REQUIREMENTS SPECIFICATION
for Modification Proposal P137
Revised Calculation of System Buy Price and System Sell Price

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PURPOSE OF THIS DOCUMENT

The primary purpose of this document is to specify the Modification Group's requirements for the requisite change to BSC Central Service Agent, and other affected parties, functionality and associated documentation in sufficient detail to allow and Impact Assessment to be undertaken by all impacted parties.

For the purposes of this assessment, the reader should assume that the changes will be implemented as a standalone development project managed by BSCCo.

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SUMMARY OF IMPACTED PARTIES AND DOCUMENTS

The following parties/documents have been identified as being potentially impacted by Modification Proposal P137.

Parties		Party Agents		BSC Agents		Other Agents	
Suppliers	☒	Data Aggregators	☐	SAA	☒	SMRA	☐
Generators	☒	Data Collectors	☐	FAA	☐	Data Transmission Provider	☐
Licence Exemptable Generators	☒	Meter Operator Agents	☐	BMRA	☒		
Transmission Company	☒	ECVNA	☐	ECVAA	☐		
Interconnector	☐	MVRNA	☐	CDCA	☐		
Distribution System Operators	☐			TAA	☐		
				CRA	☐		
				Teleswitch Agent	☐		
				SVAA	☐		
				BSC Auditor	☐		
				Profile Administrator	☐		
				Certification Agent	☐		
				MIDP	☐		
				TFLA	☐		

Sections of the BSC	
A	☐
B	☐
C	☐
D	☐
E	☐
F	☐
G	☐
H	☐
J	☐
K	☐
L	☐
M	☐
N	☐
O	☐
P	☐
Q	☒
R	☐
S	☐
T	☒
U	☐
V	☐
W	☐
X	☒

Code Subsidiary Documents	
BSC Procedures	☐
Codes of Practice	☐
BSC Service Descriptions	☒
Service Lines	☐
Data Catalogues	☒
Communication Requirements Documents	☐
Reporting Catalogue	☒
MIDS	☐
Core Industry Documents	
Grid Code	☒
Supplemental Agreements	☒
Ancillary Services Agreements	☐
Master Registration Agreement	☐
Data Transfer Services Agreement	☐
British Grid Systems Agreement	☐
Use of Interconnector Agreement	☐
Settlement Agreement for Scotland	☐
Distribution Codes	☐
Distribution Use of System Agreements	☐
Distribution Connection Agreements	☐
BSCCo	
Internal Working Procedures	☒
TOMAS	☒
Other Documents	
Transmission Licence	☐

The following acronyms have been used in the above matrix:

Term		Term	
SAA	Settlement Administration Agent	SVAA	Supplier Volume Allocation Agent
FAA	Funds Administration Agent	MIDP	Market Index Data Provider
BMRA	Balancing Mechanism Reporting Agent	SMRA	Supplier Meter Registration Agent
ECVAA	Energy Contract Volume Aggregation Agent	MIDS	Market Index Definition Statement
CDCA	Central Data Collection Agent	TOMAS	Trading Operations Market Analysis System
TAA	Technical Assurance Agent	ECVNA	Energy Contract Volume Notification Agent
CRA	Central Registration Agent	MVRNA	Metered Volume Reallocation Agent

1 INTRODUCTION

1.1 Proposed Modification

1.1.1 Overview

Modification Proposal P137 'Revised Calculation of System Buy Price and System Sell Price' (P137) was raised by Barclays Bank on 1 August 2003. P137 seeks to amend the Energy Imbalance Price calculation such that the most expensive[1] Acceptance remaining in the Net Imbalance Volume (NIV) sets the 'main' Energy Imbalance Price (i.e. the Energy Imbalance Price applied to Energy Imbalances in the same direction as the system).

P137 also seeks to amend the mechanism for NIV Tagging by including disaggregated Balancing Services Adjustment Data (BSAD) into the NIV Tagging mechanism as if they were Bid – Offer Acceptances, so that 'acceptances' on individual BM Units, non BM Unit specific and forward energy trades are all identified separately, along with an indication of why the 'acceptance' was taken (for example reserve, system Pre Gate Closure BM Unit Transaction (PGBT) etc.).

Prior to NIV Tagging P137 includes two new tagging mechanisms.

The first is at BM Unit level, which seeks to exclude offsetting Bid and Offer 'acceptances' on the same BM Unit from the NIV Tagging mechanism, i.e. when the volume of Offer 'acceptances' exceed the volume of Bid 'acceptances' on a BM Unit, the lowest priced Offers would be removed up to the volume of the Bid acceptances (which would also be removed) and vice versa. The intent is to ensure that offsetting "undo" acceptance volumes on the same BM Unit do not contribute to the NIV tagging process.

The second is at energy BSAD (non BM Unit specific trades) level. The smaller of the total energy BSAD buy volume and the total energy BSAD sell volume is taken, and removed from the stack it is taken from, with an equivalent volume removed from the least expensive balancing actions (i.e. the bottom) of the other NIV stack prior to NIV Tagging. For example, the Energy BSAD sell volume exceeds the Energy BSAD buy volume. The Energy BSAD buy volume will be removed from the buy stack, and an equivalent volume will be tagged off the bottom of the sell stack.

NIV Tagging is then be undertaken to derive the NIV, and enable the marginal price to be derived.

P137 does not change the derivation of the 'reverse' Energy Imbalance (i.e. the Energy Imbalance Price applied to Energy Imbalances in the opposite direction to the system).

Figure 1 represents, at a high level, the price setting mechanism. The NIV Tagging mechanism derives the 'length' of the system by comparing the Accepted Offer (and BSAD purchase) volume with the Accepted Bid (and BSAD sales) volume. Where the Offer volume exceeds the Bid volume, then the Net Imbalance Volume is positive, and the system is considered to have been short (insufficient generation to meet demand) in that Settlement Period.

The current mechanism calculates a volume weighted average price from the Accepted Offers (and Energy BSAD (Balancing Services Adjustment Data) if present) remaining in the NIV (i.e. the volume 'left' when the Accepted Bid volume is netted off the Accepted Offer volume). The NIV represents the

[1] It should be noted that 'most expensive' should, in this context, be considered in relation to the benefit of the system. Regarding Offer Acceptances, Offers are bought by the system for an increase in energy, thus the 'most expensive' will be the Offer that cost the most to take, so in Figure 1 it will be the one priced at £50/MWh. Regarding Bids, since Bids are paid to the system by Parties for a reduction in energy, the most expensive Bid will be the one that pays the system the least, so in Figure 2 it will be the one priced at £5/MWh. A point to note is that a negative Bid price will be even more expensive to the system, as the system is paying (rather than being paid) to reduce energy.

volume associated with energy balancing the system. The system balancing actions are those that are netted off by NIV Tagging.

Where the Bid volume exceeds the Offer volume, then the NIV is negative, and the system is considered to have been long (generation exceeds demand) in that Settlement Period. This is shown in Figure 2 below.

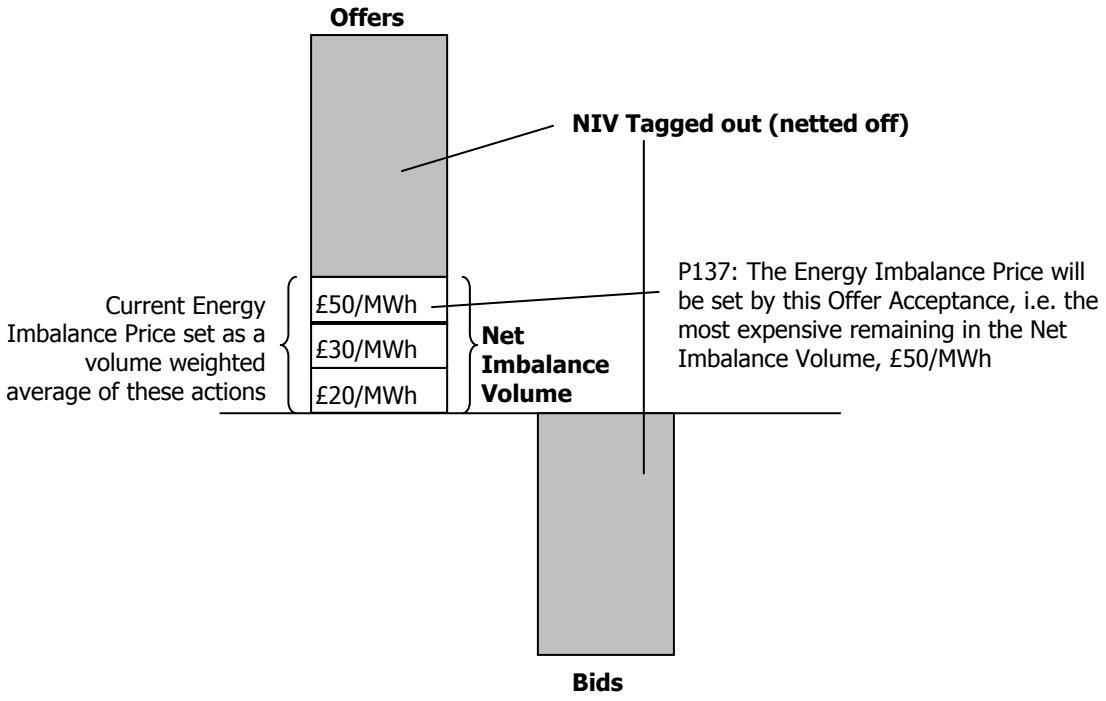

Figure 1: Positive Net Imbalance Volume

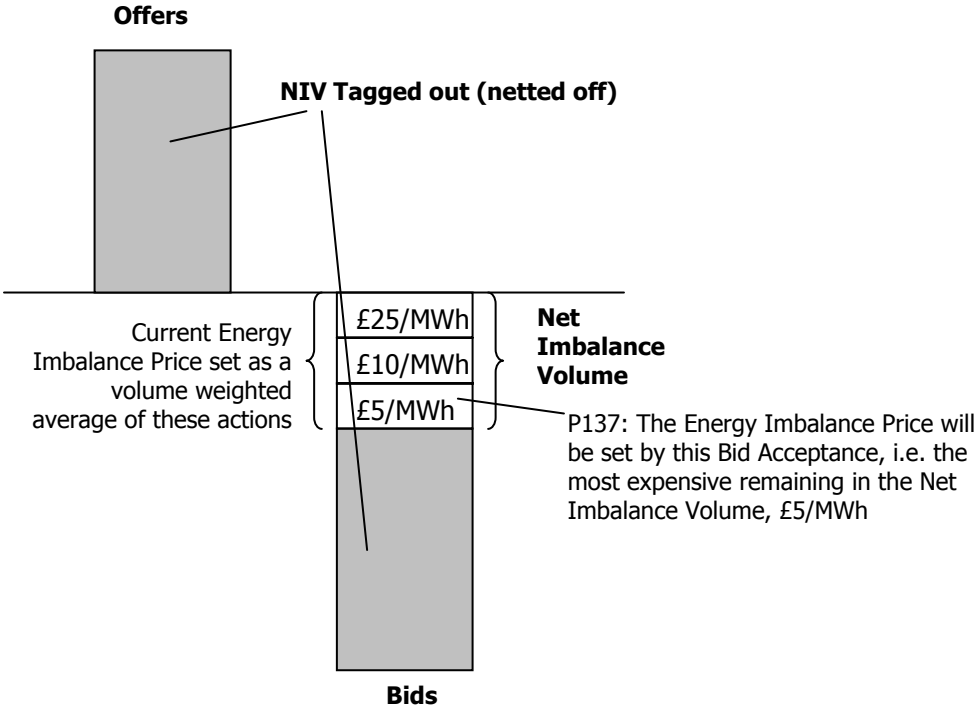

Figure 2: Negative Net Imbalance Volume

P137 proposes BSAD amendments, and although amendments to BSAD do not fall within the vires of the Code, the Transmission Company has indicated that the deliberations of the PSMG will inform a consultation on BSAD and therefore the amendments detailed within this document provide an indication of the types of amendments to BSAD that the PSMG would like to see in order to give effect to P136 and P137. It should be noted that the amendments to BSAD will be consulted on, as a separate exercise, by the Transmission Company at some point in the future, and therefore the BSAD amendments detailed in this document should not assumed to be definitive, and may change as a result of the outcome of the BSAD consultation.

1.1.2 Prompt Pricing

A marginal Energy Imbalance Price is more sensitive than a volume weighted average Energy Imbalance Price, to changes in BSAD and Bid – Offer Acceptance volumes / price through time.

Given that the BSAD volumes have the potential to change following the end of the Settlement Period, for example:

1. Frequency response volumes are not derived and reported until Settlement Day +2;
2. System BSAD has the potential to be adjusted post event for revision to the volume of System to System trades to account for transmission losses (a revision of approximately 1% of the volume of the trade); and
3. Any other amendment to BSAD that the Transmission Company becomes aware of.

Therefore a number of options are proposed in relation to the derivation of the main Energy Imbalance Price, noting that all of these options require submission of estimated BSAD by the Transmission Company in real time. It should also be noted that the reverse Energy Imbalance Price will continue to be calculated as currently defined, and therefore the following is limited to the derivation of the main Energy Imbalance Price only:

1. Calculate the Indicative Energy Imbalance Price at the end of the Settlement Period using BSAD estimates and Estimated Transmission Loss Multipliers (ETLMOs), revise the Indicative Energy Imbalance Price each time revised BSAD volumes are received from the Transmission Company up until the Interim Information Settlement Run. Thereafter SAA will derive the Energy Imbalance Price as per the latest set of information;
2. Calculate the Indicative Energy Imbalance Price at the end of the Settlement Period using BSAD estimates and Estimated Transmission Loss Multipliers (ETLMOs). Freeze the BSAD volumes and Bid – Offer Acceptance volumes and the associated prices, and use these for every Settlement Run for the Settlement Day, i.e. only TLMs change after the initial calculation of the Indicative Energy Imbalance Price on the BMRA; or
3. Calculate the Indicative Energy Imbalance Price at the end of the Settlement Period using BSAD estimates and Estimated Transmission Loss Multipliers (ETLMOs). Take the resulting Energy Imbalance Price and use it in every Settlement Run, i.e. no change to anything (including TLMs) after the initial calculation of the Indicative Energy Imbalance Price on the BMRA.

For the avoidance of doubt, for option 2 and 3, the volumes and prices used in the Energy Imbalance Price will not change over time. However, where there is a manifest error or Trading Dispute that affects the volumes and / or prices used in the Energy Imbalance Price, then the Energy Imbalance Price should be recalculated with the amendments agreed by the resolution to the manifest error / Trading Dispute.

1.1.3 Treatment of Option Fees

P137 requires specific treatment of option fees in the Energy Imbalance Price derivation mechanism, whereby an expected utilisation cost is derived by the Transmission Company and added into the Bid – Offer Acceptance price when the standing reserve is called off through the balancing mechanism (or using the equivalent mechanism for non Balancing Mechanism standing reserve delivery), as set out in section 3.2.1.2.

However, there is the potential for option fees not to form part of the solution to P137 (i.e. forming an Alternative Modification), therefore this is reflected in the relevant parts of this document.

1.2 Background and Scope

Modification Proposal P136 'Marginal Definition of the 'Main' Energy Imbalance Price' (P136) was raised by National Grid Transco on 1 August 2003.

Modification Proposal P137 'Revised Calculation of System Buy Price and System Sell Price' (P137) was raised by Barclays Bank on 1 August 2003.

Both Modification Proposals seek to amend the Energy Imbalance Price calculation to derive a marginal 'main' price, and thus both were submitted to a parallel three month Assessment Procedure by the Panel at its meeting of 14 August 2003. The assessment of P136 and P137 is being undertaken by the Pricing Issues Standing Modification Group (PSMG).

So far, the PSMG have met five times, 21 August 2003, 3, 12 and 23 September 2003 and 2 October 2003, and have held an initial consultation in respect of P137 (and P136).

1.3 Requirements Specification Overview

This specification of the process is a relatively high level view of the amendments required to support P137, as agreed by the PSMG at its meetings, and finalised on 2 October 2003. The PSMG agreed at this meeting that this specification of the process should provide the basis for the Requirements Specification of the changes required to implement P137.

The following summarises the solution to be implemented.

For P137, the amendments to BSAD are proposed to be:

- Option fees will be amended to derive an expected utilisation cost, which will be reflected in the Bid – Offer acceptance price, or BSAD price for volumes instructed under the relevant contract; and
- Disaggregated energy BSAD, such that each 'trade' is provided as a volume with a price. Thus there will be a volume and a price notified for each of the following:
  - Energy Pre Gate Closure BM Unit Transactions (PGBTs), BM Unit specific;
  - Energy forward trades; and
  - Non Balancing Mechanism standing reserve.

In summary the P137 mechanism is:

- CADL and De Minimis Tagging is undertaken, as currently defined;
- All balancing actions – Bid – Offer Acceptances, disaggregated Energy BSAD buys and sells, and net aggregated System BSAD are stacked in price order, least expensive first;

- BM Unit undo tagging is performed to 'net off' balancing actions taken in opposite directions taken on the same BM Unit. The expected utilisation cost is added to the Bid – Offer price of Bid – Offer Acceptances made under standing reserve contracts, for the purposes of this undo tagging;
- Arbitrage Tagging is performed, which removes an equal and opposite volume from both the sell stack and the buy stack to remove balancing actions where the Offer / buy Price is less than the Bid / sell price for the balancing actions, noting that expected utilisation costs are not reflected in the Bid – Offer Acceptance prices for the purposes of Arbitrage;
- **Where the expected utilisation cost is to be applied** (noting section 1.1.3), the expected utilisation cost is then added back onto to the Bid – Offer price of Bid – Offer Acceptances made under standing reserve contracts, and the stacks are re-ordered, if required to maintain price ordering. (**Where the expected utilisation cost is not to be applied**, then the NIV stacks are compiled using the Bid – Offer Acceptance price, as taken by the Transmission Company);
- Energy BSAD offsetting tagging is performed, which takes the smaller of the total energy BSAD buy volume and the total energy BSAD sell volume, and takes an equivalent volume from the least expensive balancing actions (i.e. the bottom) of the relevant NIV stack prior to NIV Tagging;
- NIV Tagging, as currently defined, is undertaken; and
- The main Energy Imbalance Price will then be the most expensive energy balancing action remaining in the NIV.

However, there are a number of variations being considered by the PSMG, and these are explored in section 2.

2 DESCRIPTION OF THE PROPOSED MECHANISM

2.1 Basic Solution for P137

The mechanism for P137 will be as follows:

The following balancing actions are taken by the Transmission Company and volumes are derived / calculated / instructed, as relevant:

1. System BSAD (SBVA / SSVA) will not be disaggregated, and will continue to be provided for each Settlement Period as a net volume without any associated price;
2. Energy BSAD will be disaggregated, and for each energy trade, a volume (MWh), price (£/MWh) and BM Unit Id will be provided. Where there is no associated BM Unit, then no Id will be provided. For example, power exchange forward trades will not have a BM Unit Id, whereas (energy) Pre Gate Closure BM Unit Transactions (PGBTs) will have a BM Unit Id associated.
3. Bid – Offer Acceptances are taken in the same way as currently.

All of these balancing actions are notified to the BSC Central Service Agent.

The BSC Central Service Agent (BMRA or SAA, depending on the timescales – BMRA real time, and SAA for Settlement Runs) will, for each Settlement Period:

1. 'CADL' tag the Bid – Offer Acceptances. This results in:
    - A set of Priced Acceptances, i.e. non CADL BOAs, deemed to have been taken for energy purposes, pending NIV Tagging; and
    - A set of Unpriced Acceptances, i.e. CADL'ed BOAs, deemed to have been taken for system purposes, and used only in the derivation of the NIV;

2. De Minimis tag the Bid – Offer Acceptances, resulting in the removal of small (<1MWh), 'unreal' acceptances;

3. BM Unit Undo tagging (see below);

4. Arbitrage tag all balancing actions, resulting in the removal of an equal and opposite volume from both the sell stack and the buy stack to remove balancing actions where the Offer / buy Price is less than the Bid / sell price for the balancing actions;

   It should be noted that Bid – Offer Acceptances are arbitraged according to the Bid – Offer price accepted by the Transmission Company, i.e. before any expected utilisation cost is applied.

5. For the remaining (Period) Bid – Offer Acceptances, use the expected utilisation cost 'look up table', provided by the Transmission Company to determine whether there are any expected utilisation costs to be reflected in the Bid – Offer prices for affected BM Units. Where a BM Unit has an expected utilisation cost (EUC), then the £/MWh Bid – Offer Price will be adjusted to include the EUC (which is also a £/MWh value), for all acceptances on the BM Unit, as specified by the look up table; and

6. BSAD Offsetting tagging (see below).

The remaining balancing actions go forward to NIV Tagging, undertaken as currently, and therefore not explored further. The main Energy Imbalance Price will then be the most expensive action remaining in the NIV.

2.1.1 BM Unit Undo Tagging

In accordance with the processing order set out above, **for each BM Unit**, the BSC Central Service Agent will:

1. Stack all the acceptances (BOAs and energy BSAD trades) for the BM Unit to determine any undo volumes, offer and equivalent volumes, on one stack (the buy volume), and bid and equivalent volumes on the other (the sell volume);

2. The BM Unit stacks are compiled using the Bid – Offer Acceptance price, adjusted for the expected utilisation cost;

3. Where the buy volume exceeds the sell volume, then the least expensive[2] priced buy balancing actions are removed up to the sell volume; or

4. Where the sell volume exceeds the buy volume, then the least expensive priced sell balancing actions are removed up to the buy volume;

5. The remaining acceptances go forward to the NIV Tagging process.

For the avoidance of doubt, where there are no offsetting actions on a specific BM Unit, then all actions on that BM Unit will go forward to the Energy Imbalance Price calculation.

For example:

BM Unit A has a PGBT sale taken for energy purposes ahead of Gate Closure. During the Settlement Period Offers are accepted at different prices. At the end of the Settlement Period, and following CADL and De Minimis tagging, the offsetting actions are stacked for undo tagging.

[2] Least expensive, in this context, is in respect of the expense to the system. In the case of buy balancing actions (including Offers), the least expensive are those that have cost the system the least to buy (i.e. the lowest positive price (and if present, the highest negative price). In the case of sell balancing actions (including Bids), the least expensive are those that have bought the system in the most money (the highest positive price), or, where there are no positively priced sell balancing actions, the actions that the system has had to pay least for where the price is negative (the lowest negative price is the least expensive).

The acceptances are stacked in price order.

The volume of the sell stack is tagged off the buy stack, least expensive acceptances first.

The balancing actions, or part of, remaining on the offer stack go forward to the NIV calculation, so in this example, illustrated by figure 4, it will be the Offer volumes at £100 / MWh and £110 / MWh.

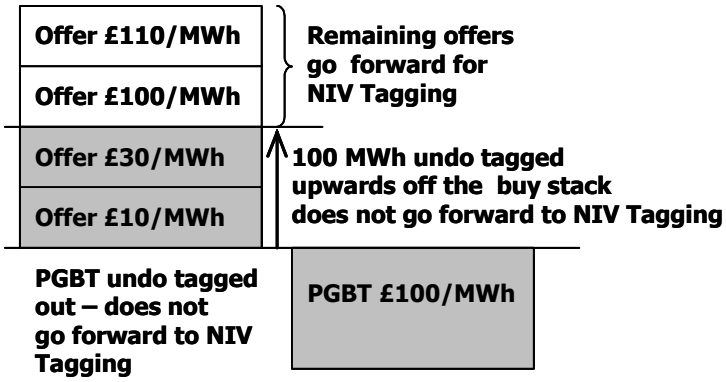

Figure 4: Buy Volume exceeds Sell Volume

For example:

BM Unit B has a PGBT sale taken for energy purposes ahead of Gate Closure. During the Settlement Period a Bid (negatively priced) and Offers are accepted at different prices. At the end of the Settlement Period, and following CADL and De Minimis tagging, the actions are stacked for undo tagging.

The acceptances are stacked in price order and the volume of the buy stack is tagged off the sell stack, least expensive acceptances first.

The balancing actions, or part of, remaining on the offer stack go forward to the NIV calculation, so in this example, illustrated by figure 5, it will be the Bid volume at -£10 / MWh and the untagged portion of the PGBT at £100 / MWh.

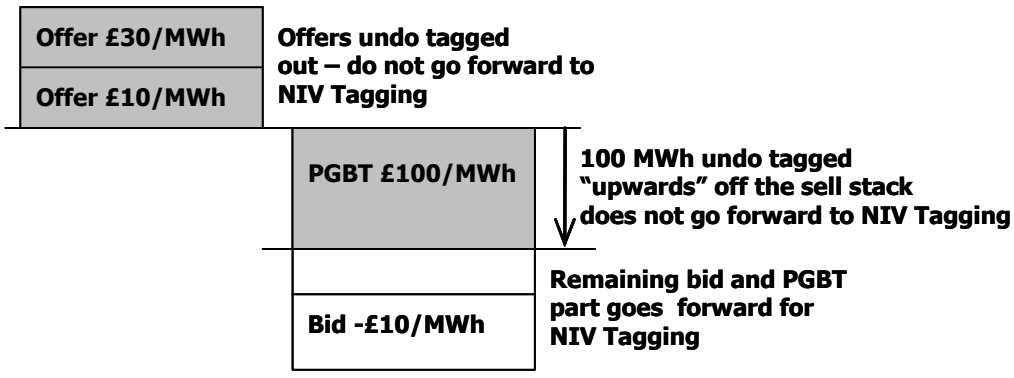

Figure 5: Sell Volume exceeds Buy Volume

2.1.2 BSAD Offsetting Tagging

In accordance with the processing order set out above, the BSC Central Service Agent will derive the total volume of energy BSAD buys (sum of all EBVA volumes) and the total volume of energy sells (sum of all ESVA volumes).

Where the BSAD energy buy volume is greater than the energy BSAD sell volume, the BSC Central Service Agent will compile the buy stack (as if it were for NIV Tagging) and will tag the buy stack, least expensive actions first, to the total volume of energy sells, illustrated in figure 7.

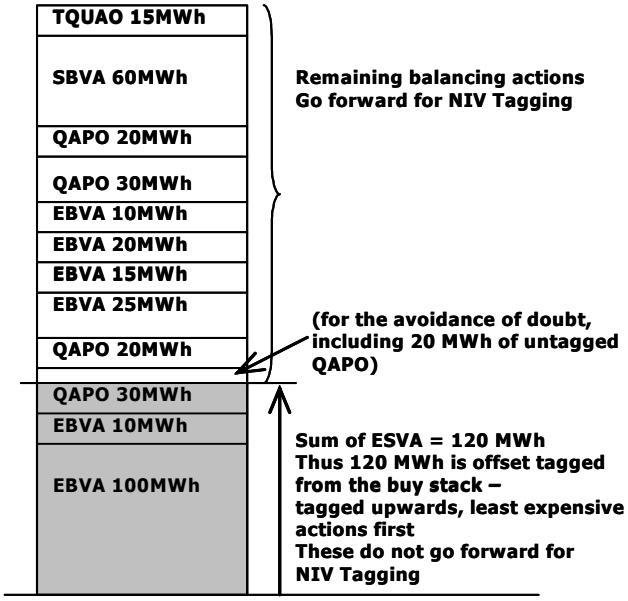

Figure 7: Offset Tagging for BSAD Forward Trades, buys greater than sells

Where the BSAD energy sell volume is greater than the energy BSAD buy volume, the BSC Central Service Agent will compile the sell stack (as if it were for NIV Tagging) and will tag the sell stack, least expensive actions first, to the total volume of energy buys, illustrated in figure 8.

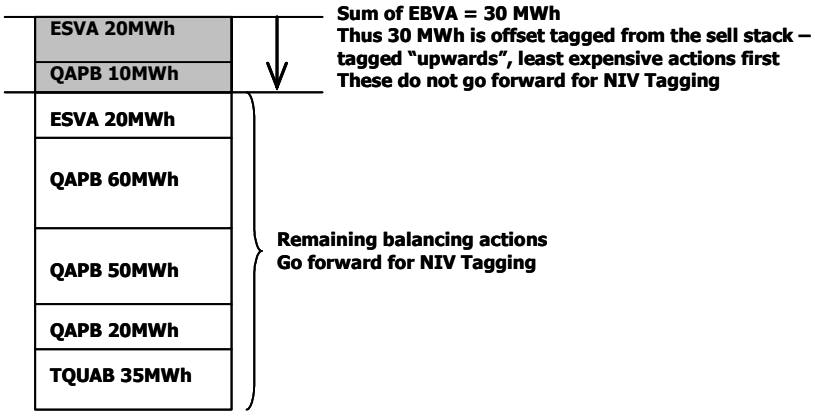

Figure 8: Offset Tagging for BSAD Forward Trades, sells greater than buys

Once all of the processing set out above completes, the remaining balancing actions can go forward to NIV Tagging, undertaken as currently (noting the reflection, or not (section 1.1.3) of the expected utilisation cost in the relevant Bid – Offer Acceptances when compiling the buy and sell stacks), and therefore not explored further. The main Energy Imbalance Price will then be the most expensive action remaining in the NIV.

Where the most expensive action remaining in the NIV is 'known' system balancing (i.e. system BSAD, system balancing services or CADL'ed acceptances), then **the most expensive energy balancing action in the NIV will set the marginal System Buy Price**.

2.2 Variations on the Basic Solution for P137

Section 2.1 explores the mechanism required by the Modification Proposal for P137. However, the PSMG are exploring other options (that potentially may eventually form an Alternative to P137). It should be noted that sections 1.1.2 and 1.1.3 cover (some of) the issues that the variations seek to address. The potential variations to the mechanism (the P137 mechanism) set out in section 2.1 are:

1. P137 mechanism, with:
    a. BMRA recalculating the Indicative Energy Imbalance Price on receipt of new / amended data until the Interim Information Run, and then with each Settlement Run using the latest data; or
    b. The Bid – Offer Acceptance volumes and prices, and BSAD volumes and prices as used by the BMRA for the Indicative Energy Imbalance Price calculation at the end of the Settlement Period frozen for use in each Settlement Run (i.e. only TLMs change the Energy Imbalance Price after the initial BMRA derivation); or
    c. The price derived from the BMRA Indicative Energy Imbalance Price calculation at the end of the Settlement Period frozen for use in each Settlement Run (i.e. nothing changes the Energy Imbalance Price after the initial BMRA derivation).
2. P137 mechanism without application of expected utilisation costs (i.e. no reflection of option fees in the Bid – Offer Acceptance price, and no requirement to publish the expected utilisation costs), with:
    a. BMRA recalculating the Indicative Energy Imbalance Price on receipt of new / amended data until the Interim Information Run, and then with each Settlement Run using the latest data; or
    b. The Bid – Offer Acceptance volumes and prices, and BSAD volumes and prices as used by the BMRA for the Indicative Energy Imbalance Price calculation at the end of the Settlement Period frozen for use in each Settlement Run (i.e. only TLMs change the Energy Imbalance Price after the initial BMRA derivation); or
    c. The price derived from the BMRA Indicative Energy Imbalance Price calculation at the end of the Settlement Period frozen for use in each Settlement Run (i.e. nothing changes the Energy Imbalance Price after the initial BMRA derivation).
3. P137 mechanism with a price cap, i.e. the Energy Imbalance Price is derived using the P137 mechanism, and if it exceeds a pre defined price, then it is capped to that price;
4. P137 mechanism without application of expected utilisation costs (i.e. no reflection of option fees in the Bid – Offer Acceptance price, and no requirement to publish the expected utilisation costs), with a price cap, i.e. the Energy Imbalance Price is derived using the P137 mechanism, and if it exceeds a pre defined price, then it is capped to that price; and

5. Any of the above with amendment to the Settlement Report (SAA – I014) to indicate, against each Bid – Offer Acceptance / BSAD balancing action, what tagging has been applied, if any, to the balancing action / acceptance.

3 POTENTIAL CHANGES TO EXTERNAL SYSTEMS

3.1 BSC Parties

The introduction of P137 has an impact on the systems and processes of BSC Parties.

This is believed to be the extent of the impact on external systems at this time.

BSC Parties that verify the Settlement calculations will be impacted by the amendments to the way in which the main Energy Imbalance Price (i.e. the price applied to imbalances in the same direction as the system) is calculated.

BSC Parties will also be impacted by the amendments to BMRA (as specified in section 4.1), including amendment to TIBCO messages.

Furthermore, amendments to the Settlement Report will impact Parties receiving the report.

3.2 Transmission Company

The implementation of P137 will impact the Transmission Company.

Where the Settlement Report (SAA – I014, sub flow 2) is amended to report new data items, then the Transmission Company is impacted by such amendment to the Settlement Report.

The Transmission Company is also impacted by the amendments to the way in which Balancing Services Adjustment Data (BSAD) is derived and then reported. This will impact:

- Transmission Company systems and processes;
- The Balancing Services Adjustment Data Methodology Statement (currently at issue 2.1, dated 11 March 2002[3]); and
- The 'BMRA and SAA Interface Specification' (reference IS/24.12.0001, Issue 9, 27 November 2002).

The following details the requirements of P137, noting that the BSAD amendments proposed to support P137 have NOT been consulted on and have NOT been approved by the Authority.

It should be noted that the proposed BSAD amendments fall outside the vires of the Code, however, the Transmission Company has indicated that the deliberations of the PSMG will inform a consultation on BSAD and therefore the amendments detailed within this document provide an indication of the types of amendments to BSAD that are required to give effect to P137. It should be noted that the amendments to BSAD will be consulted on, as a separate exercise, by the Transmission Company at some point in the future, and therefore the BSAD amendments detailed in this document should not assumed to be definitive, and may change as a result of the outcome of the BSAD consultation.

[3] Noting that on 26 September 2003 the Authority approved amendments to the BSAD Methodology Statement (in relation to the derivation of Option fees) effective from 24 October 2003.

3.2.1 BSAD Derivation

Currently BSAD is derived in accordance with the BSAD Methodology Statement. Eight data items are reported to the BSC Central Systems, as follows:

1. Net Buy Price Volume Adjustment (System) ($SBVA_j$) (MWh);
2. Net Sell Price Volume Adjustment (System) ($SSVA_j$) (MWh);
3. Net Buy Price Volume Adjustment (Energy) ($EBVA_j$) (MWh);
4. Net Sell Price Volume Adjustment (Energy) ($ESVA_j$) (MWh);
5. Net Buy Price Cost Adjustment (Energy) ($EBCA_j$) (£);
6. Net Sell Price Cost Adjustment (Energy) ($ESCA_j$) (£);
7. Buy Price Price Adjustment (BPA_j) (£); and
8. Sell Price Price Adjustment (SPA_j) (£).

Thus for each Settlement Period, the Transmission Company derives the option fee apportionment, reported as the Price Price Adjustments, the net volume (no associated price) of system BSAD trades, and the net volume (with an associated price) for the energy BSAD trades and notifies these to the BSC Central Service Agent (BMRA and SAA).

The notification occurs at 17:00 day ahead (for all Settlement Periods in the following Settlement Day), and then for each Settlement Period, as soon as practicable following Gate Closure, but by no later than the end of the Settlement Period.

For P137 it is proposed that, for non firm BSAD volumes (for example frequency response and non Balancing Mechanism delivered standing reserve) the Transmission Company will provide an estimate of the volumes to be delivered in the Settlement Period, such that the volumes can be notified, and used in the BMRA Indicative Energy Imbalance Price calculation in real time.

These estimates can be revised after real time, and depending on the mechanism used (see section 1.1.2), may or may not be used in subsequent Settlement Runs to derive the Energy Imbalance Price. However, revised values will be published in order to allow monitoring of the accuracy of the estimation.

BSAD can, where it changes, be amended and notified by the Transmission Company up until the Final Reconciliation Settlement Run.

The current BSAD report is provided below for information, where it can be seen that BSAD is currently reported as a 'flat list' of data.

NGC32	**F**							**NETBSAD-Cost & price Adjustment**
NGG32	R	1	G					**NETBSAD**
N0290	D			1			varchar2(8)	Data Type
N0340	D			1			text(10)	Sett Date
N0201	D			1			integer(2)	Settlement Period
N0419	D			1			decimal(10,2)	Net Energy Buy-Price Cost Adjustment
N0417	D			1			decimal(10,3)	Net Energy Buy-Price Volume Adjustment
N0415	D			1			decimal(10,3)	Net System Buy-Price Volume Adjustment
N0372	D			1			decimal(10,2)	Buy-Price Price Adjust
N0420	D			1			decimal(10,2)	Net Energy Sell-Price Cost Adjustment

N0418	D			1			decimal(10,3)	Net Energy Sell-Price Volume Adjustment
N0416	D			1			decimal(10,3)	Net System Sell-Price Volume Adjustment
N0371	D			1			decimal(10,2)	Sell-Price Price Adjust

3.2.1.1 System BSAD Derivation and Reporting

P137 implicitly requires that the system BSAD derivation be amended to include additional volumes (i.e. volumes that are not included in the system BSAD under the current derivation) deemed to be associated with system balancing. These volumes are delivered in the form of Frequency Response, and it is proposed that the system BSAD derivation be amended to include such volumes, noting that a net system BSAD volume will still be derived and reported, as follows:

1. Net Buy Price Volume Adjustment (System) ($SBVA_j$) (MWh);
2. Net Sell Price Volume Adjustment (System) ($SSVA_j$) (MWh);

3.2.1.2 Price Price Adjustment Derivation and Reporting

This section details the treatment of option fees, where option fees are to be used in the derivation of the Energy Imbalance Price under P137. Where this is not to be the case, then this section can be disregarded (see section 1.1.3).

(a) Background

P137 requires amendment to the way in which option fees are used in the Energy Imbalance Price calculation. Currently the option fees are provided as a Price adjuster which is added to the volume weighted average price derived from balancing actions remaining in the NIV.

The contribution to BSAD of standing reserve option payments is currently calculated with reference to the total option payment for a Settlement Period and the total contracted capability, effectively allocating the overall cost of the option fees into the Settlement Periods for which the service is available.

P137 seeks to amend this such that option fees are targeted at those Settlement Periods for which the standing reserve is actually used ('called off'). It seeks to do this by deriving an expected utilisation cost for the standing reserve ahead of use, which is then added to the price of the instruction when the service is called off.

It is envisaged that the expected utilisation cost be derived by the Transmission Company based on an assessment of how many times the standing reserve will be called off, and for what volume, and by apportioning the option fee for the contract across the expected usage. For a hypothetical example, the Transmission Company buys a standing reserve contract at £2000, the service is available for 20 Settlement Periods, but it only expects to use it ten times for 10 MWh per time, resulting in an expected utilisation cost of £20 / MWh (£2000 / (10 * 10), as opposed to the current mechanism which would result in a price adjuster of £10 per Settlement Period in the service availability window of 20 Settlement Periods.

Then each time the standing reserve is called off:

- For Balancing Mechanism participants a Bid – Offer Acceptance is taken. When placing this action into the relevant stack for NIV Tagging, the expected utilisation cost will be added to the acceptance price, such that the acceptance price is adjusted for the expected utilisation cost; and
- For non Balancing Mechanism participants a BSAD volume and price is notified, where the volume is the volume of standing reserve delivered, and the price is the price for delivering the standing

reserve, adjusted by the Transmission Company to include the expected utilisation cost for that contract.

The expected utilisation cost for each standing reserve contract will be derived by the Transmission Company and published once the standing reserve auction has completed. It should be noted that the intent is to publish the BM Unit and the expected utilisation cost, against the service availability window. The intent is to protect some of the information, such that BSC Parties should not be able to determine the actual contract cost, as they will not know the Transmission Company's assessment of the expected utilisation.

(b) Price Price Adjusters for Standing Reserve in the Balancing Mechanism

In order to support this utilisation of the Price Price Adjusters, they will be reported by the Transmission Company (at least annually on initial determination, as described above, and then where any changes occur), for each BM Unit, as follows:

1. BM Unit Id; with
2. Buy Price Price Adjustment (BPA_{ij}) (£ / MWh); and
3. Settlement Date and Settlement Period range – service availability window.

And:

4. BM Unit Id; with
5. Sell Price Price Adjustment (SPA_{ij}) (£ / MWh); and
6. Settlement Date and Settlement Period range – service availability window.

These will then be used by the BSC Central Service Agent to determine whether an expected utilisation cost should be added to the Bid – Offer Acceptance price for standing reserve called through the Balancing Mechanism (described below in section 4).

(c) Price Price Adjusters for Standing Reserve Outside of the Balancing Mechanism

There are two options for the derivation and reporting of option fees for non Balancing Mechanism Standing Reserve:

Option 1:

Use the (non BM Unit specific) Energy BSAD variables (see section 3.2.1.3) to report the volume associated with the non BM delivered standing reserve. The cost associated with the volume will be the cost of the call off, adjusted with the expected utilisation cost.

Option 2:

Create a process whereby the non BM standing reserve can be treated equivalently with the BM standing reserve ((b) above). This can be achieved by:

- Creating a 'dummy' BM Unit for each non BM standing reserve contract;
- Deriving and publish the expected utilisation costs as set out in (a) and (b) above;
- When the non BM standing reserve is called off, the Transmission Company will issue a Bid – Offer Acceptance on the associated dummy BM Unit, priced at the cost of the instruction (i.e. not including the expected utilisation cost);
- When the Bid – Offer Acceptance is processed by the BSC Central Service Agent, it will look up the expected utilisation cost for the dummy BM Unit and adjust the Bid – Offer price accordingly; and

- Some way of excluding these dummy BM Units from processing (other than inclusion of the Bid – Offer Acceptances in the NIV derivation) is required, such that they appear in the relevant Transmission Company Energy Account, but do not incur Bid – Offer cashflows, BM Cashflows, Energy Imbalance calculations, derivation of Transmission Loss Multipliers, etc.

Therefore the price price adjustments will be reported as described in section (b) above.

3.2.1.3 Energy BSAD Derivation and Reporting

P137 explicitly requires that the energy BSAD derivation be amended to report individual BSAD trades, and to associate them, where relevant, with a specific BM Unit (for the purposes of including them in the BM Unit 'undo' tagging process).

Furthermore, P137 explicitly requires that the energy BSAD derivation be amended to include additional volumes (i.e. volumes that are not included in the energy BSAD under the current derivation) deemed to be associated with energy balancing. These volumes are delivered in the form of non Balancing Mechanism delivered Standing Reserve, and it is proposed that the energy BSAD derivation be amended to derive and report such volumes.

The reporting of BSAD requires amendment to report each individual BSAD trade as a volume with an associated price. Currently the price associated with the net volume is a £ value, representing the net average value of the energy bought. It is envisaged that this will become a £/MWh value to represent the values of the trade, and to make BSC System processing of the BSAD trades easier.

Since some BSAD trades will require a BM Unit to be reported against the trade, then there is a requirement to amend the structure of the current BSAD report to reflect this.

In order to allow reporting of disaggregated BSAD, both BM Unit specific trades and non BM Unit specific, it is proposed that the BSAD variables be amended as follows (this is an example for the purposes of this requirements specification and impact assessment thereon):

BSAD Buy Energy Trades

1. ~~Net~~ Buy Price Volume Adjustment (Energy) ($EBVA^{n}_{j}$) (MWh); with
2. ~~Net~~ Buy Price Cost Adjustment (Energy) ($EBCA^{n}_{j}$) (£ / MWh).

And:

3. BM Unit Buy Price Volume Adjustment (Energy) ($BMEBVA^{n}_{ij}$) (MWh); with
4. BM Unit Buy Price Cost Adjustment (Energy) ($BMEBCA^{n}_{ij}$) (£ / MWh); and
5. BM Unit Name / Id.

BSAD Buy Energy Trades

6. ~~Net~~ Sell Price Volume Adjustment (Energy) ($ESVA^{n}_{j}$) (MWh); with
7. ~~Net~~ Sell Price Cost Adjustment (Energy) ($ESCA^{n}_{j}$) (£ / MWh).

And:

8. BM Unit Sell Price Volume Adjustment (Energy) ($BMESVA^{n}_{ij}$) (MWh); with
9. BM Unit Buy Price Cost Adjustment (Energy) ($BMESCA^{n}_{ij}$) (£ / MWh); and
10. BM Unit Name / Id.

Where 'n' is the BSAD trade number, and is populated and used in the same way as the Bid – Offer pair number. BSAD trade numbers should be contiguous, and should be unique for each trade.

3.2.2 BSAD Reporting: Estimated Data

Section 1.1.2 details the requirement for prompt reporting. On this basis, the Transmission Company will be required to estimate all non firm BSAD volumes for notification to BSAD for notification to the BMRA / SAA in real time (i.e. by no later than the end of the Settlement Period to which the volume being notified applies, noting that this could be extended to allow the volumes to be notified in time for inclusion in the Indicative Energy Imbalance Price calculation performed by the BMRA).

The Transmission Company should then revise the estimated volumes accordingly and notify them to the BMRA / SAA following the Settlement Period as soon as it becomes aware of the revised (correct) values.

For the purposes of this impact assessment, it is assumed that amended BSAD values will be notified using the original BSAD Trade Number ('n'), so that it is clear that it is a revised version of previously submitted data. However, the actual approach to be utilised will be agreed between the Transmission Company and the BSC Central Service Agent (co-ordinated by BSCCo).

3.2.3 BSAD Reporting (EXAMPLE)

The preceding section (3.1) details the amendments to the derivation of BSAD for the purposes of meeting the requirements of P137. The detailed BSAD changes will require amendment to the content and structure of the interface that reports BSAD variables.

An example of how this could look (for the purposes of illustrating the relationship of the variables, and for the purposes of this impact assessment only):

System and Energy BSAD

NGC32	**F**							**BSAD-Cost & Volume Adjustment**
NGG32	**R**	**1**	**G**					**BSAD**
N0290	D			1			varchar2(8)	Data Type
N0340	D			1			text(10)	Sett Date
N0201	D			1			integer(2)	Settlement Period
NEW	**R**	**1**		**G**				**System BSAD**
N0415	D				1		decimal(10,3)	Net System Buy Price Volume Adjustment
N0416	D				1		decimal(10,3)	Net System Sell Price Volume Adjustment
NEW	**R**	**0-***		**G**				**Energy Buy BSAD (Non BMU)**
NEW	D				1		integer(10)	BSAD Trade Number
N0419	D				1		decimal(10,2)	Energy Buy-Price Cost Adjustment
N0417	D				1		decimal(10,3)	Energy Buy-Price Volume Adjustment
NEW	**R**	**0-***		**G**				**Energy Buy BSAD (BMU)**
NEW	D				1		integer(10)	BSAD Trade Number
N0034					1		text(11)	BM Unit Id
N0419	D				1		decimal(10,2)	BM Unit Energy Buy-Price Cost Adjustment
N0417	D				1		decimal(10,3)	BM Unit Energy Buy-Price Volume Adjustment
NEW	**R**	**0-***		**G**				**Energy Sell BSAD (Non BMU)**
NEW	D				1		integer(10)	BSAD Trade Number
N0420	D				1		decimal(10,2)	Energy Sell Price Cost Adjustment
N0418	D				1		decimal(10,3)	Energy Sell Price Volume Adjustment
NEW	**R**	**0-***		**G**				**Energy Sell BSAD (BMU)**
NEW	D				1		integer(10)	BSAD Trade Number

N0034					1		text(11)	BM Unit Id
NEW	D				1		decimal(10,2)	BM Unit Energy Sell Price Cost Adjustment
NEW	D				1		decimal(10,3)	BM Unit Energy Sell Price Volume Adjustment

Price Price Adjustment BSAD (for publication)

NEW	**F**							**BSAD-Price Price Adjustment**
NEW	**R**	**0-***	**G**					**Buy Price Price Adjustment**
N0034	D			1			text(11)	BM Unit Id
N0372	D			1			decimal(10,2)	Buy Price Price Adjustment
NEW	**R**	**1-***		**G**				**Service Availability Window (dates)**
N0082	D				1		date	Effective from Settlement Date
N0084	D				1		date	Effective to Settlement Date
NEW	**R**	**1-***			**G**			**Service Availability Window (periods)**
N0361	D					1	integer(2)	From Settlement Period
N0362	D					1	integer(2)	To Settlement Period
NEW	**R**	**0-***	**G**					**Sell Price Price Adjustment**
N0034	D			1			text(11)	BM Unit Id
N0371	D			1			decimal(10,2)	Sell Price Price Adjustment
NEW	**R**	**1-***		**G**				**Service Availability Window (dates)**
N0082	D				1		date	Effective from Settlement Date
N0084	D				1		date	Effective to Settlement Date
NEW	**R**	**1-***			**G**			**Service Availability Window (periods)**
N0361	D					1	integer(2)	From Settlement Period
N0362	D					1	integer(2)	To Settlement Period

4 POTENTIAL CHANGES TO BSC SYSTEMS

The introduction of P137 has an impact on two key BSC Systems; the Balancing Mechanism Reporting Agent (BMRA) and Settlement Administration Agent (SAA). This is believed to be the extent of the impact on BSC Systems at this time.

4.1 Amendments to the BMRA

The Balancing Mechanism Reporting Agent (BMRA) is impacted in a number of ways:

1. By the amendment to the receipt, validation, processing and publication of BSAD, as described in section 3.2;
2. By the amendment to the way in which the main Indicative Energy Imbalance Price is calculated;
3. Potentially by the requirement to pictorially represent the Energy Imbalance Price calculation;
4. Potentially by the requirement to recalculate the Indicative Energy Imbalance Prices on receipt of amended BSAD data, up to the Interim Information Settlement Run; and
5. Potentially by the requirement to publish the expected utilisation costs against each (relevant) BM Unit (if the BMRA is the most appropriate place to publish the data).

The bullet commencing 'potentially' above, indicate that these are optional requirements that should be considered for the purposes of the impact assessment, but which may not form part of the final solution.

Each of the requirements is explored in more detail below:

4.1.1 BMRA: BSAD Receipt, Validation, Processing and Publication Amendments

Section 3 sets out the potential amendments to BSAD required to give effect to P137. BMRA is impacted by these amendments as follows:

Receipt

BMRA will be required to receive the amended interfaces at day ahead, after Gate Closure, and thereafter as the data changes.

It is envisaged that the Energy BSAD will be processed in a similar manner to Bid – Offer Acceptances, using, as far as relevant, equivalent conventions to the use of Bid – Offer Acceptance number for the processing and treatment of the BSAD Trade number. However, it should be noted that the convention for the treatment of the BSAD Trade number has not been explored in detail, and may change as agreed between BSCCo, the BSC Central Service Agent and the Transmission Company.

For the purposes of this impact assessment, it is assumed that amended BSAD values will be notified using the original BSAD Trade Number ('n'), so that it is clear that it is a revised version of previously submitted data. However, the approach to be utilised will be agreed between the Transmission Company and the BSC Central Service Agent (co-ordinated by BSCCo).

Validation: Net BSAD Validation

Currently BSAD is validated to ensure that the 'netting' rules have been followed, i.e. where there is a value of other than zero for System Buy Volume Adjustment, then the System Sell Volume Adjustment must be zero, and vice versa. Where there is a value of other than zero for the Energy Buy Volume Adjustment, then the Energy Sell Volume Adjustment must be zero, and vice versa.

Under P137, this validation need only be applied to the System BSAD, which will continue to be provided as a net volume for use in the Net Imbalance Volume derivation.

Validation: BSAD Trade Number Validation

It is envisaged that the Energy BSAD will be validated in a similar manner to Bid – Offer Acceptances, using, as far as relevant, equivalent conventions to the use of Bid – Offer Acceptance number for the validation of the BSAD Trade number. This means that the BSAD Trade number should be contiguous and unique, thus allowing BSC Central Service Agent identification of any missing energy BSAD trades.

However, it should be noted that the convention for the validation of the BSAD Trade number / energy BSAD has not been explored in detail, and may change as agreed between BSCCo, the BSC Central Service Agent and the Transmission Company.

Publication: System and Energy BSAD

Currently BSAD is published for each Settlement Day in a flat list on the BMRA. With the amendments described in section 3, a flat list may not be appropriate for all of the BSAD variables.

For example, it may be appropriate to consider continuing to publish System BSAD and non BM Unit specific Energy BSAD (EBVA, EBCA, ESVA and ESCA) in a list, against the relevant Settlement Period. The BM Unit specific Energy BSAD trades could then be published in a similar manner to Bid – Offer Acceptances, such that there is a list of BM Unit specific trades for a Settlement Period reported with

the System and non BM Unit specific energy BSAD, as well as the volume and price reported against the individual BM Unit for the Settlement Period.

Reporting: Amendment to TIBCO Reports

Clearly the amendments to BSAD variables will require amendment to the TIBCO reports for reporting this information.

4.1.2 Amendment to the Indicative Energy Imbalance Price Calculation

BMRA is required to calculate the Indicative Energy Imbalance Price according to the following requirements (explored in more detail in section 2):

The BMRA will, for each Settlement Period, and to the current timetable (i.e. at this time it is Settlement Period plus 45 minutes):

1. 'CADL' tag the Bid – Offer Acceptances. This results in:
   - A set of Priced Acceptances, i.e. non CADL BOAs, deemed to have been taken for energy purposes, pending NIV Tagging; and
   - A set of Unpriced Acceptances, i.e. CADL'ed BOAs, deemed to have been taken for system purposes, and used only in the derivation of the NIV;
2. De Minimis tag the Bid – Offer Acceptances, resulting in the removal of small (<1MWh), 'unreal' acceptances;
3. BM Unit Undo tag, using all (relevant) balancing actions (Bid – Offer Acceptances and BM Unit specific energy BSAD trades);
4. Arbitrage tag all balancing actions (Bid – Offer Acceptances and BM Unit specific energy BSAD trades), resulting in the removal of an equal and opposite volume from both the sell stack and the buy stack to remove balancing actions where the Offer / buy Price is less than the Bid / sell price for the balancing actions;

   It should be noted that Bid – Offer Acceptances are arbitraged according to the Bid – Offer price accepted by the Transmission Company, i.e. before any expected utilisation cost is applied.
5. **Where the expected utilisation cost is to be applied**, for the remaining (Period) Bid – Offer Acceptances, use the expected utilisation cost 'look up table', provided by the Transmission Company to determine whether there are any expected utilisation costs to be reflected in the Bid – Offer prices for affected BM Units. Where a BM Unit has an expected utilisation cost (EUC), then the £/MWh Bid – Offer Price will be adjusted to include the EUC (which is also a £/MWh value), for all acceptances on the BM Unit, as specified by the look up table. **Where the expected utilisation cost is not to be applied**, then the NIV stacks are compiled using the Bid – Offer Acceptance price, as taken by the Transmission Company; and
6. BSAD Offsetting tagging (using all remaining balancing actions).

The remaining balancing actions go forward to NIV Tagging, undertaken as currently defined. The main Energy Imbalance Price will then be the most expensive energy action remaining in the NIV. For the avoidance of doubt, where there are any system balancing actions remaining in the NIV (System BSAD or the CADL'ed volume (TQUAO (Offers) and TQUAB (Bids)), then these will be disregarded and the most expensive remaining balancing action will set the main price.

The same set of default rules as utilised currently will continue to remain in force, namely:

1. Where there are no energy balancing actions remaining in the NIV, then the main price will default to the reverse price (derived from the Market Index Data);
2. Where there is no Market Index Data, then the reverse price will default to the marginal price from the NIV, and where there are no energy balancing actions in the NIV, then both the main and the reverse price will be zero;
3. Where there is a negative spread (i.e. SSP exceeds SBP), then the reverse price is capped to the main (marginal from the NIV) price.

For the avoidance of doubt it is believed that there is no requirement to amend any other aspect of the Indicative Energy Imbalance Price calculation.

4.1.3 Pictorial Representation of the Indicative Energy Imbalance Price Derivation

Given that a marginal price is more sensitive than an average to volume changes in the Net Imbalance Volume derivation, it has been proposed that a pictorial representation of the NIV would be appropriate, such that Parties can determine what adjustments to volumes in the stack are required to move the marginal price.

Under P137, it is envisaged that there will be the following pictorial representations:

1. BM Unit Undo Tagging: Appearance along the lines of figures 4 and 5 in section 2, denoting the balancing actions that have been tagged out for each BM Unit;
2. BSAD Offsetting Tagging: Appearance along the lines of figures 7 and 8 in section 2, denoting the balancing actions that have been tagged out by the BSAD Offsetting Tagging; and
3. NIV Tagging: Appearance along the lines of the following figure, denoting the balancing actions in the stack, with the volume and price, and denoting the actions that have been tagged out by the NIV Tagging.

Parties should be able to see the balancing actions that comprise each of the stacks being tagged, with the associated volume and price, so that it is clear what has been tagged and why, and what is remaining in the NIV.

Furthermore, where appropriate, Parties should be able to identify those BM Units that have had the expected utilisation cost reflected in the Bid – Offer acceptance price (potentially with the expected utilisation cost and Bid – Offer Acceptance price reported separately).

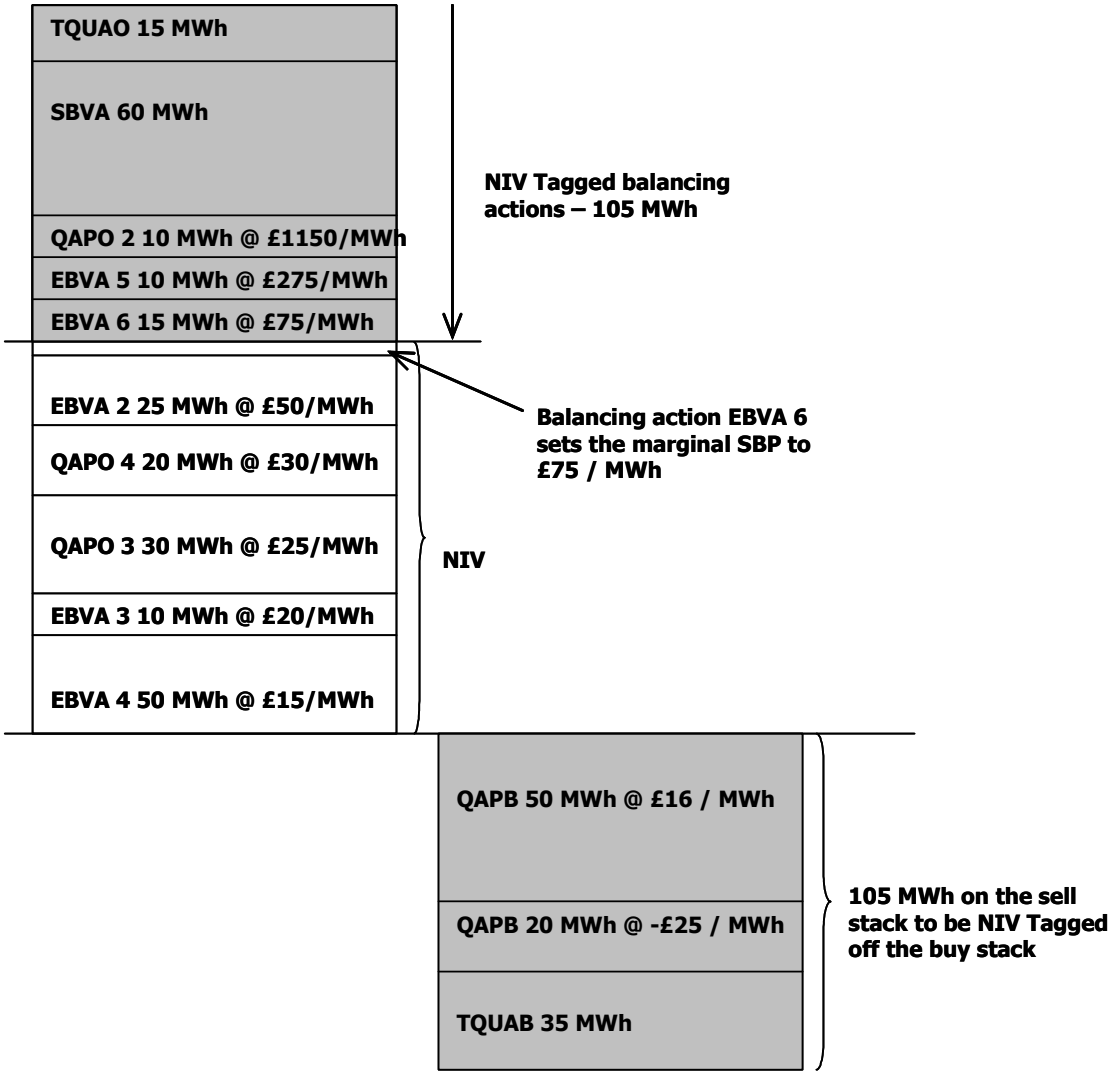

Figure 9: Example NIV Pictorial Representation on the BMRA

4.1.4 Requirement to Recalculate the Indicative Energy Imbalance Prices

Noting section 1.1.2, and given the importance of accurate prompt pricing, in conjunction with the sensitivity of a marginal price to changes in the volumes comprising the NIV, it may be considered to be appropriate to extend the window of the BMRA Indicative Energy Imbalance Price calculation up to the Initial Information Settlement Run, such that the Indicative Energy Imbalance Price calculation is triggered by any amendment to Bid – Offer Acceptance volumes and BSAD volumes between the calculation undertaken at the end of the Settlement Period and the Initial Information Settlement Run.

The pictorial representation should also be refreshed following any recalculation of the Indicative Energy Imbalance Prices. Consideration should also be given to how to report changes since the initial calculation such that any iterations of the calculation can be determined / accessed on the BMRA.

Furthermore, although the content of the TIBCO report that provides the Indicative Energy Imbalance Prices (and Indicative NIV) will not change, it will be provided to Parties on each iteration of the

Indicative Energy Imbalance Price for a Settlement Period, and this amendment to usage will impact BMRA (and Parties).

4.1.5 Publish Expected Utilisation Costs

Noting section 1.1.3, and following from section 3.2.1.2, where the Transmission Company derives the expected utilisation costs for each BM Unit (and dummy BM Unit if option 2 in section 3.2.1.2 is adopted), then the BMRA will publish this, most likely in tabular format, initially on receipt from the Transmission Company, and thereafter when ever the data changes, as notified by the Transmission Company. BMRA will publish the BM Unit, expected utilisation cost and service availability window. Consideration should also be given to publishing the expected utilisation costs and service availability window against each (relevant) BM Unit, such that the BM Unit data is enhanced to include this information.

4.2 Amendments to the SAA

The Settlement Administration Agent SAA) is impacted in a number of ways:

1. By the amendment to the receipt, validation, processing and publication of BSAD, as described in section 3.2;
2. Potential amendment to the treatment of dummy BM Units (under option 2 from section 3.2.1.2)
3. By the amendment to the way in which the main Energy Imbalance Price is calculated;
4. Amendment to the Settlement Report; and
5. Amendment to the Data used in Settlement Runs.

Each of the requirements is explored in more detail below:

4.2.1 SAA: BSAD Receipt, Validation, Processing and Reporting Amendments

Section 3 sets out the potential amendments to BSAD required to give effect to P137 and section 4.1.1 above details the requirements on the BMRA for the receipt and validation of BSAD. It is assumed that the SAA will receive the BSAD once validated by the BMRA. Thus the requirements for validation and processing need not be repeated here.

Once difference between the BMRA and the SAA is the requirement for BSAD to be reported in the Settlement Report. Therefore the Settlement Report (SAA – I014, all subflows) will require amendment to the reporting of BSAD, to provide it more in line with the (example) format provided in section 3.2.

Where expected utilisation costs are utilised (see section 1.1.3), then the expected utilisation cost for a BM Unit should be included in the Settlement Report with the Bid – Offer Acceptance data for the BM Unit, but only where it has been used / applied in the Settlement Period. There are three options as to how this can be achieved:

1. Report the Bid – Offer Acceptance price inclusive of the expected utilisation cost only;
2. Report the Bid – Offer Acceptance price (as taken by the Transmission Company), and the expected utilisation cost separately; and
3. Report the Bid – Offer Acceptance price inclusive of the expected utilisation cost and the expected utilisation cost, such that the original Bid – Offer price can be derived.

4.2.2 Treatment of Dummy BM Units (Option 2, section 3.2.1.2)

If option 2 in relation to the treatment of non Balancing Mechanism delivered standing reserve is adopted, then the dummy BM Units will have to be removed / excluded from all processing other than the receipt of Bid – Offer data in respect of that BM Unit, and the use of the Bid – Offer Acceptance data in the NIV derivation, and the Energy Imbalance Price calculation where the volume remains in the NIV.

Therefore, the BM Unit will have to be excluded from BSCCo BM Unit charges (under Section D of the Code), Energy Indebtedness calculations, Transmission Loss Multiplier derivation, Transmission Loss Factor derivation (i.e. excluded from the Network Mapping Statement), Energy Account Energy Imbalance calculations, RCRC application, Non Delivery calculations, and so on.

4.2.3 Amendment to the Energy Imbalance Price Calculation

SAA is required to calculate the Energy Imbalance Price according to the following requirements (explored in more detail in section 2):

The SAA will, for each Settlement Period in each Settlement Day:

1. 'CADL' tag the Bid – Offer Acceptances. This results in:
   - A set of Priced Acceptances, i.e. non CADL BOAs, deemed to have been taken for energy purposes, pending NIV Tagging; and
   - A set of Unpriced Acceptances, i.e. CADL'ed BOAs, deemed to have been taken for system purposes, and used only in the derivation of the NIV;
2. De Minimis tag the Bid – Offer Acceptances, resulting in the removal of small (<1MWh), 'unreal' acceptances;
3. BM Unit Undo tag, using all (relevant) balancing actions (Bid – Offer Acceptances and BM Unit specific energy BSAD trades);
4. Arbitrage tag all balancing actions (Bid – Offer Acceptances and BM Unit specific energy BSAD trades), resulting in the removal of an equal and opposite volume from both the sell stack and the buy stack to remove balancing actions where the Offer / buy Price is less than the Bid / sell price for the balancing actions;

   It should be noted that Bid – Offer Acceptances are arbitraged according to the Bid – Offer price accepted by the Transmission Company, i.e. before any expected utilisation cost is applied.
5. **Where the expected utilisation cost is to be applied**, for the remaining (Period) Bid – Offer Acceptances, use the expected utilisation cost 'look up table', provided by the Transmission Company to determine whether there are any expected utilisation costs to be reflected in the Bid – Offer prices for affected BM Units. Where a BM Unit has an expected utilisation cost (EUC), then the £/MWh Bid – Offer Price will be adjusted to include the EUC (which is also a £/MWh value), for all acceptances on the BM Unit, as specified by the look up table. **Where the expected utilisation cost is not to be applied**, then the NIV stacks are compiled using the Bid – Offer Acceptance price, as taken by the Transmission Company; and
6. BSAD Offsetting tagging (using all remaining balancing actions).

The remaining balancing actions go forward to NIV Tagging, undertaken as currently defined. The main Energy Imbalance Price will then be the most expensive energy action remaining in the NIV. For the avoidance of doubt, where there are any system balancing actions remaining in the NIV (System BSAD

or the CADL'ed volume (TQUAO (Offers) and TQUAB (Bids)), then these will be disregarded and the most expensive remaining balancing action will set the main price.

The same set of default rules as utilised currently will continue to remain in force, namely:

1. Where there are no energy balancing actions remaining in the NIV, then the main price will default to the reverse price (derived from the Market Index Data);
2. Where there is no Market Index Data, then the reverse price will default to the marginal price from the NIV, and where there are no energy balancing actions in the NIV, then both the main and the reverse price will be zero;
3. Where there is a negative spread (i.e. SSP exceeds SBP), then the reverse price is capped to the main (marginal from the NIV) price.

For the avoidance of doubt it is believed that there is no requirement to amend any other aspect of the Energy Imbalance Price calculation.

4.2.4 Amendments to the Settlement Report

The following amendments to the Settlement Report are proposed for P137:

1. BSAD reporting amendments, as discussed in section 4.2.1, including reporting of option fees;
2. In terms of BSAD, there is now a requirement to report multiple NIV Untagged BSAD volumes;

As the Energy Imbalance Price calculation becomes more complex, it could be considered that the Settlement Report should contain more information in relation to the processing of Bid – Offer Acceptances, and BSAD balancing actions, so that it can be seen what has been done to them, for example, currently a flag is set where the Bid – Offer Acceptance has been CADL'ed, and it is proposed that this be extended to indicate (at a glance) whether part or all of the Bid – Offer Acceptance / balancing action has been:

1. Arbitraged Tagged;
2. BM Unit Undo Tagged;
3. BSAD Offsetting Tagged; and / or
4. NIV Tagged.

4.2.5 Amendments to Data used in Settlement Runs

Section 1.1.2 explores the possibility of 'freezing', or not, the BMRA derived Indicative Energy Imbalance Price, in order to provide Energy Imbalance Price stability to BSC Parties. The three options are:

1. As now, i.e. each Settlement Run uses the latest available data in the calculation of the Energy Imbalance Price; or
2. The prices and volumes associated with Bid – Offer Acceptances and BSAD balancing actions used by the BMRA when calculating the Indicative Energy Imbalance Price are 'frozen' and used in every Settlement Run; or
3. The Indicative Energy Imbalance Price calculated by the BMRA is 'frozen' and used in every Settlement Run.

5 POTENTIAL CHANGES TO BSCCO SYSTEMS

The introduction of P137 has an impact on the BSCCo TOMAS system. This is believed to be the extent of the impact on BSCCo Systems at this time.

TOMAS will require amendment to:

- Receive the new and amended reports:
  - Amendment to the receipt and processing of the Settlement Reports; and
  - Amendment to the receipt and processing of the amended BMRA BSAD reporting.
- Reflect the new Energy Imbalance Price calculation.

Other departments in ELEXON are impacted by the requirement to be aware of the amendment to the derivation of the Energy Imbalance Prices.

6 DEVELOPMENT PROCESS

For the purposes of this assessment, the reader should assume that the changes will be implemented as a standalone development project managed by BSCCo.

The following sections give an indication of the control points required during design, testing and implementation and are supplied to provide a basis on which the BSC Central Service Agent can estimate.

6.1 Design

BSCCo intend that responsibility for the correctness of the design should remain with the BSC Central Service Agent, but that BSCCo should have the opportunity to review it, and identify apparent inconsistencies with the requirements.

6.2 Testing

BSCCo intend that responsibility for software testing should lie with the BSC Central Service Agent, but that BSCCo should have some visibility of the process, in order to gain assurance that the integrity of Trading and Settlement is maintained. The following processes are proposed to achieve this:

[Further detail.]

7 GLOSSARY

The following acronyms have been used throughout this document:

Term	
BM	Balancing Mechanism
BMRA	Balancing Mechanism Reporting Agent
BOA	Bid – Offer Acceptance
BPA	Buy Price Price Adjustment
BSAD	Balancing Services Adjustment Data

Term	
CADL	Continuous Acceptance Duration Limit
EBCA	Net Energy Buy Price Cost Adjustment
EBVA	Net Energy Buy Price Volume Adjustment
ESCA	Net Energy Sell Price Cost Adjustment
ESVA	Net Energy Sell Price Volume Adjustment
EUC	Expected utilisation cost
NIV	Net Imbalance Volume
P137	Proposed Modification P137
PGBT	Pre – Gate Closure BM Unit Transaction
PSMG	Pricing Issues Standing Modification Group
QAPB	Period Priced Accepted Bid Volume
QAPO	Period Priced Accepted Offer Volume
RCRC	Residual Cashflow Reallocation Cashflow
SAA	Settlement Administration Agent
SBP	System Buy Price
SBVA	Net System Buy Price Volume Adjustment
SPA	Sell Price Price Adjustment
SSP	System Sell Price
SSVA	Net System Sell Price Volume Adjustment
TLM	Transmission Loss Multiplier
TOMAS	Trading Operations Market Analysis System
TQUAB	Total Period Unpriced Accepted Bid Volume
TQUAO	Total Period Unpriced Accepted Offer Volume

8 DOCUMENT CONTROL

a Authorities

Version	Date	Author	Reviewer	Reason for review

b Distribution

Recipient	Version	Date	Reason

c References

Ref	Document	Owner	Issue date	Version

ANNEX 1 – TRANSMISSION COMPANY POTENTIAL REQUIREMENTS

The following requirements reflect the amendments / potential amendments required to implement P137, assuming that the relevant BSAD amendments have been consulted on and approved by the Authority and this may not be the case. Therefore the BSAD amendments are examples only, for the purposes of obtaining an impact assessment from BSCCo, the BSC Central Service Agent and the Transmission Company.

It should be noted that requirements 3 and 4 are mutually exclusive.

<table>
<tr><th>Ref:</th><th colspan="4">Requirement</th><th>Detailed Description</th></tr>
<tr><td>1.</td><td colspan="4">Provide an estimate of non firm BSAD volumes in real time, i.e. by the end of the Settlement Period (or at the latest by Settlement Period +30 minutes, i.e. in time for the BMRA Indicative Energy Imbalance Price calculation). Following up with revised volumes / prices where the estimates become firm.</td><td>See sections 1.1.2 and 3.2.2</td></tr>
<tr><td>2.</td><td colspan="4">Provide the expected utilisation cost (against the service availability window) for all BM Units that are contracted to provide Standing Reserve through the Balancing Mechanism (and for Option 2, 3.2.1.2, where there is to be a deemed acceptance against a dummy BM Unit (see bullet 4 below)).

The expected utilisation cost is expected to be reported as BPA_{ij} / SPA_{ij}, i.e. as a cost (in £ / MWh) against the relevant BM Unit (hence the 'ij' subscript)</td><td>See section 3.2.1.2 and 3.2.3</td></tr>
<tr><td>3.</td><td colspan="4">Provide volumes and prices (using the amended energy BSAD variables) for Standing Reserve provided outside of the Balancing Mechanism, where the price reflects both the cost of the instruction and the expected utilisation cost.</td><td>See Option 1, 3.2.1.2</td></tr>
<tr><td>4.</td><td colspan="4">Create dummy BM Units for all Standing Reserve contracts that are not called off in the Balancing Mechanism, such that a deemed Bid – Offer Acceptance can be issued for the dummy BM Unit where the contract is called off, and the BSC Central Service Agent can determine the expected utilisation cost for the BM Unit (see bullet (2) above).</td><td>See Option 2, 3.2.1.2</td></tr>
<tr><td rowspan="3">5.</td><td colspan="4">Amend the Energy BSAD variables such that they can be reported against each individual energy BSAD trade, and against an identified BM Unit (if there is such an association). Section 3.2.1.3 proposes an <u>example</u> of the format of the energy BSAD variables that supports this utilisation, namely the use of 'n' – BSAD Trade number to provide equivalence with Bid – Offer Acceptances, and the creation of a new variable that is BM Unit specific:</td><td rowspan="3">See section 3.2.1.3 and 3.2.3</td></tr>
<tr><td>$EBVA^{n}_{j}$ non BM Unit specific

$EBCA^{n}_{j}$ in £ / MWh</td><td>$ESVA^{n}_{j}$ non BM Unit specific

$ESCA^{n}_{j}$ in £ / MWh</td><td>$BMEBVA^{n}_{ij}$ BM Unit specific

$BMEBCA^{n}_{ij}$ in £ / MWh</td><td>$BMESVA^{n}_{ij}$ BM Unit specific

$BMESCA^{n}_{ij}$ in £ / MWh</td></tr>
</table>

ANNEX 2 – BSC AGENT REQUIREMENTS

The following requirements reflect the amendments / potential amendments required to implement P137, assuming that the relevant BSAD amendments have been consulted on and approved by the Authority and this may not be the case. Therefore the BSAD amendments are examples only, for the purposes of obtaining an impact assessment from BSCCo, the BSC Central Service Agent and the Transmission Company.

Ref:	Requirement	Detailed Description
1.	**BMRA and SAA**: Amend the Energy Imbalance Price calculation to reflect the requirements of P137 in full.	See sections 2.1, 4.1.2 and 4.2.3.
2.	**BMRA and SAA**: Amend the Energy Imbalance Price calculation to reflect the requirements of P137 WITHOUT the amended treatment of option fees (i.e. option fees are reported as currently (or not reported at all), and are not used in the Energy Imbalance Price calculation).	See sections 1.1.3, 2.2, 4.1.2 and 4.2.3.
Each of the following requirements should be assessed against both 1 and 2 above, and where there is any difference in costs and timescales arising from the different treatment of option fees then this should be highlighted.		
3.	**BMRA and SAA**: Amend the receipt and processing of BSAD to allow receipt, validation and processing of individual BSAD trades.	See sections 3.2.3, 4.1.1 and 4.2.1.
4.	**BMRA**: Publication of the amended BSAD.	See sections 3.2.3 and 4.1.1
5.	**BMRA**: Amend the BMRA to pictorially report the Energy Imbalance Price calculation.	See section 4.1.3
6.	**BMRA**: Amend the BMRA to recalculate the Indicative Energy Imbalance Price (and report it, including amendments to the pictoral representation) on receipt of amendments to Bid – Offer Acceptance and BSAD volumes and prices up to the Interim Information Settlement Run.	See sections 1.1.2 and 4.1.4
7.	**BMRA**: Publish expected utilisation costs for each BM Unit against the service availability window (expected to be in the form of a flat list only).	See section 4.1.5
8.	**BMRA**: Additionally to bullet (6) above, publish expected utilisation cost and service availability window against each BM Unit, as part of the BM Unit data.	See section 4.1.5

Ref:	Requirement	Detailed Description
9.	**SAA**: Exclude dummy BM Units (i.e. those in place to report non Balancing Mechanism Standing Reserve volumes) from all aspects of the Settlement calculations, other than inclusion in the Energy Imbalance Price calculation.	See sections 3.2.1.2 and 4.2.2.
10.	**SAA**: Amendment to the Settlement Report to report the new and amended BSAD, excluding expected utilisation costs	See sections 3.2 and 4.2.5
11.	**SAA**: Amendment to the Settlement Report to report expected utilisation costs (EUC) either: 1. Bid – Offer Acceptance price inclusive of the EUC; or 2. Bid – Offer Acceptance price PLUS EUC; or 3. Bid – Offer Acceptance price inclusive of EUC PLUS EUC.	See section 4.2.1
12.	**SAA**: Amendment to the Settlement Report to indicate for each Bid – Offer Acceptance and BSAD balancing action, what tagging, if any, has been applied to the action.	See section 4.2.4.
13.	**SAA**: Use of the Energy Imbalance Price derived by BMRA (without change) for each subsequent Settlement Run, with the requirement for it to be recalculated in the case of manifest error / Trading Dispute, and the revised value used from then on.	See sections 1.1.2 and 4.2.5.
14.	**SAA**: Use of the same Bid – Offer Acceptance data and BSAD that was used in the calculation of the Indicative Energy Imbalance Price derived by BMRA (without change) for each subsequent Settlement Run, with the requirement for it to be amended in the case of manifest error / Trading Dispute, and the revised value(s) used from then on.	See sections 1.1.2 and 4.2.5.
15.	**SAA**: Use of a cap where the Energy Imbalance Price exceeds a defined value (both the cap and the Energy Imbalance Price limit should be parameterised to allow easy changes).	See section 2.2.