to submit long PNs to ensure protection from large imbalance charges. This length may reduce when confidence (if any) is built up in the methodology used to calculate SBP;
- Small Suppliers: Benefit from reduced imbalance risk;
  - Large Suppliers: Benefit in the same way as small suppliers, Licence Exempt Generators: Benefit from the 'enhanced' value of spill;
  - Unpredictable Generators: (includes renewables and commissioning plant) Benefit through less punitive SBP and from the 'enhanced' value of spill;
  - Non Portfolio Generators: Benefit through lower 'trip' risk through less punitive SBP;
  - Portfolio Generators: Loss of market power, but will benefit through lower 'trip' risk;
  - Vertically Integrated Players: Loss of market power, but will benefit from improved efficiency of market as a whole;
  - Non Physical Traders: Benefit through the opportunity to take on physical imbalance risk and offer risk management products; and
  - Transmission Company: Not financially affected except through its ability to hit incentive targets if BSUoS increases. Likely to have concerns about parties deviating from FPN and accuracy of information pre Gate Closure.
- The risk profiles of all parties should be reduced by Modification P78, to the extent that Modification P78 reduces the significant asymmetry between the SBP and SSP and volatility in the reverse price. However, it is not expected that Modification P78 would change the relative risk profiles between different classes of Parties; and

– Decreased risk for large Suppliers, portfolio generators and vertically integrated players. Increased risk for LEGs, unpredictable generators, non portfolio generators, Non Physical Traders (noting that consolidation is discouraged) and the Transmission Company.

Q16 Do you believe that Modification Proposal P78 better facilitates achievement of the Applicable BSC Objectives, if so, which one(s) and why?

– Fourteen responses (thirty-one Parties, responses 003, 006, 007, 009, 010, 011, 012, 013, 015, 016, 017, 018, 020 and 021) believe that Modification P78 better facilitates the Applicable BSC Objectives;

– Five responses (thirty-one Parties, responses 002, 005, 008, 014, 017 and 019) believe that Modification P78 does not better facilitate the Applicable BSC Objectives; and

– One response, (one Party, response 001) stated that it was too early to tell; and

– One response (one Party, response 004) made no comment.

Reasons given for Modification P78 better facilitating the Applicable BSC Objectives:

– Modification P78 prevents more system balancing actions from polluting the energy imbalance price, making that price more cost-reflective and it sets the reverse price as less penal, which is more cost-reflective. It therefore facilitates competition;

– Modification P78 reduces the incentive to spill excessively leading to more economic and efficient operation of the balancing mechanism;

– Modification P78 is more likely to target energy imbalance costs at those who cause that imbalance;

– Modification P78 would help to promote more effective competition in the generation and supply of electricity as it could potentially increase market liquidity, though some participants may still consider taking withhold positions;

– If more accuracy were gained from PN submissions, this would help the role of the System Operator in its obligations imposed under the transmission licence to balance the system in an economic and efficient manner;

– Improved removal of 'polluting' system balancing actions from the energy imbalance price tends towards a more cost reflective imbalance price. A less penal reverse price is also more cost reflective. This improved cost reflectivity better meets the Applicable BSC Objective to further promote effective competition in the generation and supply, and sale and purchase of electricity;

– The incentive for parties to balance, both individually and collectively, prior to Gate Closure better meets the Applicable BSC Objective to ensure the efficient discharge by the Transmission Company of the obligations imposed under the Transmission Licence; and

– Modification P78 should better facilitate competition in generation and supply by removing any cross subsidies caused by artificially high cash out prices under default rules and/or when system balancing costs are not tagged out.

Reasons for not better facilitating the Applicable BSC Objectives:

– The proposer considers that Modification P78 will promote effective competition in the generation and supply of electricity by improving the stability and cost reflectivity of imbalance cash-out

prices. Modification P78 removes the link to the cost of energy acceptances on the smaller stack since they will all be tagged. The proposal therefore fails to meet its objective; and

– Since Modification P78 will reduce market length, reduce the buy sell spread and make Parties more inclined to go short than at present, the volume of reserve required from the BM and hence BSUoS will increase. This transfers economic purchasing from Parties up until Gate Closure to the Transmission Company via its forward trading and actions in the BM thus reducing the efficient and economic operation by the Transmission Company of the Transmission system.

Q17 Do you believe that an Alternative Modification Proposal better facilitates achievement of the Applicable BSC Objectives than Modification Proposal P78, if so, what is it?

1. There are strong concerns over the viability of any defined "market price" for the reverse cash-out price under current market conditions. Whilst no specific alternative is suggested here, PIMG should strongly consider a reverse price derived using some measure of NGC actions e.g. forward contracts (exc. system related PGBTs).

2. While P78 improves the calculation of energy imbalance prices there are a number of flaws. It still does not address the problems of energy imbalance prices being polluted by system actions such as transmission constraints and actions that are not tradable in the forward markets. Further the determination of a market price will be difficult with the lack of liquidity in the half hourly forward markets. Therefore, as a 'straw man' the following is presented for consideration:

   – Retain the definition of NIV, so removing the need for BRL;

   – Calculate the EIP from the 'main' stack as the average volume weighted price of all the offers/bids that would have been necessary to balance the system, after arbitrage and CADL have been applied and including BSAD volumes and prices. This must be done strictly in price order and so the defaulting rules being considered for P79 should be used, that is, it has to be possible for the System Operator to accept a submitted bid or offer. That way if the system is short 1000MW and there are 3 offers available each for 500MW at prices of £20, £21 and £30 respectively but the offer at £30 has to be accepted to relieve a transmission constraint as it also helps balance the system then the SBP would be £20.50, with the difference (£9.50) being used in the calculation of BSUoS;

   – Calculate the 'reverse' price as being the average volume weighted price of the first 25MWh of bids/offers that could have been accepted after CADL and arbitrage have been taken into account and by applying the same default rules as above. Using a small volume of bids/offers to derive the calculation will prevent gaming of the rules by parties submitting spurious prices for very small volumes and should be a fair reflection of a market price as the Balancing Mechanism is more liquid than the power exchanges;

   – Change CADL to 30 minutes so that only system actions traded in the half hourly forward markets are included in EIPs.

3. Further consideration needs to be given to ensuring that system balancing costs are fully removed from energy imbalance. System balancing costs could still feed into imbalance prices where NGC seeks to correct a net imbalance and resolve a transmission constraint simultaneously.

Q18 Are there any other issues not identified in the supporting document which you believe should be considered during the assessment of Modification Proposal P78.

- The document does not fully explore whether in the current market use of a "market price" for the reverse price is viable, given liquidity and representative nature concerns, and thus whether a calculated price based on NGC actions would be preferable (003);
- P12 implementation should be considered, as it materially effects market and participant behaviour, and Modification P78 should not be implemented until there has been some experience of the market under reduced Gate Closure (responses 005 and 011);
- The main problems with P78 are (response 005):
  1. It is not reflective of NGC's balancing actions.
  2. It is unclear how the reverse price is to be calculated.
  3. The reverse price is likely to be easily gamed.
- The Consultation Document fails to address the specific problems faced by embedded generation in the current mechanism. The only way for such players to participate in the current process is to:
  - Either go into CVA and be consolidated, which is an administratively expensive process relative to the scale of generation and is not currently offering any attractive prices anyway; or
  - To sell to suppliers in SVA and be offered the derisory spill price.

  The reason that suppliers are offering embedded generation such low prices is not related to inherent variability of output (which Ofgem has already demonstrated is generally not the case) but because the product that an embedded generator must offer to suppliers is different to the one offered by CVA generation. This is because CVA generation delivers firm energy through contracts with the generator able to manage its own meter risk, whereas an embedded generator must sell that meter risk to the supplier and has no opportunity to manage it.

  Because the current mechanism is not rewarding upward flexibility properly (because the spill market means that excessive downward flexibility is being taken), consumers are being forced to overpay for self-reserve rather than for the product that the Transmission Company would otherwise contract for. This depresses BSUoS, which has an adverse impact on embedded benefits (responses 006 and 013).
- Wider government objectives such as CHP strategy (response 007);
- The purity of the Energy Imbalance Prices should be considered further, as under Modification P78, the existing mechanism is utilised to calculate the Energy Imbalance Prices, thus retaining a measure of 'pollution' from system balancing actions (response 012);
- Key to this modification is setting the market price. There seems little point in discussing whether Modification P78 better separates out system from energy trades, encourages balancing etc until a market price can be agreed. The price must be transparent, not gameable, not predictable in advance of Gate Closure and also representative of the cost of short term energy. These are conflicting objectives and progress of other aspects of this modification should be halted until a suitable market price can be established (014);

- The assessment needs to consider the reallocation of the beer fund to establish who will benefit from P78 (014);
- The assessment also needs to consider the incentives on the Transmission Company. Whilst these issues might be considered to be outside of the vires of the PIMG, in its determination on Modification P3, Ofgem considered that 'NGC would have faced distorted incentives relating to its balancing services purchasing strategy of variations in energy imbalance prices were related to whether it had contracted forward, rather than to fundamental market conditions'. The PIMG does therefore need to consider what impact Modification P78 will have on Transmission Company's incentive scheme since the Transmission Company benefits in its incentive scheme from a long market (response 014); and
- Portfolio Players and vertically integrated players currently have the ability to employ internal Risk Management Strategies both within Gate Closure and prior to Gate Closure. Modification P78 moves this advantage over independent players to the day ahead market and to earnings that may be realised from the Balancing Mechanism. In a perfect market independent service providers would be able to deliver services (and benefits) to small and independent players comparable with those naturally realised by portfolio and vertically integrated players. Modification P78 discourages the emergence of such service providers (response 019).

Q19 Do you believe that further analysis / modelling is required over that currently identified by the PIMG (in the supporting document), and if so, what specific form should this take?

- The impact of Modification P78 should be fully assessed, specifically the likely incentives to balance and contract (responses 001 and 008). Any modelling should take into consideration the likely effects of Modification P12 (response 005);
- Tangible analysis in the form of scenarios and simulations should be undertaken, as this is preferable to pure conjecture (response 003);
- Robust comparison of Modifications P78 and P78 should be undertaken to enable an evaluation of which better facilitates achievement of the Applicable BSC Objectives (response 003);
- Modelling and analysis should be thorough and consider the effect of the Modification on intermittent generators and CHP participation (response 007);
- In defining the 'market price', consideration should be given as to how power exchange prices will be affected by the implementation of P12. Further, it should be noted that one definition of a 'market price' is already in use, in the context of the NIRP definition in NGC's 2002/03 System Operator incentive scheme. The interaction with this price should be considered as part of further detailed analysis (response 011); and
- Any analysis provided and reported should be heavily caveated and should list the assumptions made when modelling. Without a detailed explanation of the limitations it is likely that Parties will choose the Modification which meets their cash-out expectations / requirements, without exploration of the implications of the change (response 014).

15.2 Second Assessment Consultation Responses

Pending Receipt / consultation

16 SUMMARY OF TRANSMISSION COMPANY ANALYSIS

16.1 Response to First Request for Analysis

The Transmission Company was provided with a request for analysis in parallel with the first Assessment consultation undertaken. The request for analysis comprises the set of consultation questions posed to BSC Parties, as well as three additional questions specifically aimed at the Transmission Company.

The following presents the Transmission Company response in full, with the Annex provided by the Transmission Company (in response to question 21, and referred to throughout the responses) attached in ANNEX 5.

Q1 In your opinion, does Modification Proposal P74 give a better separation of balancing actions (i.e. system vs energy) used in setting the Energy Imbalance Price(s), if so, how?

Yes. P78 will eliminate the use of the reverse stack in setting the imbalance prices, which is currently mainly made up of system balancing actions. This will therefore improve the separation between system and energy actions.

The main stack price is set by those acceptances meeting the Net Imbalance Volume (NIV) i.e. only those actions contributing to resolving the market length will set the Imbalance price.

Q2 In your opinion will Modification Proposal P74 / P78 have an impact on system security?

No. P78 retains the incentive for participants to avoid imbalance and there is no new incentive to deviate from FPNs. (see Q 4 & 11)

Q3 In your opinion, what would be the effect on the level of BSUoS charges from the implementation of Modification Proposal P74 / P78, considered in the context of the overall costs of balancing.

Currently the market is generally long which leads to more bids than offers being accepted and hence low BSUoS charges. If implemented, P78 should lead to a more balanced market and this in turn would lead to higher BSUoS charges as the System Operator actions were more equally divided between bids and offers. However, this should be more than counteracted by lower contract costs, as suppliers no longer over-contract. (N.B. Total Imbalance Charges + Beer Fund = 0) The mechanics by which P78 encourages the market to balance is progressive and predictable. It is forecast the market length would be reduced, but the market would remain slightly long. (See separate analysis in annex)

Q4 In your opinion, is Modification Proposal P74 valuing actions more correctly, if so, why and if not, why not?

Yes. Applying P78 to a short market any participant who spills will receive market price, so the participant is neither rewarded nor penalised. Conversely, participants who deliver balancing actions will be paid their bid price as currently. Participants will still retain an incentive to forward contract as, if spilling, they run the risk of receiving SSP in event that the market is long. Similar argument can be applied in a long market.

Q5 In your opinion, how does Modification Proposal P74 change the relative reward for notified and instructed actions and how do you believe this to impact on your balancing of the system, and do you believe this is appropriate?

As stated in the answer to Q4 P78 offers a neutral price to those whose error contributes to balancing the market, whilst those delivering actions will be paid as bid. We believe that it is appropriate to retain a greater reward for instructed actions than those notified actions delivered unilaterally. (In turn, un-notified unilateral actions are of less value again).

Q6 In your opinion does such a change correctly reflect your perceived value and if not, what costs are not included and how significant do you deem them to be? Could these be calculated and / or estimated in advance?

Yes, we believe it is cost reflective to cash out those who reduce the system imbalance at market price and use SBP/SSP for those adding to the imbalance.

Q7 In your opinion, does Modification Proposal P74 more correctly target the cost of energy balancing actions to those causing the imbalance over the current baseline?

Yes, as described in answers 5 and 6 above, we believe that P78 is more cost reflective than either the present arrangements or P74.

Q8 In your opinion, how does Modification Proposal P74 change the perceived risk of Bid - Offer submission, how would it change the level of participation seen in the Balancing Mechanism under the current baseline and how do you believe it would affect system balancing?

We do not anticipate any change to the perceived risk of bid/offer submission or BM participation.

Q9 In your opinion, how do you believe Modification Proposal P74 would affect the level of part loading seen under the current arrangements and in what way do you believe it would be more or less efficient for participants and for the system as a whole?

Part loading can be split into 'voluntary' and 'instructed' by the System Operator. There are two reasons for voluntary part loading: to provide flexibility in future FPN submissions to cover unexpected events and the possibility of having an offer accepted. If the motivation is to provide flexibility in future FPNs and hence avoid imbalance charges, the incentive will weaken as the likely costs of imbalance are reduced. It follows that P78 is likely to reduce voluntary part loading. The volume of instructed part loading would depend upon the market length and the need to provide frequency response/regulating reserve. With a more balanced market less instructed part loading would be expected, provided the total level of part loading was sufficient for frequency response/regulating reserve.

Q10 In your opinion, does Modification Proposal P74 change the incentives to deviate from FPN over the current baseline, if so, how and why?

No. The incentives to deviate from FPNs are likely to reduce, as the imbalance prices become more cost reflective, but not to the extent that parties have no incentive to match their contracts or are even rewarded for being in imbalance as would happen with P74.

Q11 In your opinion, (noting the forthcoming implementation of Modification P12 to reduce Gate Closure to one hour), does Modification Proposal P74 increase the incentive on parties to change Physical Notifications shortly before Gate Closure and do you believe this to be a good or bad thing?

No. The incentive will reduce, as the costs of imbalance are likely to reduce.

Q12 In your opinion, to what extent will Modification Proposal P74 address the issue of asymmetric risk?

Refer to analysis in separate Annex.

Q13 In your opinion, do you believe that Modification Proposal P74 will change the incentives on parties to balance their individual (contractual) trading positions before Gate Closure, if so, how and why?

P78 will improve the incentive on parties by making the imbalance prices more cost reflective without removing the incentive to balance. (see analysis in separate Annex).

Q14 In your opinion, do you believe that Modification Proposal P74 will change the incentives for parties as a whole (i.e. in total, even if not balanced on an individual basis) to balance the market as a whole before Gate Closure, if so, how and why?

Yes. With P78 the incentive on individual parties varies, as the length of the market as a whole moves, tending to move the market progressively towards balance. (see analysis in separate Annex).

Q15 In your opinion, does Modification Proposal P74 lead Parties to anticipate the 'direction' of the market, and therefore the Energy Imbalance Price. Could this lead to volume volatility and consequential price instability in the market?

No. P78 will still retain the incentive to close out a participant's position pre gate closure rather than anticipate the direction of the market. Those who do anticipate the direction of the market will be cashed out at more cost-reflective prices.

Q16 What, in your opinion, is the effect on the Transmission Company in terms of balancing actions, of a balanced market?

In a truly balanced market the System Operator would still have to instruct system balancing actions and, depending upon the level of part-loaded plant available, may need to create regulating reserve/pull back for frequency response. However, generally less action by the System Operator would be required.

Q17 What effect do you think Modification Proposal P74 will have on liquidity and prices in the forwards and spot markets, the interrelation of forwards and spot markets with Energy Imbalance Prices and also the level of Energy Imbalance Prices themselves?

If the market becomes less long under P78 then the forward price may reduce slightly as the contract volume falls. Also, if the market is more balanced then SBP will reduce and SSP will increase, as they will only be set when they are the 'main' price: the problem of system actions dominating the reverse stack price will be removed. (P78 also benefits from the removal of BRL from influencing the main price). This softening of imbalance prices may encourage parties to trade closer to gate closure, as the fear of a notification failure leading to imbalance exposure will be reduced.

Q18 Do you believe that the implementation of Modification Proposal P74 will encourage the development of risk management products and new types of contracts, and what effect do you think this will have on competition and the efficiency of the forwards and spot markets?

P78 will reduce the exposure to high SBP price and hence the reduced risk will reduce the need for risk management products. However, the principle that parties consolidating their errors would enjoy reduced imbalance charges would remain intact. Pool style "contracts for differences" would not be attractive, as there would still be a spread between the imbalance prices.

Q19 Do you believe that Modification Proposal P74 better facilitates achievement of the Applicable BSC Objectives, if so, which one(s) and why?

Yes to 3(b) 'The efficient, economic and co-ordinated operation by the Transmission Company of the Transmission System', as P78 will provide more cost reflective incentives for a participant to balance its position before gate closure, see answer to Q13.

Yes to 3(c) 'Promoting effective competition in the generation and supply of electricity, and (so far as is consistent therewith) promoting such competition in the sale and purchase of electricity', as P78 promotes a more cost reflective imbalance price in both the main and reverse stack, see answer to Q1.

Q20 Do you believe that an Alternative Modification Proposal better facilitates achievement of the Applicable BSC Objectives than Modification Proposal P74, if so, what is it?

No

Q21 Are there any other issues not identified in the supporting document which you believe should be considered during the assessment of Modification Proposal P74.

See analysis in separate Annex

Q22 Do you believe that further analysis / modelling is required over that currently identified by the PIMG (in the supporting document), and if so, what specific form should this take?

No.

ANNEX 1 – PROPOSED TEXT TO MODIFY THE BSC

a Proposed Modification P78

It should be noted that this proposed text s in draft format for this Assessment Report, and is provided as an indication of the potential amendments required. This text will be finalised prior to being issued as a final draft in the Modification Report.

Section C

[Consider whether any changes required to take account of ELEXON's role in contracting with Market Index Data Providers]

Section O

[Confirm no changes required to Section O, provided references to BSC Agents are deemed to include Market Index Data Providers]

Section Q

[Confirm changes required to Q6 – awaiting outcome of assessment as to whether both net and gross BSAD can be made available.]

[Consider also whether there is to be a rule requiring validation of net BSAD and, if so, by whom]

[NB. Acronyms used in algebra in T may need changing if both net and gross BSAD is to be reported]

Section T

Section T 1.3

A new paragraph 1.3.8 shall be inserted as follows:

1.3.8 Data required from the Market Index Data Provider(s) are Market Index Data.

Section T 1.5

Paragraph 1.5 of Section T shall be deleted in its entirety and replaced with the following new paragraph 1.5 and paragraph 1.5A:

1.5 Market Index Definition Statement

1.5.1 The Panel shall establish by no later than the commencement date, and have in force at all times thereafter, a statement having regard to the principles set out in paragraph 1.5.3 and which is approved by the Authority (such statement, as revised from time to time in accordance with this paragraph 1.5, being the "**Market Index Definition Statement**").

1.5.2 The Market Index Definition Statement shall contain the following:

(a) nomination of the particular entity or entities (each a "**Market Index Data Provider**") which shall be responsible for making available Market Index Data in respect of each Settlement Period for the purposes of paragraph 4.4;

(b) full definition of the particular data and methodology to be used by the Market Index Data Provider(s) in determining the Market Index Data for each Settlement Period (including, where applicable, identification of the particular products, period of trading and any relevant weighting to be applied); and

(c) definition and determination, for the purposes of paragraph 4.4.6A, of a minimum liquidity requirement per Settlement Period in respect of each Market Index Data Provider individually (in each case, an "**Individual Liquidity Threshold**") and all Market Index Data Providers in aggregate (the "**Aggregate Liquidity Threshold**") which, for the avoidance of doubt, may be zero in any case and may differ according to the Settlement Period.

1.5.3 The principles referred to in paragraph 1.5.1 are:

(a) the Market Index Data is to be used in Settlement to calculate a price (expressed in £/MWh) in respect of each Settlement Period (in accordance with paragraphs 4.4.5(b) and 4.4.6(b)) which reflects the price of wholesale electricity in England and Wales [for delivery] in respect of that Settlement Period in the short term market, in circumstances where the levels of liquidity in the market during that period in respect thereof are not exceptionally low;

(b) for the purposes of paragraph 1.5.2(a):

(i) 'reflects' means 'provides a reasonable reflection of';

(ii) references to the 'market' are to the market in general and not to any particular market or particular type of market (organised or otherwise);

(iii) 'short term' is to be taken as meaning, in respect of a Settlement Period, a period immediately prior to Gate Closure which is no more than a maximum of 48 hours prior to Gate Closure; and

(iv) the price of wholesale electricity [for delivery] in respect of a Settlement Period may include the price for a block of Settlement Periods which include that Settlement Period, provided the block comprises no more than [24] hours in total.

1.5.4 The Panel shall review the Market Index Definition Statement:

(a) from time to time, and in any event at least once every 12 months;

(b) if any change in circumstances occurs or is expected to occur which affects or is likely to affect in any material way the provision of Market Index Data by a Market Index Data Provider;

by reference to the principles set out in paragraph 1.5.3 and shall make such revisions to the Market Index Definition Statement as may be determined by it and approved by the Authority following such review.

1.5.5 In establishing and reviewing the Market Index Definition Statement, the Panel shall:

(a) investigate what data exists in respect of the market referred to in paragraph 1.5.3;

(b) consult with Parties and other interested parties in connection with the Market Index Definition Statement and have due regard to any representations made and not withdrawn during such consultations;

(b) provide copies of any written representations so made to the Authority.

1.5.6 BSCCo shall ensure that the Market Index Definition Statement (as revised from time to time) is published and is available to any person on request.

1.5.7 For the purposes of this paragraph 1.5, the "**commencement date**" is the date with effect from which, pursuant to paragraphs 4.4.5(b) and 4.4.6(b), Market Index Price and Market Index Volume data is to be applied in determining Energy Imbalance Prices for the purposes of Settlement.

1.5A Provision of Market Index Data

1.5A.1 The Market Index Data to be provided by each Market Index Data Provider in respect of each Settlement Period shall comprise for that Settlement Period:

(a) a volume expressed in MWh; and

(b) a price expressed in £/MWh,

in each case determined in accordance with the Market Index Definition Statement.

1.5A.2 For each Settlement Period, each Market Index Data Provider will determine its Market Index Data in accordance with the Market Index Definition Statement and submit such data to:

(a) the BMRA, such as to be received by the BMRA no later than the end of the Settlement Period to which the data pertains;

(b) the SAA, by way of daily report containing the data separately for each Settlement Period in the Settlement Day to which the data pertains and such as to be received by the SAA no later than the end of the Business Day next following the relevant Settlement Day.

1.5A.3 Without prejudice to any rights or remedies available to BSCCo under the Market Index Data Provider Contract, if a Market Index Data Provider is unable to determine and/or submit its Market Index Data or to do so within the timescales set out in paragraph 1.5A.2, it will:

(a) inform BSCCo, the BMRA and the SAA immediately, giving details of the cause of such inability, when it expects to be able to determine and submit such data and the Settlement Periods likely to be affected;

(b) endeavour to determine and submit such data as soon as it reasonably can, in which case such data shall be taken into account in the next Settlement Run for the relevant Settlement Day following submission.

1.5A.4 In respect of any Settlement Day for which the SAA does not receive Market Index Data from a Market Index Data Provider:

(a) the provisions of paragraph 1.4 shall not apply (and the default rules under paragraph 4.4.6A shall apply instead); and

(b) the SAA shall inform BSCCo.

1.5A.5 Without prejudice to Section W1.3.2(c)(iv), where, following the submission by a Market Index Data Provider of Market Index Data in accordance with paragraph 1.5A.2, a change is made to any underlying data item of a Market Index Data Provider such that the Market Index Data so submitted is no longer the data which would have been submitted in respect of the Settlement Period in accordance with the Market Index Definition Statement:

(a) the Market Index Data Provider will:

(i) inform BSCCo of such change and its effect on the Market Index Data;

(ii) resubmit the Market Index Data for the relevant Settlement Period(s) taking account of such change; and

(b) where the Market Index Data Provider resubmits any Market Index Data as provided in paragraph (ii) above, such revised Market Index Data shall be taken into account in the next Settlement Run for the relevant Settlement Day.

1.5A.6 Without prejudice to paragraph 4.4.4B, if in respect of a Settlement Period and a Market Index Data Provider the Individual Liquidity Threshold for that Market Index Data Provider (as determined in accordance with the Market Index Definition Statement) exceeds the Market Index Volume which would otherwise have been submitted, the Market Index Data Provider will instead submit a Market Index Volume with a value of zero.

1.5A.7 It shall be the responsibility of BSCCo to enter into a contract with each person nominated as a Market Index Data Provider for the provision of Market Index Data in accordance with this paragraph 1.5A and for these purposes:

(a) a Market Index Data Provider shall not be considered to be a 'BSC Agent' under the Code;

(b) notwithstanding paragraph 1.5A.7(a), the provisions of Section E2 (other than Section E2.7) and Section E3 shall apply to each Market Index Data Provider Contract and to the provision of Market Index Data as if references to BSC Agent were to a Market Index Data Provider and references to a BSC Agent Contract were to the Market Index Data Provider Contract subject to the following:

(i) provisions in Section E2 and E3 relating to the selection and appointment of BSC Agents shall not apply (the selection and appointment of Market Index Data Provider(s) being prescribed in the Market Index Definition Statement);

(ii) references in Section E2 and E3 to BSC Service Descriptions shall be disregarded.

1.5A.8 It is recognised that a Market Index Data Provider may (but need not) be a Party: where a Market Index Data Provider is a Party:

(a) such Party shall have no rights, benefits, obligations or liability in its capacity as Market Index Data Provider to or against any other Party under the Code, but without prejudice and subject to its rights and obligations:

(i) as Market Index Data Provider under its Market Index Data Provider Contract; and

(ii) in any other capacity under the Code;

(b) references to Party or Parties in the Code shall be construed as excluding any Market Index Data Provider (which is a Party) in its capacity as a Market Index Data Provider (but as including such Party in any other capacity);

(c) the provision of Market Index Data shall be made pursuant to the Market Index Data Provider Contract and not pursuant to the Code and, accordingly, such data shall not be considered relevant party data for the purposes of Section H4.6;

(d) Section H4.6 shall apply to Market Index Data Providers as if references to BSC Agents included Market Index Data Providers and references to BSC Agent Contracts included Market Index Data Provider Contracts;

(e) the provision, disclosure and use of any data relating to a Party which is used in or in connection with the determination of Market Index Data by a Market Index Data Provider shall not be construed as being made pursuant to any provision of the Code.

1.5A.9 Notwithstanding paragraph 1.5A.7(a), references to BSC Agents and BSC Agent Contracts in:

(a) Section H; and

(b) Section W,

shall be deemed to include, respectively, Market Index Data Providers and Market Index Data Provider Contracts.

[NB. Further work needed – may apply elsewhere]

1.5A.10 For the purposes of this paragraph 1.5A:

(a) references to a Market Index Data Provider are to a Market Index Data Provider identified in the version of the Market Index Definition Statement prevailing at the time in question;

(b) in respect of a Market Index Data Provider, references to Market Index Data are to such data as that Market Index Data Provider is to submit in accordance with the Market Index Definition Statement.

Section T 4.4.4

Paragraph 4.4.4 of Section T shall be deleted and replaced with the following new paragraph 4.4.4:

4.4.4 In respect of each Settlement Period:

(a) some or all of the accepted Bids and accepted Offers may be defined as NIV Tagged Bids and NIV Tagged Offers respectively in accordance with the provisions in Annex T-1, and all such NIV Tagged Bids and NIV Tagged Offers shall be disregarded for the purposes of the calculation of energy imbalance prices;

(b) some or all of the Buy Price Volume Adjustment (BVA) and Sell Price Volume Adjustment (SVA) may be defined as NIV Tagged BVA and NIV Tagged SVA respectively in accordance with the provisions in Annex T-1, and all such NIV Tagged BVA and NIV Tagged SVA shall be disregarded for the purposes of the calculation of energy imbalance prices;

(c) some or all of the Total System Un-priced Bid Volume and Total System Un-priced Offer Volume may be defined as NIV Tagged Total System Un-priced Bid Volume and NIV Tagged Total System Un-priced Offer Volume respectively in accordance with the provisions in Annex T-1, and all such NIV Tagged Total System Un-priced Bid Volume and NIV Tagged Total System Un-priced Offer Volume shall be disregarded for the purposes of the calculation of energy imbalance prices.

Section T 4.4.4A

A new paragraph 4.4.4A shall be inserted in Section T as follows:

4.4.4A In respect of each Settlement Period, the Net Imbalance Volume will be determined as follows:

$$NIV_j = \{TQPAO_j + BVA_j + TQUAO_j\} - \{(-TQPAB_j) + (-SVA_j) + (-TQUAB_j)\}$$

Section T4.4.4B

A new paragraph 4.4.4B shall be inserted in Section T as follows:

4.4.4B Without prejudice to paragraph 1.5A.3(b) and 1.5A.5(b), if in respect of a Settlement Period j and a Market Index Data Provider s either:

(a) the Individual Liquidity Threshold exceeds the Market Index Volume (QXP_{sj}); or

(b) the Market Index Data Provider fails to submit the Market Index Data in time such that it can be taken into account in the relevant Settlement Run,

the Market Index Volume (QXP_{sj}) shall be deemed to be zero.

Section T 4.4.5

Paragraph 4.4.5 of Section T shall be amended to read as follows:

4.4.5 In respect of each Settlement Period:

(a) if the Net Imbalance Volume is not equal to zero, and is a positive number, then the System Buy Price will be determined as follows:

$$SBP_j = \{\Sigma_i \Sigma^n \{QAPO^n_{ij} * PO^n_{ij} * TLM_{ij}\} + UBCA_j\} / \{\Sigma_i \Sigma^n \{QAPO^n_{ij} * TLM_{ij}\} + UBVA_j\} + \{BPA_j\}$$

where Σ_i represents the sum over all BM Units and Σ^n represents the sum over those accepted Offers that are not De Minimis Accepted Offers and not Arbitrage Accepted Offers and not NIV Tagged Offers.

(b) if the Net Imbalance Volume is equal to zero, or is a negative number, then the System Buy Price will be determined as follows:

$SBP_j = \Sigma_s \{PXP_{sj} * QXP_{sj}\} / \Sigma_s \{QXP_{sj}\}$

where Σ_s represents the sum over all Market Index Data Providers;

provided that, if the Net Imbalance Volume is a negative number and SSP_j as determined in accordance with paragraph 4.4.6(a) would exceed SBP_j as determined in this paragraph (b) above, then SBP_j shall instead be equal to SSP_j as determined in accordance with paragraph 4.4.6(a).

Section T 4.4.6

Paragraph 4.4.6 of Section T shall be amended to read as follows:

4.4.6 In respect of each Settlement Period:

(a) if the Net Imbalance Volume is not equal to zero, and is a negative number, then the System Sell Price will be determined as follows:

$SSP_j = \{\Sigma_i \Sigma^n \{QAPB^n_{ij} * PB^n_{ij} * TLM_{ij}\} + USCA_j\} / \{\Sigma_i \Sigma^n \{QAPB^n_{ij} * TLM_{ij}\} + USVA_j\} + \{SPA_j\}$

where Σ_i represents the sum over all BM Units and Σ^n represents the sum over those accepted Bids that are not De Minimis Accepted Bids and not Arbitrage Accepted Bids and not NIV Tagged Bids.

(b) if the Net Imbalance Volume is equal to zero, or is a positive number, then the System Sell Price will be determined as follows:

$SSP_j = \Sigma_s \{PXP_{sj} * QXP_{sj}\} / \Sigma_s \{QXP_{sj}\}$

where Σ_s represents the sum over all Market Index Data Providers;

provided that, if the Net Imbalance Volume is a positive number and SSP_j as so determined would exceed SBP_j as determined in accordance with paragraph 4.4.5(a), then SSP_j shall instead be equal to SBP_j as determined in accordance with paragraph 4.4.5(a).

Section T 4.4.6A

The following new paragraph 4.4.6A shall be inserted in Section T as follows:

4.4.6A Without prejudice to paragraph 1.5A.3(b) and 1.5A.5(b), if for whatever reason (including the submission or deemed submission of zero values or the absence of Market Index Data) in respect of a Settlement Period:

$\Sigma_s \ QXP_{sj} = 0$

where Σ_s represents the sum over all Market Index Data Providers,

then:

(a) if the Net Imbalance Volume is a positive number, SSP_j shall be equal to SBP_j as determined in accordance with paragraph 4.4.5(a);

(b) if the Net Imbalance Volume is a negative number, SBP_j shall be equal to SSP_j as determined in accordance with paragraph 4.4.6(a); and

(c) if the Net Imbalance Volume is zero, each of SBP_j and SSP_j shall be zero.

Section T4.4.7

Replace "Trade Tagged Offers" with "NIV Tagged Offers".

Section T4.4.8

Replace "Trade Tagged Bids" with "NIV Tagged Bids".

Section T 4.4.10

Paragraph 4.4.10 of Section T shall be deleted and replaced with the following:

4.4.10 In respect of each Settlement Period, the Total NIV Tagged Volume will be determined as follows:

$$TCQ_j = \{\Sigma_i (\Sigma^{n'} QAPB^{n'}_{ij} - \Sigma^{n*} QAPO^{n*}_{ij})/2\} + \{(TTQUAB_j - TTQUAO_j) / 2\} + \{(TSVA_j - TBVA_j)/2\}$$

where Σ_i represents the sum over all BM Units and $\Sigma^{n'}$ represents the sum over those accepted Bids which are NIV Tagged Bids and Σ^{n*} represents the sum over those accepted Offers which are NIV Tagged Offers.

Section T 5.2.3

Paragraph 5.2.3 shall be amended as follows:

5.2.3 …

(c) Use any adjusted or revised data submitted to it for the relevant Settlement Period by the CRA, the CDCA, the ECVAA, the Transmission Company, ~~and~~ any Interconnector Administrator and any Market Index Data Provider,

Annex T-1

Paragraph 3 of Annex T-1 shall be deleted and replaced with the following:

3 NIV Tagging

3.1 In respect of each Settlement Period, NIV Tagged Offers, NIV Tagged Bids, NIV Tagged SVA, NIV Tagged BVA, NIV Tagged Total System Un-priced Offer Volume and NIV Tagged Total System Un-priced Bid Volume will be defined in the following way:

(a) If:

$\{\{\Sigma^{n'} (-QAPB^{n'}{}_{ij})\} + (-SVA_j) + (-TQUAB_j)\} = 0$

where $\Sigma^{n'}$ is the sum over those accepted Bids that are both Non-De Minimis Bids and Non-arbitrage Bids; or

$\{\{\Sigma^{n*} QAPO^{n*}{}_{ij} + BVA_j + TQUAO_j\} = 0$

where Σ^{n*} is the sum over those accepted Offers that are both Non-De Minimis Offers and Non-arbitrage Offers:

then no Bids or Offers or SVA or BVA volumes or Total System Un-priced Offer Volume or Total System Un-priced Bid Volume will be NIV Tagged.

(b) Otherwise, the following procedure will be carried out. The set of all accepted Bids, which are neither De Minimis Bids nor Arbitrage Bids, will be ranked in price order, cheapest first (where the cheapest is allocated an n' value of 1, the next cheapest an n' value of 2 and so on). In any case where such Bids have the same price as each other, the ordering of such Bids will be random, subject to paragraph (g). The set of Non-De Minimis and Non-arbitrage Bids $\{QAPB^{n'_1}{}_{ij}, QAPB^{n'_2}{}_{ij}, \ldots, QAPB^{n'_w}{}_{ij}\}$ is then a set of "**Ranked Priced Bids**".

The Sell Price Volume Adjustment (SVA_j) will be added into the set of Ranked Priced Bids according to the Sell Price Cost Adjustment (SCA_j) (converted to £ / MWh, i.e. SCA_j / SVA_j). The volume will, for the purposes of the NIV calculation only, be assigned an n' value and the n' values of the Ranked Priced Bids will be adjusted accordingly. The set of Ranked Priced Bids including the Sell Price Volume Adjustment (SVA_j) will then be a set of "**Ranked Bids**".

Where the price of the Sell Price Volume Adjustment is the same as any other Ranked Priced Bid, then the Sell Price Volume Adjustment volume will be given the lowest n' value of the Bid(s) with the same price.

The Total System Un-priced Bid Volume ($TQUAB_j$) will then be added into the set of Ranked Bids as n' = 1 and the n' values of the Ranked Bids will be adjusted accordingly. The volume will, for the purposes of the NIV calculation only, be assigned an n' value .

This then, for the purposes of the NIV Tagging calculation only, will constitute a set of "**Ranked Bid Volumes**", as follows:

$(-QAPB^{n'}{}_{ij})$, $(-SVA^{n'}{}_{j})$, $(-TQUAB^{n'}{}_{j})$

The set of all accepted Offers, which are neither De Minimis Offers nor Arbitrage Offers will be ranked in price order, most expensive first (where the most expensive is allocated an n* value of 1, the next most expensive an n* value of 2 and so on). In any case where such Offers have the same price as each other, the ordering of such Offers will be random, subject to paragraph (g). The set of Non-De Minimis and Non-arbitrage Offers $\{QAPO^{n^*_1}{}_{ij}, QAPO^{n^*_2}{}_{ij}, \ldots, QAPO^{n^*_x}{}_{ij}\}$ is then a set of "**Ranked Priced Offers**".

The Buy Price Volume Adjustment (BVA_j) will be added into the set of Ranked Priced Offers according to the Buy Price Cost Adjustment (BCA_j) (converted to £ / MWh, i.e. BCA_j / BVA_j).

The volume will, for the purposes of the NIV calculation only, be assigned an n* value and the n* values of the Ranked Priced Offers will be adjusted accordingly. The set of Ranked Priced Offers including the Buy Price Volume Adjustment (BVA_j) will then be a set of "**Ranked Offers**".

Where the price of the Buy Price Volume Adjustment is the same as any other Ranked Priced Offer, then the Buy Price Volume Adjustment volume will be given the highest n* value of the Offer(s) with the same price.

The Total System Un-priced Offer Volume ($TQUAO_j$) will then be added into the set of Ranked Offers as n*=1 and the n* values of the Ranked Offers will be adjusted accordingly. The volume will, for the purposes of the NIV calculation only, be assigned an n* value.

This then, for the purposes of the NIV Tagging calculation only, will constitute a set of "**Ranked Offer Volumes**", as follows:

$(QAPO^{n^*}_{ij})$, $(BVA^{n^*}_{j})$, $(TQUAO^{n^*}_{j})$

(c) If:

$$\{\Sigma^{n'} (-QAPB^{n'}_{ij}) + (-SVA^{n'}_{j}) + (-TQUAB^{n'}_{j})\} \leq \{\Sigma^{n^*} QAPO^{n^*}_{ij} + BVA^{n^*}_{j} + TQUAO^{n^*}_{j}\}$$

where $\Sigma^{n'}$ is the sum over the Ranked Priced Bids and Σ^{n^*} is the sum over the Ranked Priced Offers,

then for the smallest value of q such that

$$\Sigma^{n' v>q} (-QAPB^{n'v}_{ij}), (-SVA^{n'v}_{j}), (-TQUAB^{n'v}_{j}) \leq 0$$

where $\Sigma^{n' v>q}$ is the sum over those Ranked Bid Volumes for which v is greater than q

then, subject to paragraph (g):

(A) for all q≥1 each Ranked Bid Volume of the Ranked Bid Volumes numbered n'_1 to n'_{q-1} will be defined as a NIV Tagged Bid, the NIV Tagged SVA, or the NIV Tagged Total System Un-priced Bid Volume (as the case may be), and

(B) if

$$\Sigma^{n' v>q} (-QAPB^{n'v}_{ij}), (-SVA^{n'v}_{j}), (-TQUAB^{n'v}_{j}) = 0$$

then the Ranked Bid Volume numbered n'_q will be defined as a NIV Tagged Bid, or the NIV Tagged Sell Price Volume Adjustment, or the NIV Tagged Total System Un-priced Bid Volume (as the case may be);

(d) Since $\{\{\Sigma^{n'} (-QAPB^{n'}_{ij}) + (-SVA^{n'}_{j}) + (-TQUAB^{n'}_{j})\} \leq \{\Sigma^{n^*} QAPO^{n^*}_{ij} + BVA^{n^*}_{j} + TQUAO^{n^*}_{j}\}$ there must exist a number e and a number φ (which may be a fraction or zero) for which

$$\{(\Sigma^{n' v<q} (-QAPB^{n'v}_{ij}), (-SVA^{n'v}_{j}), (-TQUAB^{n'v}_{j})) + ((-QAPB^{n'q}_{ij}), (-SVA^{n'q}_{j}), (-TQUAB^{n'q}_{j}))\} = (\Sigma^{n^* v<e} (QAPO^{n^*v}_{ij}), (BVA^{n^*v}_{j}), (TQUAO^{n^*v}_{j})) + \{\varphi * ((QAPO^{n^*e}_{ij}), (BVA^{n^*e}_{j}), (TQUAO^{n^*e}_{j}))\}$$

where $\Sigma^{n' v<q}$ is the sum over those Ranked Bid Volumes for which v is less than q and $\Sigma^{n* v<e}$ is the sum over those Ranked Offer Volumes for which v is less than e.

Subject to paragraph (g), each Ranked Offer Volume of the Ranked Offer Volumes numbered 1 to e–1 for which this is true will be defined as a NIV Tagged Offer, or the NIV Tagged BVA or the NIV Tagged Total System Un-priced Offer Volume (as the case may be). If φ is a fraction rather than 0, then the fraction φ of the Ranked Offer Volume numbered 1 will be defined as a NIV Tagged Offer, the NIV Tagged BVA, or the NIV Tagged Total System Un-priced Offer Volume (as the case may be).

For the purposes of the Energy Imbalance Price calculation (Section T 4.4.5 and 4.4.6):

The NIV Untagged BVA ($UBVA_j$) is the portion of Buy Price Volume Adjustment (BVA_j) which is not NIV Tagged BVA ($TBVA_j$) for the relevant Settlement Period. If none of the Buy Price Volume Adjustment (BVA_j) is NIV Tagged BVA, the NIV Untagged BVA shall be equal to the Buy Price Volume Adjustment (BVA_j) (and the NIV Tagged BVA shall be set to zero). If all of the Buy Price Volume Adjustment (BVA_j) is NIV Tagged BVA, the NIV Untagged BVA shall be set to zero.

The NIV Untagged BCA ($UBCA_j$) is then the portion of the Buy Price Cost Adjustment associated with the NIV Untagged BVA for the relevant Settlement Period determined as follows:

$$UBCA_j = UBVA_j * (BCA_j / BVA_j)$$

The NIV Untagged Total System Un-priced Offer Volume ($UTQUAO_j$) is the portion of the Total System Un-priced Offer Volume which is not NIV Tagged Total System Un-priced Offer Volume ($TTQUAO_j$) for the relevant Settlement Period. If none of the Total System Un-priced Offer Volume is NIV Tagged Total System Un-priced Offer Volume, the NIV Untagged Total System Un-priced Offer Volume ($UTQUAO_j$) shall be equal to the Total System Un-priced Offer Volume (and the NIV Tagged Total System Un-priced Offer Volume shall be set to zero). If all of the Total System Un-priced Offer Volume is NIV Tagged Total System Un-priced Offer Volume, the NIV Untagged Total System Un-priced Offer Volume ($UTQUAO_j$) shall be set to zero.

(e) If:

$$\{\{\Sigma^{n'} (-QAPB^{n'}{}_{ij}) + (-SVA^{n'}{}_{j}) + (-TQUAB^{n'}{}_{j})\} > \{\Sigma^{n*} QAPO^{n*}{}_{ij} + BVA^{n*}{}_{j} + TQUAO^{n*}{}_{j}\}$$

where $\Sigma^{n'}$ is the sum over the Ranked Priced Bids and Σ^{n*} is the sum over the Ranked Priced Offers,

then for the smallest value of q such that

$$\Sigma^{n* v>q} (QAPO^{n*v}{}_{ij}), (BVA^{n*v}{}_{j}), (TQUAO^{n*v}{}_{j}) \leq 0$$

where $\Sigma^{n* v>q}$ is the sum over those Ranked Offer Volumes for which v is greater than q

then, subject to paragraph (g):

(A) each Ranked Offer Volume of the Ranked Offer Volumes numbered n^*_1 to n^*_{q-1} will be defined as a NIV Tagged Offer, or the NIV Tagged BVA, or the NIV Tagged Total System Un-priced Offer Volume (as the case may be), and

(B) if

$$\Sigma^{n^* v>q} (QAPO^{n^*v}_{ij}), (BVA^{n^*v}_{j}), (TQUAO^{n^*v}_{j}) = 0$$

then the Ranked Offer Volume numbered n^*_q will be defined as a NIV Tagged Offer, or the NIV Tagged BVA, or the NIV Tagged Total System Un-priced Offer Volume (as the case may be);

(f) Since $\{\Sigma^{n'} (-QAPB^{n'}_{ij}) + (-SVA^{n'}_{j}) + (-TQUAB^{n'}_{j})\} > \{\Sigma^{n^*} QAPO^{n^*}_{ij} + BVA^{n^*}_{j} + TQUAO^{n^*}_{j}\}$ there must exist a number e and a number φ (which may be a fraction or zero) for which

$$\{(\Sigma^{n^* v<q} (QAPO^{n^*v}_{ij}), (BVA^{n^*v}_{j}), (TQUAO^{n^*v}_{j})) + ((QAPO^{n^*q}_{ij}), (BVA^{n^*q}_{j}), (TQUAO^{n^*q}_{j}))\} = (\Sigma^{n' v<e} (-QAPB^{n'v}_{ij}), (-SVA^{n'v}_{j}), (-TQUAB^{n'v}_{j})) + \{\varphi * ((-QAPB^{n'e}_{ij}), (-SVA^{n'e}_{j}), (-TQUAB^{n'e}_{j}))\}$$

where $\Sigma^{n^* v<q}$ is the sum over those Ranked Offer Volumes for which v is less than q and $\Sigma^{n' v<e}$ is the sum over those Ranked Bid Volumes for which v is less than e.

Subject to paragraph (g), each Ranked Bid Volume of the Ranked Bid Volumes numbered 1 to e–1 for which this is true will be defined as a NIV Tagged Bid, or the NIV Tagged SVA, or the NIV Tagged Total System Un-priced Bid Volume (as the case may be). If φ is a fraction rather than 0, then the fraction φ of the Ranked Bid Volume numbered n'_1 will be defined as a NIV Tagged Bid, or the NIV Tagged SVA, or the NIV Tagged Total System Un-priced Bid Volume (as the case may be).

For the purposes of the Energy Imbalance Price calculation (Section T 4.4.5 and 4.4.6):

The NIV Untagged SVA ($USVA_j$) is the portion of the Sell Price Volume Adjustment (SVA_j) which is not NIV Tagged SVA ($TSVA_j$) for the relevant Settlement Period. If none of the Sell Price Volume Adjustment (SVA_j) is NIV Tagged SVA, the NIV Untagged SVA shall be equal to the Sell Price Volume Adjustment (SVA_j) (and the NIV Tagged SVA shall be set to zero). If all of the Sell Price Volume Adjustment (SVA_j) is NIV Tagged SVA, the NIV Untagged SVA shall be set to zero.

The NIV Untagged SCA ($USCA_j$) is then the portion of the Sell Price Cost Adjustment (SCA_j) associated with the NIV Untagged SVA for the relevant Settlement Period determined as follows:

$$USCA_j = USVA_j * (SCA_j / SVA_j)$$

The NIV Untagged Total System Un-priced Bid Volume ($UTQUAB_j$) is the portion of Total System Un-priced Bid Volume which is not NIV Tagged Total System Un-priced Bid Volume ($TTQUAB_j$) for the relevant Settlement Period. If none of the Total System Un-priced Bid Volume is NIV Tagged Total System Un-priced Bid Volume, the NIV Untagged Total System Un-priced Bid Volume ($UTQUAB_j$) shall be equal to the Total System Un-priced Bid Volume (and the NIV Tagged Total System Un-priced Bid Volume shall be set to zero). If all of the

Total System Un-priced Bid Volume is NIV Tagged Total System Un-priced Bid Volume, the NIV Untagged Total System Un-priced Bid Volume ($UTQUAB_j$) shall be set to zero.

(g) However, for each of paragraphs (c), (d), (e) and (f) (each a "relevant provision") separately, if the application of the relevant provision (the 'initial calculation') would result in there being any Ranked Bid Volume or Ranked Offer Volume which:

(1) is not (as the case may be) a NIV Tagged Bid, NIV Tagged Offer, NIV Tagged SVA or NIV Tagged BVA but

(2) has the same price (other than merely by virtue of being a fraction (1 - φ) pursuant to the initial calculation) as a Ranked Bid which is a NIV Tagged Bid or NIV Tagged SVA or (as the case may be) Ranked Offer which is a NIV Tagged Offer or NIV Tagged BVA,

then:

(i) all such Ranked Bids $QAPB^{n''_r}{}_{ij}$ or $SVA^{n''_r}{}_j$ or Ranked Offers $QAPO^{n''_r}{}_{ij}$ or $BVA^{n''_r}{}_j$ (whether or not NIV Tagged Bids, NIV Tagged SVA, NIV Tagged Offers or NIV Tagged BVA on the basis of the initial calculation) which have the same price are "threshold Bids" (in the case of Ranked Bids) or "threshold Offers" (in the case of Ranked Offers);

(ii) no threshold Bid or threshold Offer shall be defined as a NIV Tagged Bid or NIV Tagged SVA or NIV Tagged Offer or NIV Tagged BVA (as the case may be) pursuant to the relevant provision, but instead the fraction δ of each threshold Bid $QAPB^{n''_r}{}_{ij}$ or $SVA^{n_r}{}_j$ or threshold Offer $QAPO^{n''_r}{}_{ij}$ or $BVA^{n_r}{}_j$ which satisfies the following shall be defined as a NIV Tagged Bid, NIV Tagged SVA, NIV Tagged Offer or NIV Tagged BVA (as the case may be):

$$\delta * (\sum^{n'_r} QAPB^{n'_r}{}_{ij}, SVA^{n'_r}{}_j) = \sum^{n'_{r'}} QAPB^{n'_{r'}}{}_{ij}, SVA^{n'_{r'}}{}_j$$

or (as the case may be)

$$\delta * (\sum^{n'_r} QAPO^{n'_r}{}_{ij}, BVA^{n'_r}{}_j) = \sum^{n'_{r'}} QAPO^{n'_{r'}}{}_{ij}, BVA^{n'_{r'}}{}_j$$

where

$\sum^{n'_r}$ is the sum over all threshold Bids or (as the case may be) threshold Offers, and

$\sum^{n'_{r'}}$ is the sum over all threshold Bids or (as the case may be) threshold Offers (including a fraction φ thereof) which, on the basis of the initial calculation would have been defined as NIV Tagged Bids, NIV Tagged SVA, NIV Tagged Offers or NIV Tagged BVA.

Section U

Paragraph 2.5.8 of Section U shall be amended as follows:

2.5.8 For the purposes of this paragraph 2.5:

(a) relevant BSC Agents are the CDCA, ECVAA, SAA and (notwithstanding Section T1.5.7(a)), each Market Index Data Provider and relevant Parties are the Transmission Company and each Interconnector Administrator;

(b) settlement data means the data, if any, used by the CDCA for the purposes of a Volume Allocation Run or provided by the ECVAA, the Transmission Company, an Interconnector Administrator or a Market Index Data Provider to or used by the SAA for the purposes of a Settlement Run;

(c) the date of the relevant initial run is:

(i) in relation to the CDCA, the date on which the Initial Volume Allocation Run is carried out;

(ii) in relation to the SAA, the ECVAA, the Transmission Company, an Interconnector Administrator or a Market Index Data Provider, the date on which the Initial Settlement Run is carried out.

Section V

Paragraph 2.6.5 shall be amended as follows:

2.6.5 The BMRA shall calculate:

(a) the Net Imbalance Volume (NIVj);

(b) he Indicative System Buy Price ($ISBP_j$), and

(c) the Indicative System Sell Price ($ISSP_j$)

in accordance with the rules in Section T4.4 save that in each case the terms $ETLMO^+$, $ETLMO^-$, $INIV_j$, $IQAPB^n_{ij}$, $IQAPO^n_{ij}$, $IUBCA_j$, $IUBVA_j$, $IBPA_j$, $IUSCA_j$, $IUSVA_j$, $ISPA_j$, $ISBP_j$ and $ISSP_j$, shall (for the purposes of this paragraph 2.6 only) be substituted for the terms $TLMO^+$, $TLMO^-$, NIV_j, $QAPB^n_{ij}$, $QAPO^n_{ij}$, $UBCA_j$, $UBVA_j$, BPA_j, $USCA_j$, $USVA_j$, SPA_j, SBP_j and SSP_j in Section T.

2.6.6 The BMRA shall calculate:

(a) the Indicative Period BM Unit Bid Cashflow (ICB^n_{ij}), and

(b) the Indicative Period BM Unit Offer Cashflow (ICO^n_{ij})

in accordance with the rules in Section T3 save that in each case the terms $ETLMO^+$, $ETLMO^-$, $IQAB^n_{ij}$, $IQAO^n_{ij}$, ICB^n_{ij} and ICO^n_{ij} shall (for the purposes of this paragraph 2.6 only) be substituted for the terms $TLMO^+$, $TLMO^-$, QAB^n_{ij}, QAO^n_{ij}, CB^n_{ij} and CO^n_{ij} in Section T.

2.6.7 In the event that the BMRA is unable to calculate ISBP, ISSP, Indicative Period BM Unit Total Accepted Bid or Offer Volumes or Indicative Period BM Unit Bid and Offer Cashflows in accordance with this paragraph 2.6, it shall:

(a) where such inability is as a result of the receipt or otherwise of data required from the Transmission Company, contact the Transmission Company to seek to resolve such matter; and

(b) in any event, report the matter to BSCCo

provided that, in the case of Market Index Data, where the BMRA has not received Market Index Data in respect of a Settlement Period from a Market Index Data Provider, it shall calculate ISBP and ISSP using zero values in place of such missing Market Index Data and, in that event, shall post a warning message to that effect on the BMRS.

[Insert provisions to address display of Market Index Data – confirm whether this is to be displayed by BSCCo or the BMRA. Also for display of Gross BSAD, if applicable]

Section W

A new paragraph 1.3.2(c)(iv) shall be inserted in paragraph 1.3.2(c) of Section W as follows:

1.3.2 ….

(c) a Trading Dispute shall not include:

(i) any query, difference or dispute as to whether or to what extent a Party is "responsible" for Exports or Imports for the purposes of Section K;

(ii) (as provided in paragraph 1.7) any dispute as to the identity at any time of the Registrant in SMRS of a SVA Metering System;

(iii) disputes as to the charges payable by Suppliers pursuant to Annex S-1; and

(iv) disputes relating to the underlying [input] data used by a Market Index Data Provider in the determination of its Market Index Data (as opposed to disputes about whether the Market Index Definition Statement has been followed, which may be a Trading Dispute).

Annex X-1

The following new definitions shall be inserted in Annex X-1 in alphabetical order:

"**Market Index Data**":	means the data to be provided by the Market Index Data Provider(s) in accordance with the Market Index Definition Statement or, in relation to a particular Market Index Data Provider, the data to be so provided by that Market Index Data Provider, in each case as set out in Section T1.5 and T1.5A;
"**Market Index Data Provider**":	has the meaning given to that term in Section T1.5;
"**Market Index Data Provider Contract**":	means the contract (as amended, supplemented, renewed or replaced from time to time) between BSCCo and a Market Index Data Provider for the provision of Market Index Data;
"**Market Index Definition Statement**":	has the meaning given to that term in Section T1.5;

Annex X-2

Table X-1 of Annex X-2 Table X-1 (Use of Subscripts and Superscripts Applying Except in Relation to Section S) shall be amended as follows:

Symbol	Parameter
e	A particular order number of a [Ranked Bid Volume or Ranked Offer Volume]
q	The order number of a [Ranked Bid Volume or Ranked Offer Volume]
s	Market Index Data Provider
v	A particular order number of a ranked accepted Offer or a [Ranked Bid Volume or Ranked Offer Volume] as the case may be
x	The order number of a ranked Non-arbitrage Offer *[Do we still use this?]*

Table X-2 of Annex X-2 shall be amended as follows:

[[It should be noted that the following assumes the adoption of Option 2 with regards to BSAD reporting (i.e. net and gross reporting).]]

Defined Term	Acronym	Units	Definition / Explanatory Text
~~Balancing Reserve Level~~	~~BRL_i~~	~~MWh~~	~~The value established and from time to time revised and approved in accordance with Section T1.5~~ ~~*In respect of a Settlement Period, in the event that any accepted Offer or accepted Bid is*~~

Defined Term	Acronym	Units	Definition / Explanatory Text
			~~*defined as a Trade Tagged Offer or Trade Tagged Bid, the Balancing Reserve Level is equal to the minimum aggregate quantity of accepted Offers or the minimum aggregate quantity of the magnitude of accepted Bids used in the determination of the System Buy Price and System Sell Price respectively.*~~
Buy Price Cost Adjustment	BCA_j	£	The amount sent by the Transmission Company as the gross Buy Price Cost Adjustment in accordance with Section Q6.3.
Buy Price Volume Adjustment	BVA_j	MWh	The amount sent by the Transmission Company as the gross Buy Price Volume Adjustment in accordance with Section Q6.3.
Net Buy Price Cost Adjustment	$NBCA_j$	£	The amount sent by the Transmission Company as the Net Buy Price Cost Adjustment in accordance with Section Q6.3.
Net Buy Price Volume Adjustment	$NBVA_j$	MWh	The amount sent by the Transmission Company as the Net Buy Price Volume Adjustment in accordance with Section Q6.3.
Net Imbalance Volume	NIV_j	MWh	The amount determined in accordance with Section T 4.4.4A.
Net Sell Price Cost Adjustment	$NSCA_j$	£	The amount sent by the Transmission Company as the Net Sell Price Cost Adjustment in accordance with Section Q6.3.
Net Sell Price Volume Adjustment	$NSVA_j$	MWh	The amount sent by the Transmission Company as the Net Sell Price Volume Adjustment in accordance with Section Q6.3.
~~Trade~~ NIV Tagged Bid			Has the meaning given to that term in Annex T-1.
NIV Tagged BVA	$TBVA_j$		Has the meaning given to that term in Annex T-1.
~~Trade~~ NIV Tagged Offer			Has the meaning given to that term in Annex T-1.
NIV Tagged SVA	$TSVA_j$		Has the meaning given to that term in Annex T-1.

Defined Term	Acronym	Units	Definition / Explanatory Text
NIV Tagged Total System Un-priced Bid Volume	$TTQUAB_j$		Has the meaning given to that term in Annex T-1.
NIV Tagged Total System Un-priced Offer Volume	$TTQUAO_j$		Has the meaning given to that term in Annex T-1.
NIV Untagged Buy Price Cost Adjustment	$UBCA_j$	£/MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Buy Price Volume Adjustment	$UBVA_j$	MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Sell Price Cost Adjustment	$USCA_j$	£/MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Sell Price Volume Adjustment	$USVA_j$	MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Total System Un-priced Bid Volume	$UTQUAB_j$	MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Total System Un-priced Offer Volume	$UTQUAO_j$	MWh	Has the meaning given to that term in Annex T-1.
Sell Price Cost Adjustment	SCA_j	£	The amount sent by the Transmission Company as the gross Sell Price Cost Adjustment in accordance with Section Q6.3.
Sell Price Volume Adjustment	SVA_j	MWh	The amount sent by the Transmission Company as the gross Sell Price Volume Adjustment in accordance with Section Q6.3.
Total ~~Trade~~ NIV Tagged Volume	TCQ_j	MWh	The quantity determined in accordance with Section T4.4.10. *Total ~~Trade~~ NIV Tagged Volume is a MWh quantity equal in magnitude to both the Period Priced Accepted Offer Volume, NIV Tagged BVA, and NIV Tagged Total System Un-priced Offer Volume summed over all ~~Trade~~ NIV Tagged Offers, NIV Tagged BPA, and NIV Tagged Total System Un-priced Offer Volume and the Period Priced Accepted Bid Volume,*

Defined Term	Acronym	Units	Definition / Explanatory Text
			NIV Tagged SVA, and NIV Tagged Total System Un-priced Bid Volume summed over all ~~Trade~~ NIV Tagged Bids, NIV Tagged SVA, and NIV Tagged Total System Un-priced Bid Volume in Settlement Period j.
Market Index Volume	QXP_{sj}	MWh	In relation to a Market Index Data Provider and a Settlement Period, the volume to be provided by that Market Index Data Provider in accordance with the Market Index Definition Statement.
Market Index Price	PXP_{sj}	£/MWh	In relation to a Market Index Data Provider and a Settlement Period, the price to be provided by that Market Index Data Provider in accordance with the Market Index Definition Statement.

Table X-3 of Annex X-2 Table X-3 (Glossary of Acronyms Applying Except in Relation to Section S) shall be amended as follows:

Acronym	Units	Corresponding Defined Term or Expression
~~BRL_j~~	~~MWh~~	~~Balancing Reserve Level~~
$NBCA_j$	£	Net Buy Price Cost Adjustment
$NBVA_j$	MWh	Net Buy Price Volume Adjustment
NIV_j	MWh	Net Imbalance Volume
$NSCA_j$	£	Net Sell Price Cost Adjustment
$NSVA_j$	MWh	Net Sell Price Volume Adjustment
PXP_{sj}	£/MWh	Market Index Price
QXP_{sj}	MWh	Market Index Volume
TCQ_j	MWh	Total ~~Trade~~ NIV Tagged Volume
$TBVA_j$	MWh	NIV Tagged Bid Price Volume Adjustment
$TSVA_j$	MWh	NIV Tagged Sell Price Volume Adjustment
$TTQUAB_j$	MWh	NIV Tagged Total System Un-price Bid Volume

$TTQUAO_j$	MWh	NIV Tagged Total System Un-price Offer Volume
$UBCA_j$	£	NIV Untagged Buy Price Cost Adjustment
$UBVA_j$	MWh	NIV Untagged Buy Price Volume Adjustment
$USCA_j$	£	NIV Untagged Sell Price Cost Adjustment
$USVA_j$	MWh	NIV Untagged Sell Price Volume Adjustment
$UTQUAB_j$	MWh	NIV untagged Total System Un-priced Bid Volume
$UTQUAO_j$	MWh	NIV untagged Total System Un-priced Offer Volume

b Proposed Modification P78 - Example Definition Statement

The following reflects the provisional thinking of the PIMG with regards to the composition of the market based reverse price for the Proposed Modification P78.

It should be noted that this is not an accurate reflection of the final format of the Definition Statement, and nor is it an agreed Definition Statement. It is provided in order to reflect the intent of the PIMG with respect to the derivation and formulation of the market based reverse price, and is specified at a much higher level of detail than would be expected from the agreed Definition Statement. For an example, it is worth referring to the formulations of the Reference Prices published by the current market index providers.

It should also be noted that this statement has not been discussed or agreed with any relevant Index Provider.

The PIMG considered the information currently available from the traded markets (forwards and spot markets) and agreed that for the purposes of the example Definition Statement, it would be appropriate to use UKPX and APX as example Index Providers, as they both trade 'visibly' ahead of Gate Closure, including within day, and at least initially, should be able to provide the information required near to real time. However, it should be noted that this does not preclude utilisation of information from other Index Providers.

It should be noted that it would be expected that the Panel would determine the initial composition and formulation as part of any implementation of this Proposed Modification P78.

Definition Statement

1 Introduction

1.1 Reflective of Short-term trading

Each Index Provider will be limited to including only those trades undertaken in the period of 24 hours prior to the start of the Settlement Period for which data is to be provided. For the avoidance of doubt, for Settlement Period 1, 00:00 to 00:30 on 2 January, trades will only be eligible to go forward into the Traded Volume and Traded Price if they were concluded after 00:00 on 1 January.

1.2 Reflective of Liquid Trading

Each Index Provider will be limited to reporting a Traded Volume and Traded Price only where the Provider was deemed to have liquid trading, and therefore to have exceeded the Liquidity Threshold set by the Panel.

For the Provider to be deemed to have sufficient liquidity to contribute to the Energy Imbalance Price calculation, the Provider must have traded [37.5 MWh] in the period designated at 1.1 above.

Where the Index Provider has traded less than 37.5 MWh, then the Index Provider must notify a Traded Volume and Traded Price of 0 MWh and £0 / MWh, respectively.

1.3 Designated Index Providers

In accordance with the BSC Section T 1.5A, the Panel have designated the following Index Providers (in alphabetical order):

Designated Index Provider 1 **Automated Power Exchange (APX)**

Designated Index Provider 2 **UKPX**

2 Designated Index Provider 1 Methodology

APX trade in four hour EFA blocks, therefore for each Settlement Period, the following will be undertaken:

(a) All trades for a Settlement Period within a specific EFA block, within the 24 limit at 1.1 will be considered to be eligible for inclusion in the determination of the Traded Volume and Traded Price;

(b) Once Gate Closure has been reached for the relevant Settlement Period, then for each EFA block traded and eligible under point (a) above, the traded volume for the relevant Settlement Period will be determined as 12.5 % (1/8th) of the volume traded in the EFA block. The volume traded for the Settlement Period from each EFA block will then be summed over all EFA blocks to derive a total traded volume for the Settlement Period.

(c) Once Gate Closure has been reached for the relevant Settlement Period, then for each EFA block traded and eligible under point (a) above, the traded price for the relevant Settlement Period in the EFA block will be determined as a £/MWh price for the volume traded and derived under point (b) above. The traded price for the Settlement Period from each EFA block will then be summed as a weighted average over all EFA blocks to derive a traded price in £/MWh for the Settlement Period.

2 Designated Index Provider 2 Methodology

UKPX trade in four hour blocks, and for discrete Settlement Periods. Therefore for each Settlement Period within a four hour block, the following will be undertaken:

(a) All trades for a Settlement Period within a specific block, within the 24 limit at 1.1 will be considered to be eligible for inclusion in the determination of the Traded Volume and Traded Price;

(b) Once Gate Closure has been reached for the relevant Settlement Period, then for each block traded and eligible under point (a) above, the traded volume for the relevant Settlement Period will be determined as 12.5 % (1/8th) of the volume traded in the block. The volume traded for the Settlement Period from each block will then be summed over all blocks to derive a total traded volume for the Settlement Period.

(c) Once Gate Closure has been reached for the relevant Settlement Period, then for each block traded and eligible under point (a) above, the traded price for the relevant Settlement Period in the block will be determined as a £/MWh price for the volume traded and derived under point (b) above. The traded price for the Settlement Period from each block will then be summed as a weighted average over all blocks to derive a traded price in £/MWh for the Settlement Period.

For each discrete Settlement Period:

(d) All the trades for a Settlement Period made within the 24 limit at 1.1 will be considered to be eligible for inclusion in the determination of the Traded Volume and Traded Price;

(e) Once Gate Closure has been reached for the relevant Settlement Period, then the traded volume for the relevant Settlement Period will be determined by summing the volume of all eligible trades.

(f) Once Gate Closure has been reached for the relevant Settlement Period, then a weighted average price (£/MWh) over all the trades under (d) and (e) will be derived.

Once the traded volume and traded price for each traded product has been derived, the following will be undertaken:

(g) The traded volumes will be summed together to provide a total Traded Volume (in MWh) for the Settlement Period; and

(h) The traded price will be derived as a weighted average from the traded volumes, giving a Traded Price (£/MWh) for the Settlement Period.

c Alternative Modification P78

It should be noted that this proposed text s in draft format for this Assessment Report, and is provided as an indication of the potential amendments required. This text will be finalised prior to being issued as a final draft in the Modification Report.

Section C

[Consider whether any changes required to take account of ELEXON's role in contracting with Market Index Data Providers]

Section Q

[Confirm changes required to Q6]

Section T

Section T 1.5

Paragraph 1.5 of Section T shall be deleted in its entirety

Section T 4.4.4

Paragraph 4.4.4 of Section T shall be deleted and replaced with the following new paragraph 4.4.4:

4.4.4 In respect of each Settlement Period:

(a) some of the accepted Bids and accepted Offers may be defined as NIV Tagged Bids and NIV Tagged Offers respectively in accordance with the provisions in Annex T-1, and all such NIV Tagged Bids and NIV Tagged Offers shall be disregarded for the purposes of the calculation of energy imbalance prices;

(b) some of the Buy Price Volume Adjustment (BVA) and Sell Price Volume Adjustment (SVA) may be defined as NIV Tagged BVA and NIV Tagged SVA respectively in accordance with the provisions in Annex T-1, and all such NIV Tagged BVA and NIV Tagged SVA shall be disregarded for the purposes of the calculation of energy imbalance prices;

(c) some of the Total System Un-priced Bid Volume and Total System Un-priced Offer Volume may be defined as NIV Tagged Total System Un-priced Bid Volume and NIV Tagged Total System Un-priced Offer Volume respectively in accordance with the provisions in Annex T-1, and all such NIV Tagged Total System Un-priced Bid Volume and NIV Tagged Total System Un-priced Offer Volume shall be disregarded for the purposes of the calculation of energy imbalance prices.

Section T 4.4.4A

A new paragraph 4.4.4A shall be inserted in Section T as follows:

4.4.4A In respect of each Settlement Period, the Net Imbalance Volume will be determined as follows:

$$NIV_j = \{TQPAO_j + BVA_j + TQUAO_j\} - \{(-TQPAB_j) + (-SVA_j) + (-TQUAB_j)\}$$

Section T4.4.4B

A new paragraph 4.4.4B shall be inserted in Section T as follows:

4.4.4B For each Settlement Period:

(a) the Buy Price Cost Adjustment Price ($BCAP_j$) will be determined as follows:

$BCAP_j = BCA_j / BVA_j$

(b) the Sell Price Cost Adjustment Price ($SCAP_j$) will be determined as follows:

$SCAP_j = SCA_j / SVA_j$

Section T 4.4.5

Paragraph 4.4.5 of Section T shall be amended to read as follows:

4.4.5 In respect of each Settlement Period:

(a) if the Net Imbalance Volume is not equal to zero, and is a positive number, then the System Buy Price will be determined as follows:

$$SBP_j = \{\Sigma_i\Sigma^n \{QAPO^n_{ij} * PO^n_{ij} * TLM_{ij}\} + UBCA_j\} / \{\Sigma_i\Sigma^n \{QAPO^n_{ij} * TLM_{ij}\} + UBVA_j\} + \{BPA_j\}$$

where Σ_i represents the sum over all BM Units and Σ^n represents the sum over those accepted Offers that are not De Minimis Accepted Offers and not Arbitrage Accepted Offers and not NIV Tagged Offers.

(b) if the Net Imbalance Volume is a negative number, then the System Buy Price will be determined as the maximum of:

(i) the Bid Price of the most expensive Non-arbitrage Bid, which has a negative Bid-Offer Pair Number, in the Settlement Period; and

(ii) the Sell Price Cost Adjustment Price ($SCAP_j$) for the Settlement Period,

provided that, if the Net Imbalance Volume is a negative number and SSP_j as determined in accordance with paragraph 4.4.6(a) would exceed SBP_j as determined in this paragraph (b) above, then SBP_j shall instead be equal to SSP_j as determined in accordance with paragraph 4.4.6(a).

Section T 4.4.6

Paragraph 4.4.6 of Section T shall be amended to read as follows:

4.4.6 In respect of each Settlement Period:

(a) if the Net Imbalance Volume is not equal to zero, and is a negative number, then the System Sell Price will be determined as follows:

$$SSP_j = \{\Sigma_i \Sigma^n \{QAPB^n_{ij} * PB^n_{ij} * TLM_{ij}\} + USCA_j\} / \{\Sigma_i \Sigma^n \{QAPB^n_{ij} * TLM_{ij}\} + USVA_j\} + \{SPA_j\}$$

where Σ_i represents the sum over all BM Units and Σ^n represents the sum over those accepted Bids that are not De Minimis Accepted Bids and not Arbitrage Accepted Bids and not NIV Tagged Bids.

(b) if the Net Imbalance Volume is a positive number, then the System Sell Price will be determined as the minimum of:

(i) the Offer Price of the cheapest Non-arbitrage Offer, which has a positive Bid-Offer Pair Number, in the Settlement Period; and

(ii) the Buy Price Cost Adjustment Price ($BCAP_j$) for the Settlement Period,

provided that, if the Net Imbalance Volume is a positive number and SSP_j as so determined would exceed SBP_j as determined in accordance with paragraph 4.4.5(a), then SSP_j shall instead be equal to SBP_j as determined in accordance with paragraph 4.4.5(a).

Section T4.4.6B

A new paragraph T4.4.6B shall be inserted in Section T as follows:

4.4.6B If, for any Settlement Period, the Net Imbalance Volume is equal to zero, then

(a) the System Buy Price will be determined as:

(i) the cheapest Non-arbitrage Offer, which has a positive Bid-Offer Pair Number; or

(ii) where there is no such Offer, the Buy Price Cost Adjustment Price ($BCAP_j$); or

(iii) where there is no such Offer and no such Buy Price Cost Adjustment Price, zero.

(b) the System Sell Price will be determined as:

(i) the most expensive Non-arbitrage Bid, which has a negative Bid-Offer Pair Number; or

(ii) where there is no such Bid, the Sell Price Cost Adjustment Price ($SCAP_j$); or

(iii) where there is no such Bid and no such Sell Price Cost Adjustment Price, zero.

Section T4.4.7

Replace "Trade Tagged Offers" with "NIV Tagged Offers".

Section T4.4.8

Replace "Trade Tagged Bids" with "NIV Tagged Bids".

Section T 4.4.10

Paragraph 4.4.10 of Section T shall be deleted and replaced with the following:

4.4.10 In respect of each Settlement Period, the Total NIV Tagged Volume will be determined as follows:

$$TCQ_j = \{\Sigma_i(\Sigma^{n'} QAPB^{n'}_{ij} - \Sigma^{n*} QAPO^{n*}_{ij})/2\}+\{(TTQUAB_j - TTQUAO_j) / 2\}+\{(TSVA_j - TBVA_j)/2\}$$

where Σ_i represents the sum over all BM Units and $\Sigma^{n'}$ represents the sum over those accepted Bids which are NIV Tagged Bids and Σ^{n*} represents the sum over those accepted Offers which are NIV Tagged Offers.

Section T 5.2.3

Paragraph 5.2.3 shall be amended as follows:

5.2.3 …

(c) Use any adjusted or revised data submitted to it for the relevant Settlement Period by the CRA, the CDCA, the ECVAA, the Transmission Company, ~~and~~ any Interconnector Administrator and any Market Index Data Provider,

Annex T-1

Paragraph 3 of Annex T-1 shall be deleted and replaced with the following:

3 NIV Tagging

3.1 In respect of each Settlement Period, NIV Tagged Offers, NIV Tagged Bids, NIV Tagged SVA, NIV Tagged BVA, NIV Tagged Total System Un-priced Offer Volume and NIV Tagged Total System Un-priced Bid Volume will be defined in the following way:

(a) If:

$$\{\{\Sigma^{n'}(-QAPB^{n'}_{ij})\} + (-SVA_j) + (-TQUAB_j)\} = 0$$

where $\Sigma^{n'}$ is the sum over those accepted Bids that are both Non-De Minimis Bids and Non-arbitrage Bids; or

$$\{\{\Sigma^{n*} QAPO^{n*}_{ij} + BVA_j + TQUAO_j\} = 0$$

where Σ^{n^*} is the sum over those accepted Offers that are both Non-De Minimis Offers and Non-arbitrage Offers:

then no Bids or Offers or SVA or BVA volumes or Total System Un-priced Offer Volume or Total System Un-priced Bid Volume will be NIV Tagged.

(b) Otherwise, the following procedure will be carried out. The set of all accepted Bids, which are neither De Minimis Bids nor Arbitrage Bids, will be ranked in price order, cheapest first (where the cheapest is allocated an n' value of 1, the next cheapest an n' value of 2 and so on). In any case where such Bids have the same price as each other, the ordering of such Bids will be random, subject to paragraph (g). The set of Non-De Minimis and Non-arbitrage Bids $\{QAPB^{n'_1}{}_{ij}, QAPB^{n'_2}{}_{ij}, ..., QAPB^{n'_w}{}_{ij}\}$ is then a set of "**Ranked Priced Bids**".

The Sell Price Volume Adjustment (SVA_j) will be added into the set of Ranked Priced Bids according to the Sell Price Cost Adjustment (SCA_j) (converted to £ / MWh, i.e. SCA_j / SVA_j). The volume will, for the purposes of the NIV calculation only, be assigned an n' value and the n' values of the Ranked Priced Bids will be adjusted accordingly. The set of Ranked Priced Bids including the Sell Price Volume Adjustment (SVA_j) will then be a set of "**Ranked Bids**".

Where the price of the Sell Price Volume Adjustment is the same as any other Ranked Priced Bid, then the Sell Price Volume Adjustment volume will be given the lowest n' value of the Bid(s) with the same price.

The Total System Un-priced Bid Volume ($TQUAB_j$) will then be added into the set of Ranked Bids as n' = 1 and the n' values of the Ranked Bids will be adjusted accordingly. The volume will, for the purposes of the NIV calculation only, be assigned an n' value .

This then, for the purposes of the NIV Tagging calculation only, will constitute a set of "**Ranked Bid Volumes**", as follows:

$(-QAPB^{n'}{}_{ij})$, $(-SVA^{n'}{}_{j})$, $(-TQUAB^{n'}{}_{j})$

The set of all accepted Offers, which are neither De Minimis Offers nor Arbitrage Offers will be ranked in price order, most expensive first (where the most expensive is allocated an n* value of 1, the next most expensive an n* value of 2 and so on). In any case where such Offers have the same price as each other, the ordering of such Offers will be random, subject to paragraph (g). The set of Non-De Minimis and Non-arbitrage Offers $\{QAPO^{n^*_1}{}_{ij}, QAPO^{n^*_2}{}_{ij}, ..., QAPO^{n^*_x}{}_{ij}\}$ is then a set of "**Ranked Priced Offers**".

The Buy Price Volume Adjustment (BVA_j) will be added into the set of Ranked Priced Offers according to the Buy Price Cost Adjustment (BCA_j) (converted to £ / MWh, i.e. BCA_j / BVA_j). The volume will, for the purposes of the NIV calculation only, be assigned an n* value and the n* values of the Ranked Priced Offers will be adjusted accordingly. The set of Ranked Priced Offers including the Buy Price Volume Adjustment (BVA_j) will then be a set of "**Ranked Offers**".

Where the price of the Buy Price Volume Adjustment is the same as any other Ranked Priced Offer, then the Buy Price Volume Adjustment volume will be given the highest n* value of the Offer(s) with the same price.

The Total System Un-priced Offer Volume ($TQUAO_j$) will then be added into the set of Ranked Offers as n*=1 and the n* values of the Ranked Offers will be adjusted accordingly. The volume will, for the purposes of the NIV calculation only, be assigned an n* value.

This then, for the purposes of the NIV Tagging calculation only, will constitute a set of "**Ranked Offer Volumes**", as follows:

$(QAPO^{n*}_{ij})$, (BVA^{n*}_{j}), $(TQUAO^{n*}_{j})$

(c) If:

$$\{\Sigma^{n'} (-QAPB^{n'}_{ij}) + (-SVA^{n'}_{j}) + (-TQUAB^{n'}_{j})\} \leq \{\Sigma^{n*} QAPO^{n*}_{ij} + BVA^{n*}_{j} + TQUAO^{n*}_{j}\}$$

where $\Sigma^{n'}$ is the sum over the Ranked Priced Bids and Σ^{n*} is the sum over the Ranked Priced Offers,

then for the smallest value of q such that

$$\Sigma^{n' v>q} (-QAPB^{n'v}_{ij}), (-SVA^{n'v}_{j}), (-TQUAB^{n'v}_{j}) \leq 0$$

where $\Sigma^{n' v>q}$ is the sum over those Ranked Bid Volumes for which v is greater than q

then, subject to paragraph (g):

(C) for all q≥1 each Ranked Bid Volume of the Ranked Bid Volumes numbered n'_1 to n'_{q-1} will be defined as a NIV Tagged Bid, the NIV Tagged SVA, or the NIV Tagged Total System Un-priced Bid Volume (as the case may be), and

(D) if

$$\Sigma^{n' v>q} (-QAPB^{n'v}_{ij}), (-SVA^{n'v}_{j}), (-TQUAB^{n'v}_{j}) = 0$$

then the Ranked Bid Volume numbered n'_q will be defined as a NIV Tagged Bid, or the NIV Tagged Sell Price Volume Adjustment, or the NIV Tagged Total System Un-priced Bid Volume (as the case may be);

(d) Since $\{\{\Sigma^{n'} (-QAPB^{n'}_{ij}) + (-SVA^{n'}_{j}) + (-TQUAB^{n'}_{j})\} \leq \{\Sigma^{n*} QAPO^{n*}_{ij} + BVA^{n*}_{j} + TQUAO^{n*}_{j}\}$ there must exist a number e and a number φ (which may be a fraction or zero) for which

$$\{(\Sigma^{n' v<q} (-QAPB^{n'v}_{ij}), (-SVA^{n'v}_{j}), (-TQUAB^{n'v}_{j})) + ((-QAPB^{n'q}_{ij}), (-SVA^{n'q}_{j}), (-TQUAB^{n'q}_{j}))\} = (\Sigma^{n* v<e} (QAPO^{n*v}_{ij}), (BVA^{n*v}_{j}), (TQUAO^{n*v}_{j})) + \{\varphi * ((QAPO^{n*e}_{ij}), (BVA^{n*e}_{j}), (TQUAO^{n*e}_{j}))\}$$

where $\Sigma^{n' v<q}$ is the sum over those Ranked Bid Volumes for which v is less than q and $\Sigma^{n* v<e}$ is the sum over those Ranked Offer Volumes for which v is less than e.

Subject to paragraph (g), each Ranked Offer Volume of the Ranked Offer Volumes numbered 1 to e–1 for which this is true will be defined as a NIV Tagged Offer, or the NIV Tagged BVA or the NIV Tagged Total System Un-priced Offer Volume (as the case may be). If φ is a fraction rather than 0, then the fraction φ of the Ranked Offer Volume numbered 1 will be defined as a NIV Tagged Offer, the NIV Tagged BVA, or the NIV Tagged Total System Un-priced Offer Volume (as the case may be).

For the purposes of the Energy Imbalance Price calculation (Section T 4.4.5 and 4.4.6):

The NIV Untagged BVA ($UBVA_j$) is the portion of Buy Price Volume Adjustment (BVA_j) which is not NIV Tagged BVA ($TBVA_j$) for the relevant Settlement Period. If none of the Buy Price Volume Adjustment (BVA_j) is NIV Tagged BVA, the NIV Untagged BVA shall be equal to the Buy Price Volume Adjustment (BVA_j) (and the NIV Tagged BVA shall be set to zero). If all of the Buy Price Volume Adjustment (BVA_j) is NIV Tagged BVA, the NIV Untagged BVA shall be set to zero.

The NIV Untagged BCA ($UBCA_j$) is then the portion of the Buy Price Cost Adjustment associated with the NIV Untagged BVA for the relevant Settlement Period determined as follows:

$$UBCA_j = UBVA_j * (BCA_j / BVA_j)$$

The NIV Untagged Total System Un-priced Offer Volume ($UTQUAO_j$) is the portion of the Total System Un-priced Offer Volume which is not NIV Tagged Total System Un-priced Offer Volume ($TTQUAO_j$) for the relevant Settlement Period. If none of the Total System Un-priced Offer Volume is NIV Tagged Total System Un-priced Offer Volume, the NIV Untagged Total System Un-priced Offer Volume ($UTQUAO_j$) shall be equal to the Total System Un-priced Offer Volume (and the NIV Tagged Total System Un-priced Offer Volume shall be set to zero). If all of the Total System Un-priced Offer Volume is NIV Tagged Total System Un-priced Offer Volume, the NIV Untagged Total System Un-priced Offer Volume ($UTQUAO_j$) shall be set to zero.

(f) If:

$$\{\{\Sigma^{n'} (-QAPB^{n'}{}_{ij}) + (-SVA^{n'}{}_{j}) + (-TQUAB^{n'}{}_{j})\} > \{\Sigma^{n*} QAPO^{n*}{}_{ij} + BVA^{n*}{}_{j} + TQUAO^{n*}{}_{j}\}$$

where $\Sigma^{n'}$ is the sum over the Ranked Priced Bids and Σ^{n*} is the sum over the Ranked Priced Offers,

then for the smallest value of q such that

$$\Sigma^{n* \, v>q} (QAPO^{n*v}{}_{ij}), (BVA^{n*v}{}_{j}), (TQUAO^{n*v}{}_{j}) \leq 0$$

where $\Sigma^{n* \, v>q}$ is the sum over those Ranked Offer Volumes for which v is greater than q

then, subject to paragraph (g):

(C) each Ranked Offer Volume of the Ranked Offer Volumes numbered n^*_1 to n^*_{q-1} will be defined as a NIV Tagged Offer, or the NIV Tagged BVA, or the NIV Tagged Total System Un-priced Offer Volume (as the case may be), and

(D) if

$$\Sigma^{n* \, v>q} (QAPO^{n*v}{}_{ij}), (BVA^{n*v}{}_{j}), (TQUAO^{n*v}{}_{j}) = 0$$

then the Ranked Offer Volume numbered n^*_q will be defined as a NIV Tagged Offer, or the NIV Tagged BVA, or the NIV Tagged Total System Un-priced Offer Volume (as the case may be);

(f) Since $\{\Sigma^{n'} (-QAPB^{n'}_{ij}) + (-SVA^{n'}_{j}) + (-TQUAB^{n'}_{j})\} > \{\Sigma^{n^*} QAPO^{n^*}_{ij} + BVA^{n^*}_{j} + TQUAO^{n^*}_{j}\}$ there must exist a number e and a number φ (which may be a fraction or zero) for which

$\{(\Sigma^{n^* v<q} (QAPO^{n^* v}_{ij}), (BVA^{n^* v}_{j}), (TQUAO^{n^* v}_{j})) + ((QAPO^{n^* q}_{ij}), (BVA^{n^* q}_{j}), (TQUAO^{n^* q}_{j}))\} = (\Sigma^{n' v<e} (-QAPB^{n' v}_{ij}), (-SVA^{n' v}_{j}), (-TQUAB^{n' v}_{j})) + \{\varphi * ((-QAPB^{n' e}_{ij}), (-SVA^{n' e}_{j}), (-TQUAB^{n' e}_{j}))\}$

where $\Sigma^{n^* v<q}$ is the sum over those Ranked Offer Volumes for which v is less than q and $\Sigma^{n' v<e}$ is the sum over those Ranked Bid Volumes for which v is less than e.

Subject to paragraph (g), each Ranked Bid Volume of the Ranked Bid Volumes numbered 1 to e–1 for which this is true will be defined as a NIV Tagged Bid, or the NIV Tagged SVA, or the NIV Tagged Total System Un-priced Bid Volume (as the case may be). If φ is a fraction rather than 0, then the fraction φ of the Ranked Bid Volume numbered n'_1 will be defined as a NIV Tagged Bid, or the NIV Tagged SVA, or the NIV Tagged Total System Un-priced Bid Volume (as the case may be).

For the purposes of the Energy Imbalance Price calculation (Section T 4.4.5 and 4.4.6):

The NIV Untagged SVA ($USVA_j$) is the portion of the Sell Price Volume Adjustment (SVA_j) which is not NIV Tagged SVA ($TSVA_j$) for the relevant Settlement Period. If none of the Sell Price Volume Adjustment (SVA_j) is NIV Tagged SVA, the NIV Untagged SVA shall be equal to the Sell Price Volume Adjustment (SVA_j) (and the NIV Tagged SVA shall be set to zero). If all of the Sell Price Volume Adjustment (SVA_j) is NIV Tagged SVA, the NIV Untagged SVA shall be set to zero.

The NIV Untagged SCA ($USCA_j$) is then the portion of the Sell Price Cost Adjustment (SCA_j) associated with the NIV Untagged SVA for the relevant Settlement Period determined as follows:

$USCA_j = USVA_j * (SCA_j / SVA_j)$

The NIV Untagged Total System Un-priced Bid Volume ($UTQUAB_j$) is the portion of Total System Un-priced Bid Volume which is not NIV Tagged Total System Un-priced Bid Volume ($TTQUAB_j$) for the relevant Settlement Period. If none of the Total System Un-priced Bid Volume is NIV Tagged Total System Un-priced Bid Volume, the NIV Untagged Total System Un-priced Bid Volume ($UTQUAB_j$) shall be equal to the Total System Un-priced Bid Volume (and the NIV Tagged Total System Un-priced Bid Volume shall be set to zero). If all of the Total System Un-priced Bid Volume is NIV Tagged Total System Un-priced Bid Volume, the NIV Untagged Total System Un-priced Bid Volume ($UTQUAB_j$) shall be set to zero.

(g) However, for each of paragraphs (c), (d), (e) and (f) (each a "relevant provision") separately, if the application of the relevant provision (the 'initial calculation') would result in there being any Ranked Bid Volume or Ranked Offer Volume which:

(1) is not (as the case may be) a NIV Tagged Bid, NIV Tagged Offer, NIV Tagged SVA or NIV Tagged BVA but

(2) has the same price (other than merely by virtue of being a fraction (1 - φ) pursuant to the initial calculation) as a Ranked Bid which is a NIV Tagged Bid or NIV Tagged SVA or (as the case may be) Ranked Offer which is a NIV Tagged Offer or NIV Tagged BVA,

then:

(i) all such Ranked Bids $QAPB^{n'_r}{}_{ij}$ or $SVA^{n'_r}{}_j$ or Ranked Offers $QAPO^{n'_r}{}_{ij}$ or $BVA^{n'_r}{}_j$ (whether or not NIV Tagged Bids, NIV Tagged SVA, NIV Tagged Offers or NIV Tagged BVA on the basis of the initial calculation) which have the same price are "threshold Bids" (in the case of Ranked Bids) or "threshold Offers" (in the case of Ranked Offers);

(ii) no threshold Bid or threshold Offer shall be defined as a NIV Tagged Bid or NIV Tagged SVA or NIV Tagged Offer or NIV Tagged BVA (as the case may be) pursuant to the relevant provision, but instead the fraction δ of each threshold Bid $QAPB^{n'_r}{}_{ij}$ or $SVA^{n'_r}{}_j$ or threshold Offer $QAPO^{n'_r}{}_{ij}$ or $BVA^{n'_r}{}_j$ which satisfies the following shall be defined as a NIV Tagged Bid, NIV Tagged SVA, NIV Tagged Offer or NIV Tagged BVA (as the case may be):

$$\delta * (\sum^{n'_r} QAPB^{n'_r}{}_{ij}, SVA^{n'_r}{}_j) = \sum^{n'_{r'}} QAPB^{n'_{r'}}{}_{ij}, SVA^{n'_{r'}}{}_j$$

or (as the case may be)

$$\delta * (\sum^{n'_r} QAPO^{n'_r}{}_{ij}, BVA^{n'_r}{}_j) = \sum^{n'_{r'}} QAPO^{n'_{r'}}{}_{ij}, BVA^{n'_{r'}}{}_j$$

where

$\sum^{n'_r}$ is the sum over all threshold Bids or (as the case may be) threshold Offers, and

$\sum^{n'_{r'}}$ is the sum over all threshold Bids or (as the case may be) threshold Offers (including a fraction φ thereof) which, on the basis of the initial calculation would have been defined as NIV Tagged Bids, NIV Tagged SVA, NIV Tagged Offers or NIV Tagged BVA.

Section V

Paragraph 2.6.5 shall be amended as follows:

2.6.5 The BMRA shall calculate:

(d) the Indicative System Buy Price ($ISBP_j$), and

(e) the Indicative System Sell Price ($ISSP_j$)

in accordance with the rules in Section T4.4 save that in each case the terms $ETLMO^+$, $ETLMO^-$, $IQAPB^n{}_{ij}$, $IQAPO^n{}_{ij}$, $IUBCA_j$, $IUBVA_j$, $IBPA_j$, $IUSCA_j$, $IUSVA_j$, $ISPA_j$, $ISBP_j$ and $ISSP_j$, shall (for the purposes of this paragraph 2.6 only) be substituted for the terms $TLMO^+$, $TLMO^-$, $QAPB^n{}_{ij}$, $QAPO^n{}_{ij}$, $UBCA_j$, $UBVA_j$, BPA_j, $USCA_j$, $USVA_j$, SPA_j, SBP_j and SSP_j in Section T.

2.6.6 The BMRA shall calculate:

(c) the Indicative Period BM Unit Bid Cashflow (ICB^n_{ij}), and

(d) the Indicative Period BM Unit Offer Cashflow (ICO^n_{ij})

in accordance with the rules in Section T3 save that in each case the terms $ETLMO^+$, $ETLMO^-$, $IQAB^n_{ij}$, $IQAO^n_{ij}$, ICB^n_{ij} and ICO^n_{ij} shall (for the purposes of this paragraph 2.6 only) be substituted for the terms $TLMO^+$, $TLMO^-$, QAB^n_{ij}, QAO^n_{ij}, CB^n_{ij} and CO^n_{ij} in Section T.

2.6.7 In the event that the BMRA is unable to calculate ISBP, ISSP, Indicative Period BM Unit Total Accepted Bid or Offer Volumes or Indicative Period BM Unit Bid and Offer Cashflows in accordance with this paragraph 2.6, it shall:

(a) where such inability is as a result of the receipt or otherwise of data required from the Transmission Company or a Market Index Data Provider, contact the Transmission Company or Market Index Data Provider (as the case may be) to seek to resolve such matter; and

(b) post a warning message to that effect on the BMRS; and

(c) in any event, report the matter to BSCCo.

[To be discussed. Do we want to say anything else where no data is received? Are indicative prices just not calculated in those circumstances?]

Annex X-1

The following new definitions shall be inserted in Annex X-1 in alphabetical order:

Annex X-2

Table X-1 of Annex X-2 Table X-1 (Use of Subscripts and Superscripts Applying Except in Relation to Section S) shall be amended as follows:

Symbol	Parameter
e	A particular order number of a [Ranked Bid Volume or Ranked Offer Volume]
q	The order number of a [Ranked Bid Volume or Ranked Offer Volume]
v	A particular order number of a ranked accepted Offer or a [Ranked Bid Volume or Ranked Offer

Volume] as the case may be

x

The order number of a ranked Non-arbitrage Offer

Table X-2 of Annex X-2 shall be amended as follows:

[[It should be noted that the following assumes the adoption of Option 2 with regards to BSAD reporting (i.e. net and gross reporting).]]

Defined Term	Acronym	Units	Definition / Explanatory Text
~~Balancing Reserve Level~~	~~BRL_j~~	~~MWh~~	~~The value established and from time to time revised and approved in accordance with Section T1.5~~ ~~*In respect of a Settlement Period, in the event that any accepted Offer or accepted Bid is defined as a Trade Tagged Offer or Trade Tagged Bid, the Balancing Reserve Level is equal to the minimum aggregate quantity of accepted Offers or the minimum aggregate quantity of the magnitude of accepted Bids used in the determination of the System Buy Price and System Sell Price respectively.*~~
Buy Price Cost Adjustment	BCA_j	£	The amount sent by the Transmission Company as the gross Buy Price Cost Adjustment in accordance with Section Q6.3.
Buy Price Cost Adjustment Price	$BCAP_j$	£/MWh	In relation to a Settlement Period, the price determined in accordance with Section T4.4.4B(a).
Buy Price Volume Adjustment	BVA_j	MWh	The amount sent by the Transmission Company as the gross Buy Price Volume Adjustment in accordance with Section Q6.3.
Net Buy Price Cost Adjustment	$NBCA_j$	£	The amount sent by the Transmission Company as the Net Buy Price Cost Adjustment in accordance with Section Q6.3.
Net Buy Price Volume Adjustment	$NBVA_j$	MWh	The amount sent by the Transmission Company as the Net Buy Price Volume Adjustment in accordance with Section Q6.3.
Net Imbalance Volume	NIV_j	MWh	The amount determined in accordance with Section T 4.4.4A.

Defined Term	Acronym	Units	Definition / Explanatory Text
Net Sell Price Cost Adjustment	$NSCA_j$	£	The amount sent by the Transmission Company as the Net Sell Price Cost Adjustment in accordance with Section Q6.3.
Net Sell Price Volume Adjustment	$NSVA_j$	MWh	The amount sent by the Transmission Company as the Net Sell Price Volume Adjustment in accordance with Section Q6.3.
~~Trade~~ NIV Tagged Bid			Has the meaning given to that term in Annex T-1.
NIV Tagged BVA	$TBVA_j$		Has the meaning given to that term in Annex T-1.
~~Trade~~ NIV Tagged Offer			Has the meaning given to that term in Annex T-1.
NIV Tagged SVA	$TSVA_j$		Has the meaning given to that term in Annex T-1.
NIV Tagged Total System Un-priced Bid Volume	$TTQUAB_j$		Has the meaning given to that term in Annex T-1.
NIV Tagged Total System Un-priced Offer Volume	$TTQUAO_j$		Has the meaning given to that term in Annex T-1.
NIV Untagged Buy Price Cost Adjustment	$UBCA_j$	£/MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Buy Price Volume Adjustment	$UBVA_j$	MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Sell Price Cost Adjustment	$USCA_j$	£/MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Sell Price Volume Adjustment	$USVA_j$	MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Total System Un-priced Bid Volume	$UTQUAB_j$	MWh	Has the meaning given to that term in Annex T-1.
NIV Untagged Total System Un-priced Offer	$UTQUAO_j$	MWh	Has the meaning given to that term in Annex T-1.

Defined Term	**Acronym**	**Units**	**Definition / Explanatory Text**
Volume			
Sell Price Cost Adjustment	SCA_j	£	The amount sent by the Transmission Company as the gross Sell Price Cost Adjustment in accordance with Section Q6.3.
Sell Price Cost Adjustment Price	$SCAP_j$	£/MWh	In relation to a Settlement Period, the price determined in accordance with Section T4.4.4B(b).
Sell Price Volume Adjustment	SVA_j	MWh	The amount sent by the Transmission Company as the gross Sell Price Volume Adjustment in accordance with Section Q6.3.
Total ~~Trade~~ NIV Tagged Volume	TCQ_j	MWh	The quantity determined in accordance with Section T4.4.10. *Total ~~Trade~~ NIV Tagged Volume is a MWh quantity equal in magnitude to both the Period Priced Accepted Offer Volume, NIV Tagged BVA, and NIV Tagged Total System Un-priced Offer Volume summed over all ~~Trade~~ NIV Tagged Offers, NIV Tagged BPA, and NIV Tagged Total System Un-priced Offer Volume and the Period Priced Accepted Bid Volume, NIV Tagged SVA, and NIV Tagged Total System Un-priced Bid Volume summed over all ~~Trade~~ NIV Tagged Bids, NIV Tagged SVA, and NIV Tagged Total System Un-priced Bid Volume in Settlement Period j.*

Table X-3 of Annex X-2 Table X-3 (Glossary of Acronyms Applying Except in Relation to Section S) shall be amended as follows:

Acronym	Units	Corresponding Defined Term or Expression
~~BRL_j~~	~~MWh~~	~~Balancing Reserve Level~~
$BCAP_j$	£/MWh	Buy Price Cost Adjustment Price
$NBCA_j$	£	Net Buy Price Cost Adjustment
$NBVA_j$	MWh	Net Buy Price Volume Adjustment
NIV_j	MWh	Net Imbalance Volume

$NSCA_j$	£	Net Sell Price Cost Adjustment
$NSVA_j$	MWh	Net Sell Price Volume Adjustment
$SCAP_j$	£/MWh	Sell Price Cost Adjustment Price
TCQ_j	MWh	Total ~~Trade~~ NIV Tagged Volume
$TBVA_j$	MWh	NIV Tagged Bid Price Volume Adjustment
$TSVA_j$	MWh	NIV Tagged Sell Price Volume Adjustment
$TTQUAB_j$	MWh	NIV Tagged Total System Un-price Bid Volume
$TTQUAO_j$	MWh	NIV Tagged Total System Un-price Offer Volume
$UBCA_j$	£	NIV Untagged Buy Price Cost Adjustment
$UBVA_j$	MWh	NIV Untagged Buy Price Volume Adjustment
$USCA_j$	£	NIV Untagged Sell Price Cost Adjustment
$USVA_j$	MWh	NIV Untagged Sell Price Volume Adjustment
$UTQUAB_j$	MWh	NIV untagged Total System Un-priced Bid Volume
$UTQUAO_j$	MWh	NIV untagged Total System Un-priced Offer Volume

ANNEX 2 – BSC PARTY CONSULTATION RESPONSES

a First Consultation Responses

See attached document:

MAR078_Annex 2a

Representations were received from the following Parties:

No	Company	File Number	No Parties Represented
1	British Gas Trading	P78_ASS_001	3
2	TXU Europe	P78_ASS_002	21
3	Williams Energy Marketing & Trading Europe Ltd	P78_ASS_003	1
4	Aquila Networks	P78_ASS_004	1
5	PowerGen	P78_ASS_005	3
6	Combined Heat and Power Association	P78_ASS_006	1
7	Immingham CHP LLP	P78_ASS_007	1
8	London Electricity Group	P78_ASS_008	4
9	Scottish and Southern	P78_ASS_009	4
10	SEEBOARD Energy	P78_ASS_010	1
11	ScottishPower	P78_ASS_011	4
12	Damhead Creek Ltd	P78_ASS_012	2
13	Campbell Carr	P78_ASS_013	5
14	Edison Mission	P78_ASS_014	2
15	Innogy plc	P78_ASS_015	6
16	RWE Trading Direct	P78_ASS_016	1
17	AEP Energy Services	P78_ASS_017	2
18	InterGen (UK)	P78_ASS_018	4
19	Eledor Limited	P78_ASS_019	1
20	Vattenfall AB	P78_ASS_020	1
21	BP Gas Power & Renewables	P78_ASS_021	1

b Detailed Level Impact Assessment Responses

Carried out by	Approve	Reject	Comments
Robert Gildert ELEDOR Limited		✔	P74 Disagree. Impact - Yes. This modification fundamentally undermines Eledor's business case. Eledor is a new market entrant and has contracted for systems specified to meet the requirements of the BSC. The proposed modification would fundamentally change the system, increase costs and delay market entrance. Removing the margin between System Buy Price and System Sell Price would prevent Eledor's market entrance as an Independent Consolidator. Other comments: The proposal removes the incentive on participants to self balance. It strengthens the advantages of portfolio players in the prompt pre gate closure markets. This will make the market more imperfect in the pre gate closure stage to the detriment of independent players and smaller participants. Ofgem have sought to encourage independent Consolidators to enter the market. This proposal fundamentally discourages such entrance and the proposal does not assist the long term interests of retaining a competitive market. P78 Disagree Impact - Yes. This modification undermines Eledor's business case. Rationale for the costs and timescales Eledor is a new market entrant and has contracted for systems specified to meet the requirements of the BSC. The proposed modification would fundamentally change the system, increase costs and delay market entrance. Other comments: The proposal dilutes the incentive on participants to self balance. It strengthens the advantages of portfolio players in the prompt pre gate closure markets. This will make the market more imperfect in the pre gate closure stage to the detriment of independent players and smaller participants. Ofgem have sought to encourage independent Consolidators to enter the market. This proposal discourages such entrance and the proposal does not assist the long term interests of retaining a competitive market.

Rachel Ace British Energy Generation			P74 Impact – Yes. Rationale for the costs and timescales: Option1 - no impact Option 2 - 3 months. Option 1 involves no change to the SAA-I014 file so no impact but Option 2 does involve changes to SAA-I014 and as such will have a medium impact Do you agree with the change? See our response to the Modification Proposals. P78 Impact – Yes. Rationale for the costs and timescales 3 months. Option1 has the largest impact due to extra group in SPI sub group. Option 2 also has an impact however. Both have medium impact. Do you agree with the change? See our response to the modification proposals.

John W Russell Calanais		✔	P74 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Basic Proposal: No Impact Alternative Option 1: No Impact Alternative Option 2: Low / Medium impact (due to changes in BSAD) Sonet Changes: Alternative Option 1 No Impact Alternative Option 2 £12,000 **Do you agree with the change?** With reference to previous consultation responses, ScottishPower believes that P74 will have a detrimental effect on market liquidity and that the proposal will fail to promote effective competition in the generation and supply of electricity as it could potentially reduce market liquidity and encourage some participants to withhold positions, therefore we reject this mod. P78 **Does this Modification Proposal affect your organisation regarding costs and timescales?** Option 1: Low / Medium impact (due to changes in BSAD) Option 2: Low / Medium impact (due to changes in BSAD) Alternative Option 1: Low / Medium impact (due to changes in BSAD) Alternative Option 2: Low / Medium impact (due to changes in BSAD) Sonet Changes: Basic £18,000 Alternative £12,000 **Do you agree with the change?** With reference to previous consultation responses, ScottishPower believes that possibly the proposal could help to promote more effective competition in the generation and supply of electricity as it could potentially increase market liquidity, however as with any such wide-reaching modification, it would be wise to allow more time for the market to settle down (ideally another NETA winter) and possibly there may be some further self-regulation with the introduction of P12. If such a cash-out method is still thought to be effective in ensuring compliance with applicable BSC objectives, it should be rethought at the start of 2003.

Janice Tanner Barking Power			P74 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes **Rationale for the costs and timescales:** Imbalance charges are an important element of our costs therefore any changes to the method of calculation has the potential to significantly impact upon those costs. **Do you agree with the change?** Without further modelling, we cannot fully assess the impact of such a change. **Other comments:** We would expect the originator of the modification to include the results of their modelling under different scenarios to support their proposal. Without such analysis, we believe that the proposal is incomplete. P78 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes **Rationale for the costs and timescales:** Imbalance charges are an important element of our costs therefore any changes to the method of calculation has the potential to significantly impact upon those costs. **Do you agree with the change?** Without further modelling, we cannot fully assess the impact of such a change. **Other comments:** We would expect the originator of the modification to include the results of their modelling under different scenarios to support their proposal. Without such analysis, we believe that the proposal is incomplete. It is also necessary to consider the changes to Central Systems should this modification be implemented and the costs that will fall upon BSC Parties as a result.
Ros Parsons Npower Ltd, Npower Direct Ltd, Npower Yorkshire Ltd	✔		P74 **Does this Modification Proposal effect your organisation regarding costs and timescales?** YES **Rationale for the costs and timescales** Impact on SONET – Option 1 - No Cost Impact on SONET - Option 2 - £12,000 **Do you agree with the change?** YES P78 **Does this Modification Proposal effect your organisation regarding costs and timescales?** YES **Rationale for the costs and timescales** Impact on SONET - £18,000 Impact on SONET (P78 alternative) - £12,000 **Do you agree with the change?** YES

Dave Morton SEEBOARD Energy Limited		✔	P74 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes, although only option 2 has a cost, approximately £2,000 and a lead in time of between 3-6 months. **Rationale for the costs and timescales** Details in one are for software development and timescales are due to problems with matching a development cycle and give potential best and worst case scenarios depending upon decision made for this change. **Do you agree with the change?** No, we still do not believe that this change, in either option, is an appropriate method of handling this problem. P78 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes, and in both cases this will require software changes with an implementation notice required of between 3-6 months. Cost for original P78 are around £6,750 and for alternative £4,500. **Rationale for the costs and timescales** Details in one are for software development and timescales are due to problems with matching a development cycle and give potential best and worst case scenarios depending upon decision made for this change. **Do you agree with the change?** Only with original version of this change, even though it is most expensive option. We have always considered this as most appropriate solution to this issue. We do not agree with alternative.

Geoff Allen Powergen UK plc.			P74 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes **Rationale for the costs and timescales** Option 1 has minimal impact on Powergen's systems and processes, and therefore could be implemented with minimum disruption. Option 2 would appear to require a change to the SAA_I014 sub-flows 1, 2 &3. Work to enable these revised flows to be properly received, and the data extracted and imported into our internal systems would be necessary. Initial indicative costs associated with the design, development, testing and implementation of the required changes are estimated to be £25k., with a minimum lead time of 3 months. **Do you agree with the change?** This response considers the impact on Powergen's systems of the proposed changes. Powergen will be making comment on its support or otherwise of the proposed modification through the normal processes. The above information should not be considered as support by Powergen for the proposed changes, it is provided solely to enable ELEXON to understand the implications on Powergen's systems if the proposed changes were to be made. P78 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes **Rationale for the costs and timescales** This Modification proposal would appear to require, for either of the Options presented, a change to the structure of the SAA-I014 sub-flow 1, 2 & 3 files. Accordingly work would be required on Powergen's hub to enable these files to be properly received, and the data extracted to our systems as necessary. Initial indicative costs associated with the design, development, testing and implementation of the required changes are estimated to be £25k., with a minimum lead time of 3 months. **Do you agree with the change?** This response considers the impact on Powergen's systems of the proposed changes. Powergen will be making comment on its support or otherwise of the proposed modification through the normal processes. The above information should not be considered as support by Powergen for the proposed changes, it is provided solely to enable ELEXON to understand the implications on Powergen's systems if the proposed changes were to be made.

Clare Talbot National Grid	✔(P78)	✔(P74)	**P74** **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes. We note that there would be associated changes to our BSAD processes and Methodology Statement to facilitate the implementation of the alternative to this modification. This consultation will be started once the Assessment stage has been completed successfully. As a recipient of the SAA-IO14 flow our processes will have to be amended to read the new version. We support the recommendation of the modification group to seek a change over period when both versions are available. We have not identified any impact to our Grid Code or CUSC processes. **Rationale for the costs and timescales** P74 Option 1, a cost of £62.5k internal cost estimate. P74 Option 2, a cost of £100k internal cost estimate. 3 – 6 months notice to implement depending on other commitments. **Do you agree with the change?** No **Other comments:** The issue of correctly deriving a prompt indication of market length was brought to our attention after this DLIA was issued and we intend to confirm our initial thoughts at the next PIMG meeting. However, this issue will require a full impact assessment by National Grid, which we hope to complete before the end of the report stage of the modification process. **P78** **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes We note that there would be associated changes to our BSAD processes and Methodology Statement to facilitate the implementation of this modification. This consultation will be started once the Assessment stage has been completed successfully. As a recipient of the SAA-IO14 flow our processes will have to be amended to read the new version. We support the recommendation of the modification group to seek a change over period when both versions are available. We have not identified any impact to our Grid Code or CUSC processes. **Rationale for the costs and timescales** P78 option 1, £111.5k internal cost estimate. P78 option 2, £145k internal cost estimate. 3 – 6 months notice to implement depending on other commitments. **Do you agree with the change?** Yes **Other comments:** The issue of correctly deriving a prompt indication of market length was brought to our attention after this DLIA was issued and we intend to confirm our initial thoughts at the next PIMG meeting. However, this issue will require a full impact assessment by National Grid, which we hope to complete before the end of the report stage of the modification process.

Paul Mott London Electricity		✔	**P74** **Does this Modification Proposal effect your organisation regarding costs and timescales?** This modification proposal does not affect our organisation with respect to costs. However, we would like 6 weeks notice of implementation. **Rationale for the costs and timescales** No systems changes are required but the change would have a significant commercial effect. The 6 week notice period would allow our organisation to prepare for the commercial impact of implementation. **Do you agree with the change?** No. **Other comments:** Our comments would be the same for P74 Alternative. **P78** **Does this Modification Proposal effect your organisation regarding costs and timescales?** This modification proposal does not affect our organisation with respect to costs. However, we would like 6 weeks notice of implementation. **Rationale for the costs and timescales** No systems changes are required but the change would have a significant commercial effect. The 6 week notice period would allow our organisation to prepare for the commercial impact of implementation. **Do you agree with the change?** No **Other comments:** Our comments under 1 and 2 would be the same for P78 Alternative. With respect to 3, we are more favourably inclined towards P78 Alternative than we are towards P78 Original.
Rachael Gardener Aquila Networks			No comment.
Roger Grew Siemens			No impact.
Chris Ridgway InterGen	✔		**P74** **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes **Rationale for the costs and timescales** Operational changes – minimal costs **Do you agree with the change?** Yes **P78** **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes **Rationale for the costs and timescales** Operational changes – minimal costs **Do you agree with the change?** Yes

Sarah Ames TXU			Impact – Yes, please see attached Logica response.  Impact Analysis CPC196 I1.0.doc
Sue Macklin Scottish and Southern	✔(P78)	✔(P74)	P74 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes. For Option 2 we would require a minimum of four months for implementation. No impact for Option 1. **Rationale for the costs and timescales.** Option 2 requires changes to our IT systems. **Do you agree with the change?** No. This Modification is likely to provide windfall gains which do not reflect the cost of imbalance energy and leave this cost with the same participants who are paying for the net imbalance. It therefore does not help to achieve this objective of the BSC. P78 **Does this Modification Proposal effect your organisation regarding costs and timescales?** Yes. For either option we would require a minimum of 4 months for implementation **Rationale for the costs and timescales.** Changes to IT systems **Do you agree with the change?** Yes. This Modification is likely to target energy imbalance costs at those who cause that imbalance and therefore better satisfies that objective of the BSC.

c Second Consultation Responses

Pending receipt

ANNEX 3 – BSC AGENT IMPACT ASSESSMENTS

NETA Change Form	**MP/CP/TP No:** MP78
	Logica reference: ICR391
Title: Revised Definitions of System Buy Price and System Sell Price	
Identified by: National Grid	**Date received:** 24-Jun-2002

Statement of requirement
Baseline affected: NETA Service Definition Baseline (V1.0)
Assumed changes over baseline: None
Description of Change: See Modification P78: 'Revised Definitions of System Buy Price and System Sell Price' Requirements Specification v1.0 (Ref P078AS10.doc). See also attached original MP78.
Proposed solution: See Modification P78: 'Revised Definitions of System Buy Price and System Sell Price' Requirements Specification v1.0 (Ref P078AS10.doc). This specifies two separate options to be assessed, which are referred to in this assessment as "Option 1" (original option) and "Option 2" (alternative option).
Justification for Change: See Modification P78: 'Revised Definitions of System Buy Price and System Sell Price' Requirements Specification v1.0 (Ref P078AS10.doc). See also attached original MP78.
Proposed changes to Service Levels: None.
Proposed changes to the Agreement: None.
Attachments/references: MP78.

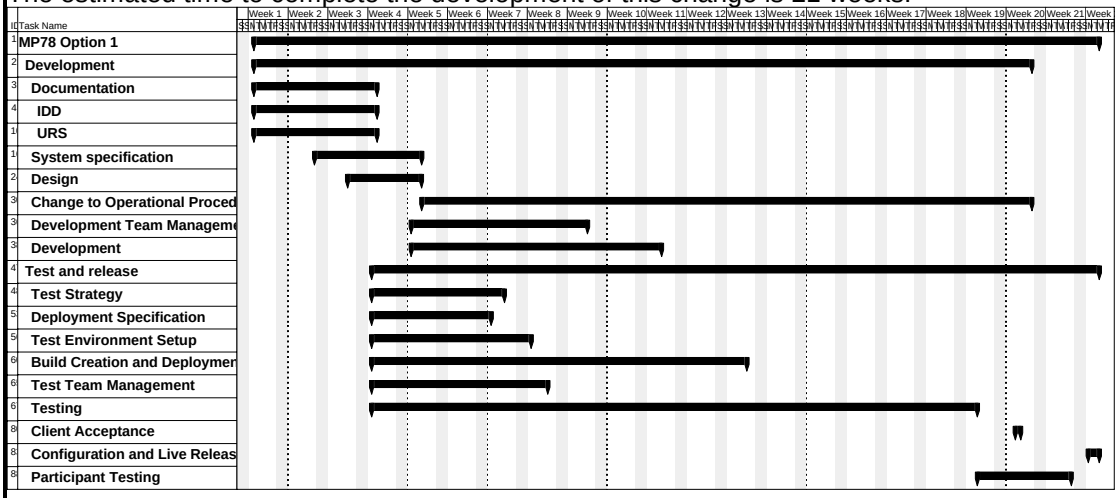
To be completed by Logica			
	High Level Impact Assessment	Detailed Level Impact Assessment	Quotation
Tick which stage is being completed:		✓	
Signed by Logica Contract Manager:			
Date:		05-Jul-2002	
HLIA category: Small/Medium/Large/Other		Price for DLIA:	
If this is a Quotation, are consequential modifications needed to the DLIA? Yes			

Logica's proposal
Logica's understanding of the requirement: This Modification Proposal seeks to amend the calculation of Energy Imbalance Prices such that Energy Imbalance Prices are reflective of the overall system imbalance.

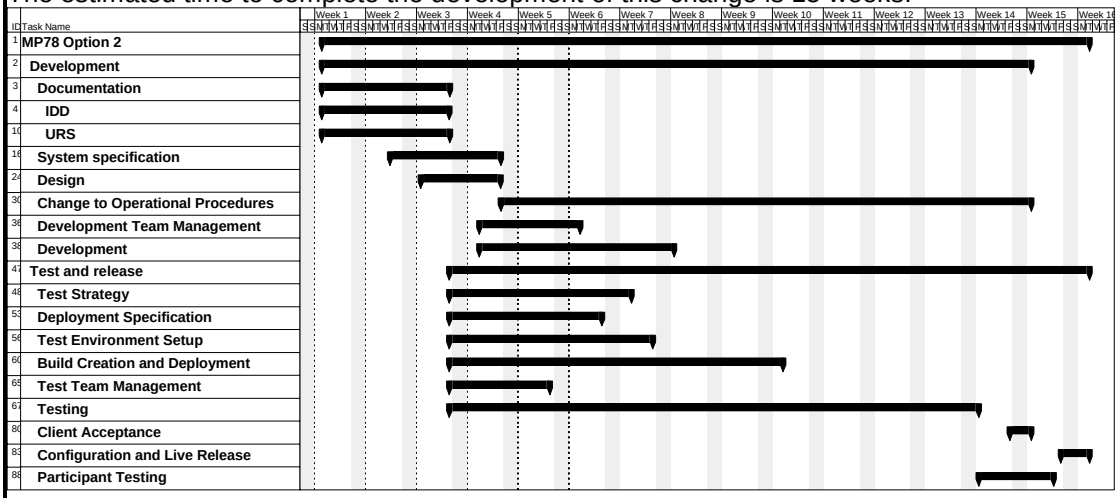
Logica's proposed design solution: See "Design Solutions" attached.
Consequential changes to Project Deliverables: See "Design Solutions" attached.
Consequential impact on BSC Service Users or Other Service Providers: None.
Testing strategy: Effort has been included for both participant testing and supporting ELEXON in witnessing tests.
Management plan for developing the Change:

Project plan for developing the Change:

The estimated time to complete the development of this change is 21 weeks.



The estimated time to complete the development of this change is 15 weeks.



Method of deployment:

Patch	Is a planned outage required? Yes

Price for Design and Build:

Item description:	Price (ex VAT)	Type of price:
Option 1 (original)	£614 500	Fixed
Option 2 (alternative)	£362 000	Fixed

Price for Operate and Maintain:

Item description:	Price per month (ex VAT)	Type of price:
Operate	£0	Fixed
Maintain – option 1 (original)	£7 169	Fixed
Maintain – option 2 (alternative)	£4 223	Fixed

If this is a DLIA or Quotation, is a price breakdown in the agreed format attached? Yes

Terms attaching to the offer

Validity period of offer: 30 days	**Type of offer:** Firm
Assumed start date:	

Payment milestones:
Logica will invoice 30% on receipt of Purchase Order or authorised start of work, 50% on completion of acceptance tests, 20% on deployment or one month after completion of acceptance tests, whichever is sooner.

Document turnaround time:
5 days

Impact on Service Levels:
None

Impact on performance of the System:

Other terms:

If this is a Quotation, is a draft contract amendment attached? Yes/No

Responsibilities of ELEXON:

- For all DCRs which are subject to review, Logica shall provide one draft issue and a maximum of 5 working days has been allowed for ELEXON to review and comment on the updates. Comments will be addressed and the final issue will be provided. A maximum of 2 working days has been allowed for review confirmation and signoff by ELEXON.
- Within reasonable levels, ELEXON will make available appropriate staff to assist Logica during the development of this change.

Assumptions made by Logica:

- Price is for a separate patch to be deployed after Release 2.
- Price and duration assume that this change is developed in isolation and the effects of other changes are excluded.
- Price excludes provision for indexation of daily rates from 1st April 2003.
- Price is for creating DCRs, not a formal documentation issue.
- Once deployed, the new SAA format will apply even when reporting for pre-NIV dates.
- It is assumed that "gross" BSAD values will be used. If net values are used, it is anticipated there will be some marginal cost savings.
- It is assumed that documentation/web pages/help text will have to be amended to reflect that BSAD is now "net".

Option 2 (alternative)

- Neither SAA nor BMRS will report which price was 'reverse'.
- Format of BMRA-Ixxx and SAA-Iyyy will be identical, both allowing 1-* periods. However, the BMRA flow will be expected for each period arriving before the end of the period to which it relates where the SAA flow will arrive daily (D+1) covering data for whole day(s). There is no need for this to be send no non-business days, but it could be.

Options and alternatives:

Design Solutions

P78 - Market Driven reverse price (Option 1 - original)

Document Changes

	BMRA	CDCA	CRA	ECVAA	SAA	TAA
URS	F004 I014 Ixxx				F009 I026 Iyyy	
SS	Yes				Yes	N/A
DS	Yes				Yes	N/A
MSS					Yes	N/A
OSM					Yes	

IDD	Part 1 document	TibCo (amend BSAD message); new market price message Csv (amend BSAD file format); new market price file SAA-I014
	Part 1 spreadsheet	S0141
	Part 2 document	BMRA-I014 SAA-I014 SAA-I026 SAA-Iyyy BMRA-Ixxx
	Part2 spreadsheet	B0141 S0142 S0143 S0261 Bxxx1 Syyy1

Software Changes

1. Amend SAA-I026 / BMRA-I014 to add 4 new BSAD figures.
2. Amend BMRA (web page, TibCo message, csv format) to report 4 new BSAD elements (affects latest BSAD only, the BSAD data reported alongside prices will only report Net values as only these are used by the calculation)
3. New loader to process BMRA-Ixxx market data sent for each period and SAA-Iyyy market data sent for each day
4. new BMRS web page to display market price information (with associated TibCo and csv formats)
5. New process to check for missing SAA-Iyyy (as per IA data)
6. Amend SAA-I014 to report new BSAD figures, NIV interim values and to report market price data
7. In SAA-F009/BMRA-F004
8. replace Trade Tagging with Net Imbalance Volume Tagging.
9. compare |TQAOj + BVAj| and |TQBOj + SVAj| to determine which is the reverse price.
10. New code to compute reverse price from market data
11. New code to compute default reverse price from bid/offer stack when no market data available
12. amend BMRS help text to reflect the change in derivation of SSP and SBP

P78 - Market Driven reverse price (Option 2 - alternative)

Document Changes

	BMRA	CDCA	CRA	ECVAA	SAA	TAA
URS	F004 I014 Ixxx				F009 I026 Iyyy	
SS	Yes				Yes	N/A
DS	Yes				Yes	N/A
MSS						N/A
OSM						

IDD	Part 1 document	TibCo (amend BSAD message) Csv (amend BSAD file format) SAA-I014
	Part 1 spreadsheet	S0141
	Part 2 document	BMRA-I014 SAA-I014 SAA-I026
	Part2 spreadsheet	B0141 S0142 S0143 S0261

Software Changes

1. Amend SAA-I026 / BMRA-I014 to add 4 new BSAD figures.
2. Amend SAA-I014 to report new BSAD figures and NIV interim values
3. Amend BMRA (web page, TibCo message, csv format) to report 4 new BSAD elements (affects latest BSAD only, the BSAD data reported alongside prices will only report Net values as only these are used by the calculation)
4. In SAA-F009/BMRA-F004
5. replace Trade Tagging with Net Imbalance Volume Tagging.
6. compare |TQAOj + BVAj| and |TQBOj + SVAj| to determine which is the reverse price.
7. New code to compute reverse price from bid/offer stack
8. amend BMRS help text to reflect the change in derivation of SSP and SBP

Detail of changes needed

Changes required	P74 option 1	P74 option 2	P78 option 1 (original)	P78 option 2 (alternative)
New calculation rule	*	*	*	*
BSAD now "gross": [ALTERNATIVE to "net"] web page changes *csv/TibCo (BSAD only, not prices)* *loader changes* *Changes to handle both 6 & 10 value files*		*	*	*
Net Imbalance Volume calculation New database table to hold interim values for reporting; Calculation change NB includes system parameter to determine whether to use new or old rule		*	*	*
S014 *BSAD extras(for gross)*		*	*	*
NIV extra values Note that where the old rules applies, these values will be reported as zero or null		*	*	*
Power Exchange prices Note that before change switched on, there will be no PX data so the new section of the report will simply not appear			*	
Market data Loader for new flow Database csv, TibCo, web page, web help Form to manually amend Manual flow for liquidity: Database Form			*	
Process to check for and chase missing data - operate impact (OSM) Process Manual flow to set liquidity threshold			*	

Text in *italics* indicates work NOT required if "net" BSAD option is taken. It is assumed that documentation/web pages/help text will have to be amended to reflect that BSAD is now "net".

ANNEX 4 – BSCCO IMPACT ASSESSMENTS

Mod No.	P78	**Title:**	**Revised Definitions of System Buy Price and System Sell Price**		
Assessor Name	Alex Grieve	**Assessor Team**	BSC Systems Delivery Programme	**Date**	25 June02

Modification Summary: see mod, requirements specification and associated reports

Summary of solution(s): See P078AS: 2 Alternative solutions
Mod Proposal (1): High Business Risk (price calculation is within operational audit scope), High complexity (change to calculation) and High Impact (interface changes – from NGC & to Parties, new SP flow from Power Exchanges) – approx 30 Config Items impacted

Alternative (2): High Risk, High complexity, High Impact (interface changes – from NGC & to Parties) – approx 30 config items impacted.

Both Mod and alternative have similar scope. 1 has additional complexity as it introduces new flow each SP from Power exchanges. Both change BSAD and therefore interfaces from NGC to Logica and BSCCo; both change all variants of SAA I014

Product Affected Reference This should include:	**Target Issue**	**Cost of Embodying CP – Man Days**
• Impact on NETA Services; (review)		
◦ BMRA, SAA URS	**Decision + Logica dev timescale + 7 weeks min**	**21**
◦ IDD		
◦ BMRA, SAA SS (DS)		
◦ OSM		
• Code and Code Subsidiary Documents		**12**
◦ BSC section T (check for issues & incorporate)		
◦ BSC Section Q & X		
◦ BMRA, SAA Service Descriptions		
◦ NDFC		
◦ REP Cat		
◦ BSCP01 (1)		**3**
• Business definition documents (review)		
◦ BPM		
• Impact on flows (new/amended/deleted/BSC party impact); (manage party/NGC communications)		**10**
◦ SAA-I014		
◦ NGC-BMRA		**15**
◦ NGC-ELEXON		

• New flow from power exchanges every SP (1) • Impact on BSCCo systems/processes (review/manage) • TOMAS • MDM & Web site • Other • Regression testing • Participant testing		**15**
Additional Project documentation • Release plan (assume part of planned release) • Test Strategy (assume part of planned release • Business Requirements Solution • Participant Test Specification • Participant Test report • Deployment Plans (part of planned release)		2md 5md 5md 15 md 5 md
Additional Audit activities (PwC)?		6%
Somewhere between 200 (Alternative) and 300 (Proposed) md effort from project + audit costs		200 - 300 md,

Impact on other Systems[5] –
NGC BSAD methodology

Assumptions[1] –

1. Assumed part of a planned release and does not require a separate BRS, Test Strategy, Plan and deployment plan;
2. No additional analysis is required once Mod approved i.e the analysis in the requirements spec (ref P078AS) is correct and does not need revisiting.
3. Either solution is a pretty complex set of changes to the price calculation, so suggest some additional test scenarios based on live data and matching output with TOMAS.
4. (1) has added complexity of introducing a new half hourly flow from Power Exchanges
5. Implementation timescale needs to allow for adequate regression testing and participant testing – see previous assumption.
6. PTS will be available for structured testing in appropriate timescale

Issues and Risks[1] –

1. High Business Risk – this mod falls within the scope of the operational audit and within the materiality criteria. It is therefore high business risk. It is also at the top end of High complexity (complex changes to complex calculation) and high scope/impact (multiple changes to multiple existing flows, plus new flow from new source (1 only))

Related CPs[1]
P74

Comments[1]

Assume you have had impact assessments from NGC, TOMAS, MDM, web site for these changes
TIMESCALE –
Decision plus the logica development timescale + 4 weeks Min

BSCSDP IA for Mods in assessment	TARGET RELEASE				
Type	**Item**	**P74 A1**	**P74 A2**	**P78 1**	**P78 A2**
BSC	Section P				
BSC	Section Q		X	X	X
BSC	Section T	X	X	X	X
BSC	Section X Annex X-1				
BSC	Section X Annex X-2		X	X	X
BSC	Section X Annex X-3				
BSC Procedures 01	Settlement calendar			X	
BSC Procedures					
BSC Procedures					
Service Descriptions	SAA	X	X	X	X
Service Descriptions	BMRA	X	X	X	X
Service Descriptions	ECVAA				
Service Descriptions	CDCA				
Service Descriptions	TAA				
Service Descriptions	CRA				
Service Descriptions	FAA				
Business Definition Documents	NETA Data File Catalogue		X	X	X
Business Definition Documents	Interface Design Document - Logica - Part 1		X	X	X
Business Definition Documents	Interface Design Document - Logica - Part 2		X	X	X
Business Definition Documents	EPFAL IDD				
Business Definition Documents	Reporting Catalogue		X	X	X
URSs	BMRA	X	X	X	X
URSs	CDCA				
URSs	CRA				
URSs	ECVAA				
URSs	SAA	X	X	X	X
URSs	TAA				
URSs	FAA				
Software	CDCA				
Software	CRA				
Software	BMRA	X	X	X	X
Software	SAA	X	X	X	X
Software	ECVAA				
Software	FAA				
Other Docs	SAA Operating Procedures		X	X	X
Other Docs	CDCA Operating Procedures				
Other Docs	CRA Operating Procedures				
Other Docs	BMRA Operating Procedures		X	X	X

[5] This field is not mandatory

Other Docs	ECVAA Operating Procedures				
Other Docs	TAA Operating Procedures				
Other Docs	FAA operating Procedures				
Communication Req Document	Communication Req Document				
Business Process Model	Business Process Model	X	X	X	X
System Specification	BMRA	X	X	X	X
System Specification	CDCA				
System Specification	CRA				
System Specification	ECVAA				
System Specification	SAA	X	X	X	X
Design Specification	BMRA	X	X	X	X
Design Specification	CRA				
Design Specification	CDCA				
Design Specification	ECVAA				
Design Specification	SAA	X	X	X	X
Manaul System Specification	CRA, SAA, ECVAA				
System/Design Spec	FAA				
Requirements Catalogue	TOMAS	X	X	X	X
Design Documents	TOMAS	X	X	X	X
Software	TOMAS	X	X	X	X
LWI	TOMAS	X	X	X	X
Process/Pages	ELEXON Website	?	X	X	X
URS	ELEXON Website	?	X	X	X
Data/Content	ELEXON Website	?	X	X	X
Configuration	Gatekeeper		X	X	X
IT Operations Guide	IT Operations Guide		X	X	X
Software	MDM		X	X	X
Logica Testing Contract	Logica Testing Contract (Ref ?CN0122)				
Logica Test Scripts	Logica Test Scripts				
BSCCo manual procedures	LWIs				
Workarounds	W001				
Workarounds	W006				
Workarounds	W013				
External Dependency	NGC		X	X	X
Business Definition Documents	BMRA SAA Interface Specifications – NGC		X	X	X
Business Definition Documents	NGC ELEXON Interface Specification		X	X	X
	Count of Possible impact	19	33	34	33
	Count of X	16	33	34	33

ANNEX 5 – TRANSMISSION COMPANY ANALYSIS

See attached document:

MAR078_Annex 5a.doc

ANNEX 6 – PROPOSERS ANALYSIS

See attached document:

MAR078_Annex 6.doc

ANNEX 7 – SUPPORTING ANALYSIS

See attached documents:

MAR078_Annex 7a graphs 1 to 5.xls

MAR078_Annex 7b graphs 6 to 9.xls

MAR078_Annex 7c graphs 10 to 12.xls

MAR078_Annex 7d graphs 13 to 15.xls

ANNEX 8 – TERMS OF REFERENCE

See attached document:

MAR078_Annex 8

ANNEX 9 – REVERSE PRICE CONSIDERATIONS

Modification Proposal P78 requires that the reverse price to be applied to energy imbalances opposite to the Net Imbalance Volume be a market price. The following represents the preliminary discussions of the PIMG in relation to the market price (from its meeting of 8 May 2002).

The PIMG suggested that the most appropriate market based reverse price would be a price derived from power exchange trading. However, the PIMG identified a number of issues which would need to be addressed when defining any formulation of market price (it should be noted that these issues are dependent upon the definition / formulation of the market price and may not apply to certain formulations):

1. Ability for prompt price reporting;

2. Utilisation of an exchange-based price may enable parties to calculate the potential cash-out price prior to Gate Closure. If prices are 'known', then there is the potential for parties to make a decision as to whether to spill / top-up in the Balancing Mechanism, thus decreasing incentives to balance and consequently leading to volatility in the Balancing Mechanism;

3. Following on from the above point, if the market price is exchange based, and is 'known' or can be derived ahead of Gate Closure, then there is the potential for gaming by parties. Parties may be able to manipulate the prices by trading on the relevant exchanges amongst themselves / within organisations at volumes and prices that affect the market price. However, it is expected that FSA regulation would be able to prevent / address this issue;

4. An exchange-based price could be affected by periods of low trading activity, for example bank holidays and Christmas, where traded volumes are low, and associated prices may be volatile. Although the PIMG recognised that periods of very low / zero trading were quite rare, it was acknowledged that (volume triggered) default rules for such periods will have to be developed to ensure that a (reasonable) market price can be calculated for such periods, if necessary. Conversely, the PIMG suggested that if an exchange based price was utilised, this may have the effect of incentivising and therefore increasing trading outside of office hours;

5. Each power exchange effectively trades a different product, therefore any formulation of a market price should take this into consideration, for example, if a weighted average of trades across all exchanges is utilised to formulate the market price, each weighted average is for a different product and thus may create an inappropriate market price; and

6. If power exchange indices are utilised to formulate the market price, then there is potential for historical exchange prices to be incorporated and reflected in the current cash-out price, thus distorting the price from the current situation. Therefore the PIMG suggested that it may be appropriate to time constrain the information being utilised to formulate the market price. However, it was noted that this approach may potentially include fewer trades and may thus be open to manipulation by parties. However it was noted by the PIMG that the traded volume would be an important consideration when determining how to formulate the market price.

7. The index should be transparent, auditable and verifiable

The PIMG noted that placing a time constraint on the information utilised in the formulation of the market price may create a more cost-reflective price, on the basis that the market price, i.e. the 'get out of imbalance price', should reflect the cost of short-term power.

The PIMG noted that the French interconnector has an influence on the traded prices until 13:00 day ahead (which is the latest time that re-notifications on interconnector volumes are accepted), as the interconnector volumes are traded at a European arbitraged price, and this will have an affect on any market price formulated from this period. However, the PIMG acknowledged that this was largely irrelevant if the market price was based on short term trading.

The PIMG therefore agreed that in order to define the formulation of a market price, more information regarding liquidity, traded volume, volatility and information availability would be required. Therefore the PIMG tasked ELEXON with getting such information from the power exchanges. The PIMG also noted that some work on Modification P12 (reduction in Gate Closure to 1 hour) had been undertaken to look at the notifications received by the ECVAA for within day trading to get an idea of how much OTC ('over the counter') trading goes on within day. The PIMG suggested that this may be useful in determining the volumes traded close to real time, and therefore the relative liquidity of the exchanges and the relative depth of the market.

The PIMG noted that it could be possible to create an index specifically for the market price, rather than utilising existing indices. It was suggested that if a preferred market is set via utilisation of an index, then parties may set contracts on it and will change the index, and potentially change (and may invalidate) the basis on which the index was originally calculated. However, it was also suggested that if more volumes are traded through the preferred market, then it becomes more reflective of the market and more liquid.

It was suggested that if a specific exchange was utilised to formulate a market price, that this may have the effect of increasing trading through this exchange at the expense of others and may be considered to be anti-competitive. Conversely, if a number of exchanges are utilised, this may spread trading across the exchanges and cause split liquidity, which, it could be argued, reduces efficiency.

The Modification Proposal suggested, as a straw man, the Transmission Company variable Settlement Period Net Imbalance Reference Price (SPNIRP) which is an average of two exchange reference prices for a Settlement Period. The PIMG noted that if this approach were to be utilised, it should be a weighted average of the two exchanges, either calculated on a Settlement Period by Settlement Period basis according to traded volume, or periodically set as a fixed weighted average.

However, concerns were raised by some PIMG Members that using a weighted average could incentivise trading through the larger of the exchanges, creating a dominant exchange. Conversely it was argued that if SPNIRP were utilised as is, then trading would be split across the two exchanges causing split liquidity and reducing efficiency.

The PIMG noted that trading across exchanges is a commercial issue, and could be deemed to be out of scope of the PIMG, but it was suggested that consideration should be given to defining a set of rules that do not adversely affect exchanges unnecessarily.

The PIMG noted the direction from the Panel to consider a market price other than an exchange based, on the grounds that:

– There may be difficulty obtaining the relevant information from the exchanges; and

– The formulation of an exchange reference price can be amended by the exchange beyond the control of the BSC, thus amending the basis upon which Energy Imbalance is cashed-out.

The PIMG noted these concerns and believed them to be valid, but surmountable, issues. The PIMG suggested that if a sufficiently robust contractual controls were to be put in place with the relevant exchanges, requiring provision of homogenous information and / or notification of amendments to any

reference price calculation, that this may address these issues and make an exchange based price feasible.

However, the PIMG also agreed to look at a non exchange based formulation of market price. A number of possible options were discussed:

1. A weighted average of all of the reported reverse prices for a (rolling) predefined period, for example 30 days, prior to the Settlement Period. However, it was noted that this mechanism does not address the deficiencies highlighted in the Modification Proposal, as any volatility in previous Settlement Periods will be carried forward. Utilisation of prices for 'like' Settlement Periods was also considered, but it was felt that this carried with it the same issues as the rolling calculation. It was also noted that both formulations could potentially be calculated / derived by participants on an ex-ante basis, which, as discussed earlier, may reduce the incentive to balance to FPN / contract ahead, making the Balancing Mechanism more volatile;

2. A market price based on the first non-arbitraged Bid - Offer Acceptance in the main stack was considered, but on balance was discounted by the Proposer in favour of a market based definition, during the drafting of the Modification Proposal;

3. A market price based on the main price with a variable percentage spread added according to the length of the market. For example, in a long market the market price could be SSP + 10%, and in a short market, SBP - 10%. However, the Ofgem representative noted that this is not legally acceptable, as it could be considered to constitute a penalty for imbalance and therefore this option was discounted by the PIMG;

4. A market price based on the marginal costs of bringing electricity onto the system. It was noted that a similar mechanism is utilised in the gas market (based on the marginal costs of bringing gas onto the system (via auction) at Hornsea), however, the PIMG acknowledged that this would not be appropriate for the electricity market.

ANNEX 10 – ASSESSMENT CRITERIA

See attached document:

MAR078_Annex 10.doc