
Meeting name	Imbalance Settlement Group (ISG)
Date of meeting	20 February 2007
Paper title	Clarification of Grid Supply Point (GSP) and GSP Group Aggregation Rules
Purpose of paper	For Decision
Synopsis	<p>ELEXON has identified that the Aggregation Rules used to calculate the GSP Metered Volume and GSP Group Take for some 'shared' GSPs could be better aligned with the requirements set out in the Code. Although this issue currently has no materiality for Settlement accuracy, ELEXON believes that the Aggregation Rules and BSCP75 should be amended to ensure consistency with the Code requirements and minimise any ambiguity in interpretation that may exist. The proposed changes would also address a potential issue in the calculation of Transmission Loss Factors, were one of the transmission losses Modification Proposals currently with the Authority to be approved. The costs of implementing these changes are expected to be minor. The ISG is invited to endorse ELEXON's proposed way forward as set out in this paper.</p>

1 Background – Purpose of Aggregation Rules

- 1.1 Aggregation Rules are the algebraic rules which describe how Import or Export Active Energy metered data is to be aggregated so that, for any Settlement Period, the Metered Volume for a Volume Allocation Unit can be calculated. Volume Allocation Units comprise:
- 1 'Relevant' BM Units (all BM Units other than Interconnector BM Units and Supplier BM Units);
 - 2 Interconnectors;
 - 3 Grid Supply Points (GSPs); and
 - 4 GSP Groups.
- 1.2 Each of the above requires a specific set of Aggregation Rules in order to determine Metered Volumes for that type of Volume Allocation Unit.
- 1.3 Aggregation Rules for these Volume Allocation Units must comply with Section R3 'Aggregation Rules' of the Balancing and Settlement Code ('the Code'), and must be submitted to the Central Data Collection Agent (CDCA) in accordance with Balancing and Settlement Code Procedure (BSCP) 75 'Registration of Meter Aggregation Rules for Volume Allocation Units'. The CDCA may, at any time, request the submission or resubmission of these Aggregation Rules.

1.4 Responsibility for Aggregation Rules

1.4.1 *BM Units*

The Code requires the Lead Party of each relevant BM Unit to submit Aggregation Rules for that BM Unit. These Aggregation Rules are required to relate to each of the Metering Systems associated with that BM Unit, in order to provide for the determination of the BM Unit Metered Volume.

1.4.2 ***Interconnectors***

The Transmission Company is required by the Code to submit a set of Aggregation Rules in relation to each transmission-connected Interconnector, whilst each Licensed Distribution System Operator (LDSO) is required to submit a set of Aggregation Rules in relation to each Distribution Interconnector which is connected to the LDSO's Distribution System. These Aggregation Rules are required to relate to the Metering Systems associated with that Interconnector, in order to provide for the determination of the Interconnector Metered Volume.

1.4.3 ***GSPs***

The Code requires each LDSO to submit a set of Aggregation Rules in relation to each GSP at which the LDSO's Distribution System is connected to the Transmission System. These Aggregation Rules are required to relate to each Metering System associated with the GSP, in order to provide for the determination of the GSP Metered Volume.

1.4.4 ***GSP Groups***

Each LDSO is required by the Code to submit a set of Aggregation Rules in relation to each GSP Group for which the LDSO is responsible. These Aggregation Rules are required to relate to each Metering System associated with each Systems Connection Point¹ in the GSP Group, in order to provide for the determination of the GSP Group Metered Volume.

1.5 **Use in Settlement**

1.5.1 For each Settlement Period, the CDCA uses the Aggregation Rules submitted by Lead Parties, the Transmission Company and LDSOs to determine the Metered Volume for each Volume Allocation Unit. For each Settlement Period, the CDCA also uses its own Aggregation Rules (established in accordance with Section R5.5 of the Code) to determine the GSP Group Take for each GSP Group. This GSP Group Take is compared with SVA Metered Volumes in Settlement by the Supplier Volume Allocation Agent (SVAA) to determine the GSP Group Correction Factor for each GSP Group.

2 **Description of Issue – GSP and GSP Group Aggregation Rules**

2.1 **Code Aggregation Rule Requirements for GSPs and GSP Groups**

2.1.1 ***GSP Metered Volume***

Section R3.2.3(a)(ii) of the Code states that the LDSO Aggregation Rules for a GSP must provide for the determination of the Metered Volume in respect of that GSP. A GSP is defined in Annex X-1 of the Code as a Systems Connection Point at which the Transmission System is connected to a Distribution System, whilst Section R1.2.1 defines a Metered Volume as the net aggregate volume of Active Energy (determined as at the Transmission System Boundary) which flowed in a Settlement Period to or from a Volume Allocation Unit. The Code therefore requires that, in relation to any GSP and any Settlement Period, the GSP Metered Volume should represent the sum of:

- 1 The quantity of Active Energy flowing from the Transmission System into a GSP Group at that GSP; and
- 2 The quantity of Active Energy flowing from a GSP Group onto the Transmission System at that GSP.

¹ A Systems Connection Point is a point of connection between two or more Systems (whether transmission or distribution), but excluding a point of connection between Distribution Systems in the same GSP Group.

2.1.2 ***GSP Group Metered Volume***

Section R3.2.3(b) of the Code states that the LDSO Aggregation Rules for a GSP Group must provide for the determination of the GSP Group Metered Volume for that GSP Group. Annex X-2 of the Code defines a GSP Group Metered Volume as, in relation to any GSP Group and any Settlement Period, the algebraic sum of:

- 1 The quantity of Active Energy flowing into a GSP Group at GSPs connected to that GSP Group and at Distribution Systems Connections Points² (DSCPs) connected to that GSP Group; and
- 2 The quantity of Active Energy flowing out of a GSP Group at GSPs connected to that GSP Group and at DSCPs connected to that GSP Group,

but disregarding Exports and Imports at Boundary Points³ in that GSP Group.

As all GSP Groups are currently net Importers of energy, the result of the GSP Group Metered Volume Aggregation Rules should in practice always be the total flow of energy from the Transmission System into the GSP Group.

2.1.3 ***GSP Group Take***

Section R5.5.1 of the Code requires the CDCA to establish Aggregation Rules by reference to which the GSP Group Take can be determined. Annex X-2 of the Code defines a GSP Group Take as being, in relation to any GSP Group and any Settlement Period, the GSP Group Metered Volume for that GSP Group plus the sum of the Imports and Exports at any CVA Boundary Points (as at the Transmission Boundary) within that GSP Group.

2.1.4 ***Discrepancy Between Code Requirements and Existing Aggregation Rules***

ELEXON has identified that the Aggregation Rules used to calculate the GSP Metered Volume and GSP Group Take for some 'shared' GSPs are not strictly in accordance with the Code requirements. This discrepancy had not been identified previously by ELEXON, since it has no materiality for Settlement accuracy under the existing Code baseline. However, it has potential implications for a zonal transmission losses scheme, were such a scheme to be approved by the Authority. The remainder of Section 2 of this paper explains the discrepancy in more detail, provides further background regarding ELEXON's investigation of the issue, and details the interaction with a zonal losses scheme. Sections 3-5 outline ELEXON's proposed solution and next steps.

2.2 **Current Aggregation Rules for 'Shared' GSPs**

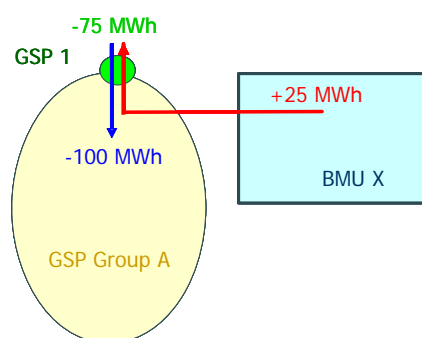
- 2.2.1 'Shared' GSPs are GSPs whose output feeders supply more than one GSP Group (resulting in both a 'majority' and 'minority' LDSO flow), or which are coupled to both a GSP Group and a directly-connected BM Unit. Currently, the LDSO Aggregation Rules for a GSP shared with a directly-connected BM Unit do not subtract the BM Unit flow at that GSP. As a result, the GSP Metered Volume does not represent the net flow between the Transmission System and the GSP Group through that GSP as required by the Code.

² A Distribution Systems Connection Point is a Systems Connection Point at which two Distribution Systems in different GSP Groups are connected.

³ A Boundary Point is a point at which any Plant or Apparatus not forming part of the Total System (the Transmission System and each Distribution System) is connected to the Total System – e.g. an embedded BM Unit or a Distribution Interconnector.

- 2.2.2 To reflect this, the CDCA currently nets off the Metered Volume of the directly-connected BM Unit as part of its calculation of the GSP Group Take. This ensures that the directly-connected BM Unit flow is not double-counted in Settlement as a result of it being present in both the Aggregation Rules submitted by the Lead Party for the BM Unit and those submitted by the LDSO for the GSP to which it is coupled. However, although the end result of the GSP Group Take calculation is therefore correct, the Aggregation Rules used to derive that result are not strictly aligned with the Code – as the Code assumes that the BM Unit flow is subtracted at the GSP, rather than GSP Group Take, level.
- 2.2.3 The diagram below shows a simplified example of the current Aggregation Rules against the 'correct' rules which would deliver consistency with the Code. As demonstrated by this example, the choice between the two sets of rules has no impact on the value of GSP Group Take entering Settlement.

Example of a GSP shared between a GSP Group and a directly-connected BM Unit



Current GSP 1 Metered Volume = -75 MWh

Correct GSP 1 Metered Volume = -75 MWh – 25 MWh (= -100 MWh)

Current GSP Group A Take = Current GSP 1 Metered Volume – 25 MWh (= -100 MWh)

Correct GSP Group A Take = Correct GSP 1 Metered Volume (= -100 MWh)

2.3 Interaction with Transmission Losses Modification Proposals

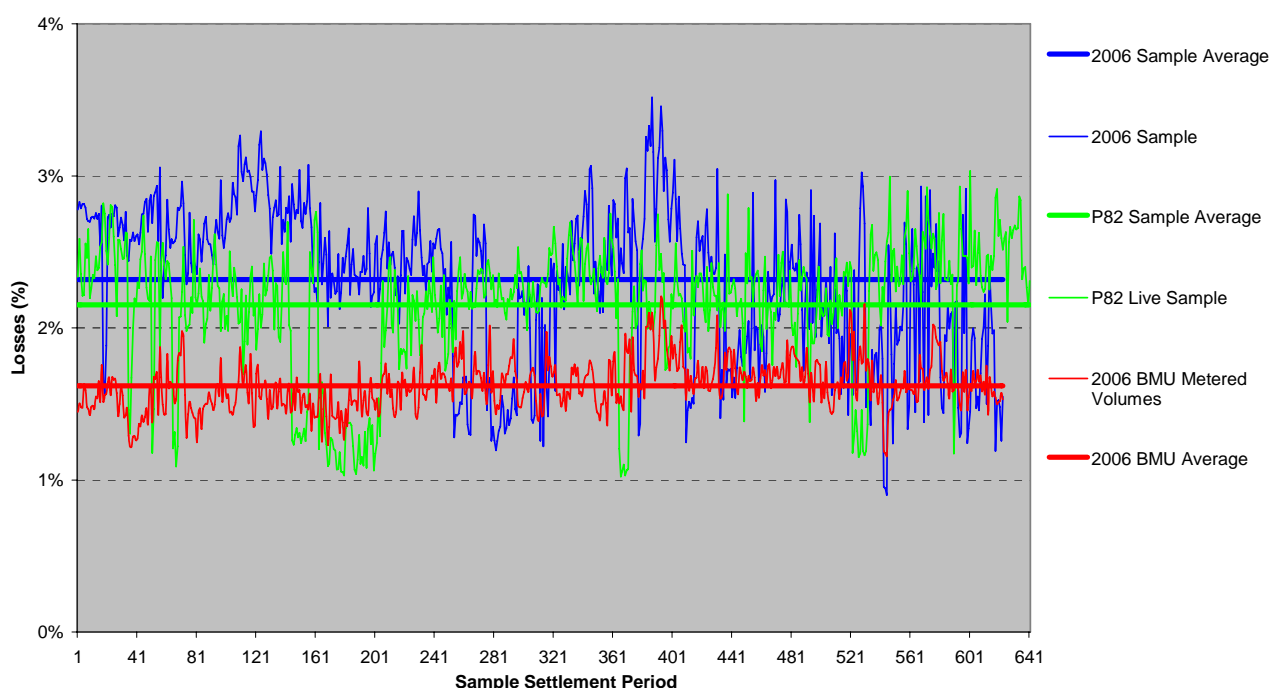
Initial ELEXON/Modification Group Investigations

- 2.3.1 ELEXON's identification of the divergence between the current shared GSP Aggregation Rules and the Code requirements arose from the P198 Modification Group's assessment of transmission losses Modification Proposals P198, P200, P203 and P204.⁴ Each of these proposals requires the calculation of zonal Transmission Loss Factors (TLFs), which represent how variations in generation or demand at different locations affect total transmission losses from the Transmission System. To calculate TLFs, a view of the net flow onto, or off, the Transmission System is required. A metered data sample is used for 623 historic 'sample' Settlement Periods, containing Metered Volumes for directly-connected BM Units, Interconnectors and GSPs. The end product of the TLF calculation is one TLF value for each GSP Group (or 'TLF Zone').

⁴ P198 'Introduction of a Zonal Transmission Losses Scheme', P200 'Introduction of a Zonal Transmission Losses Scheme with Transitional Scheme', P203 'Introduction of a Seasonal Zonal Transmission Losses Scheme' and P204 'Scaled Zonal Transmission Losses'.

2.3.2 During the progression of the proposals, the level of losses implied by the 2005/06 metered data sample used in the Modification Group's TLF-modelling exercise was found to be higher than expected (on average 2.3% of total energy per Settlement Period, as compared to an expected level of around 1.6%). In addition, the sample illustrated a higher level of implied losses than is present in the BM Unit data for the same Settlement Periods (the BM Unit data contains Supplier BM Unit Metered Volumes rather than GSP data, and gave an expected losses level of 1.62% on average). Upon examining the metered data sample which had been used for the implementation of P82, the same issue was observed.⁵ This implied that some demand was not being correctly reflected in the metered data sample. The results of this comparison are provided in the graph below. Note that the 2006 volumes cover the whole of GB, whilst those for P82 (pre-BETTA) are restricted to England and Wales.

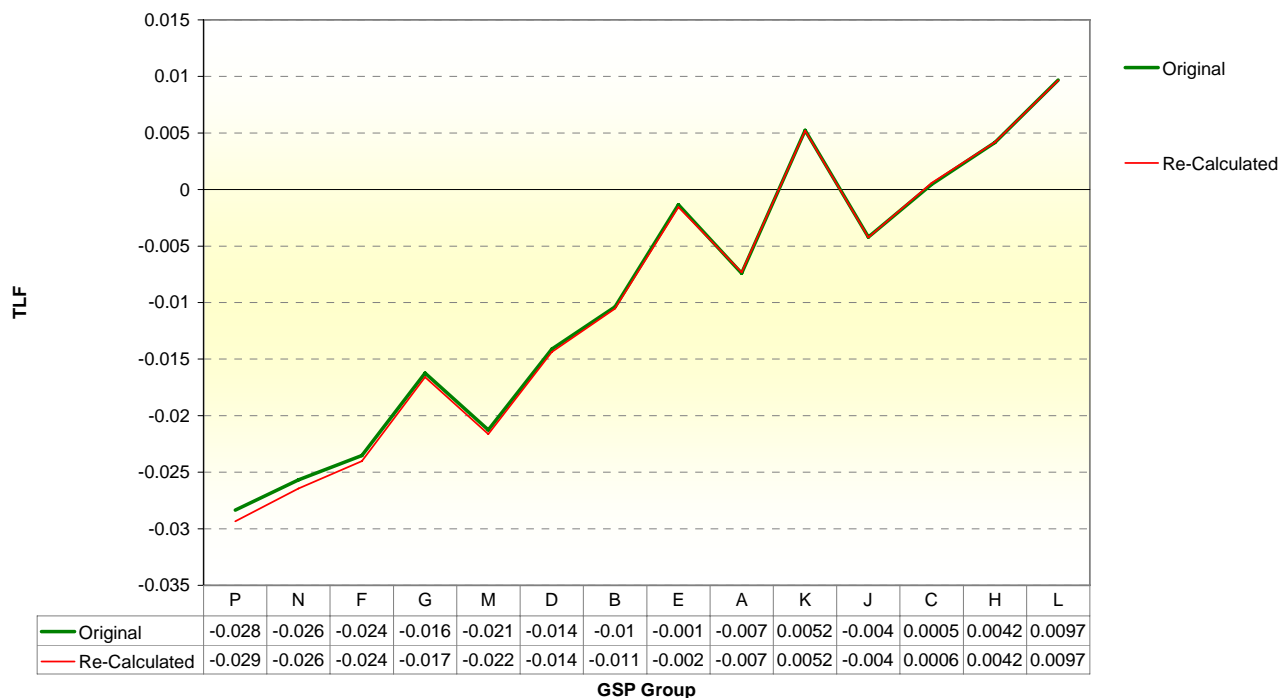
Implied Transmission Losses (BMU Vs Sample)



2.3.3 Initial investigation by ELEXON identified a potential source of the discrepancy as the Aggregation Rules for shared GSPs. At the time that the Modification Group concluded its assessment of the proposals, ELEXON had been unable to pinpoint the precise affected flows. However, by investigating metering dispensations it had identified a total of 24 registered shared GSPs spread over 10 GSP Groups/TLF Zones. Indicative modelling of the sensitivity of TLFs to the issue was undertaken by the Group by smearing the 'missing' demand (calculated as the difference between the losses implied by the metered data sample and those present in the BM Unit data) across these GSPs, and then recalculating TLFs for Proposed Modification P198 based on this revised data. The graph below shows the recalculated TLFs, whilst the accompanying table provides a key to the GSP Groups. The TLF values for each GSP Group are ordered geographically from the most northern (GSP Group P – North of Scotland) to the most southern (GSP Group L – South Western).

⁵ P82 'Introduction of Zonal Transmission Losses' was approved in 2003 but implementation was halted part-way through following a judicial review.

TLF Sensitivity to "Missing" Demand



GSP Group	GSP Group Name
A	Eastern
B	East Midlands
C	LE Distribution
D	Merseyside & North Wales
E	Midlands
F	Northern
G	North Western
H	Southern
J	South Eastern
K	South Wales
L	South Western
M	Yorkshire Electricity
N	South of Scotland
P	North of Scotland

2.3.4 The results of this exercise led the Modification Group to conclude that the impact of the issue on TLFs was unlikely to be substantial, and that it did not affect its assessment of the merits of the proposals. However, even though the materiality of the issue on TLF values was low, it was recognised that small variations in these values could have higher materiality for Parties when translated into Trading Charges. The Modification Group therefore agreed that the issue was an operational one, and should be resolved prior to the live implementation of any of the four transmission losses proposals (or their Alternative Modifications where applicable).

- 2.3.5 A minority of the Group considered that the issue should be addressed regardless of whether a zonal transmission losses scheme was approved – since, although it was acknowledged that the current Aggregation Rules do not represent an issue for Settlement, it was suggested that there was a broader operational issue regarding transparency. ELEXON therefore agreed that it would seek the views of the ISG before deciding how to progress the issue. Further information on the Modification Group's investigations and conclusions can be found in Section 4.4.3 and Appendix 8 of the P198 Assessment Report.⁶

Further ELEXON Investigations

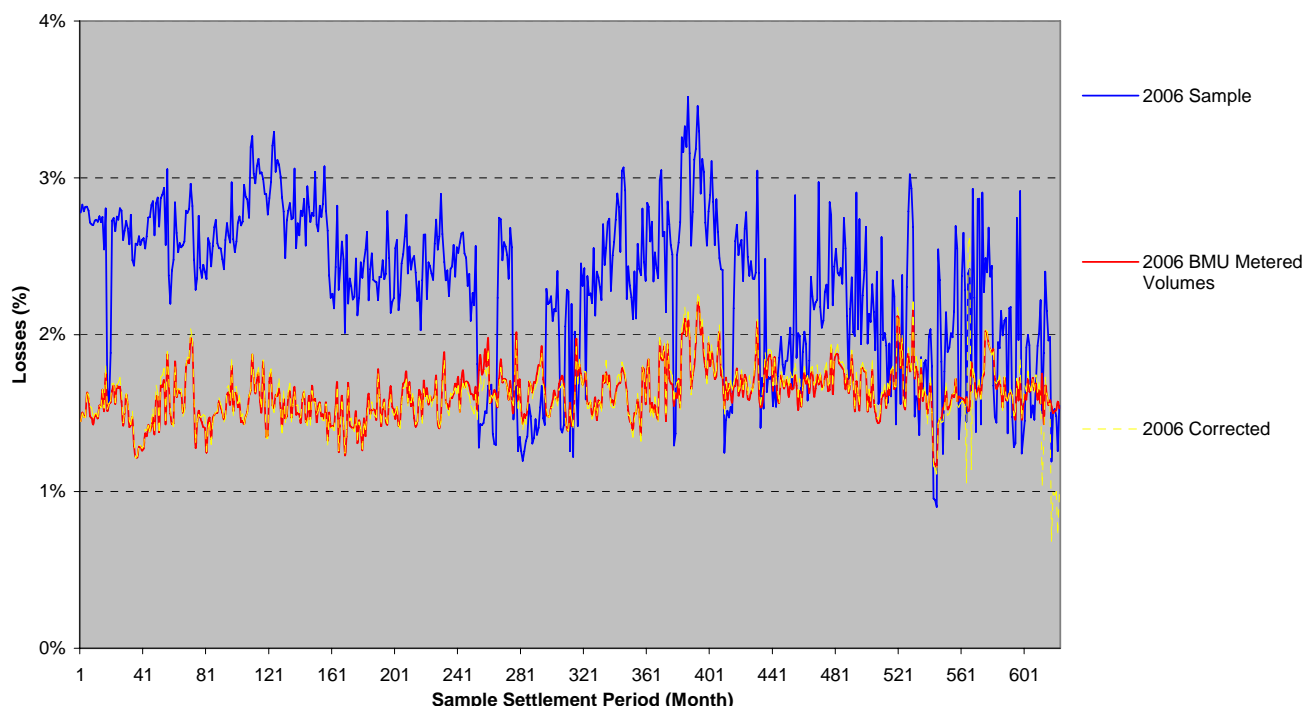
- 2.3.6 Following the submission of the losses proposals to the Authority, further investigation by ELEXON has subsequently identified that the specific source of the discrepancy between the metered data sample and BM Unit Metered Volumes is the Aggregation Rules for those GSPs which are shared between a GSP Group and a directly-connected BM Unit. The metered data sample used to calculate TLFs contains Metered Volumes for both directly-connected BM Units and GSPs. Since the current Aggregation Rules for shared GSP Metered Volumes do not subtract the directly-connected BM Unit flow at the GSP, these BM Unit flows are effectively double-counted in the metered data sample – thereby understating the level of demand and overstating the level of losses.
- 2.3.7 Although ELEXON's initial analysis during the assessment of P198, P200, P203 and P204 had suggested that the Aggregation Rules for GSPs shared between GSP Groups were also a potential source of the issue, its further investigations have subsequently eliminated these GSPs as a cause. ELEXON has confirmed that the Aggregation Rules for these GSPs correctly determine the aggregate GSP Metered Volume as the net effect of the majority and minority LDSO flows in accordance with the Code, and therefore reflect the full demand as intended in the metered data sample.
- 2.3.8 Through ELEXON's further analysis, the number of affected GSPs has therefore been identified as eight. The following table identifies the affected directly-connected BM Units:

BM Unit	Name	GSP Group
T_TILBD	Tilbury Demand	A
T_EECL-1	Enfield Energy Centre CCGT	B
T_HEYM2-D	Heysham 2 Station Demand	G
T_LITTDD	Littlebrook D Station Demand	C
T_USKM-13	Uskmouth Gen 13	K
T_USKM-14	Uskmouth Gen 14	K
T_USKM-15	Uskmouth Gen 15	K
T_ABTHD	Aberthaw Station Demand	K

- 2.3.9 In order to verify that the identified BM Units were the source of the issue, ELEXON prepared a 'corrected' metered data sample which removed the volumes associated with the identified BM Units. This corrected sample was created by identifying the net Metered Volume of the affected BM Units and subtracting the results from the implied level of losses in the original P198 metered data sample. The level of losses in the corrected data sample was then compared with those in the BM Unit data for the same Settlement Periods. The results are shown in the graph below.

⁶ A copy of the P198 Assessment Report is available from the BSC Website at:
<http://www.elexon.co.uk/documents/modifications/198/P198AR20.pdf>

Losses (BMU Vs Sample)



- 2.3.10 The level of losses in the corrected sample is closely aligned with the expected level (on average 1.62% per Settlement Period) and the level of implied losses in the BM Unit data for the same period. The results show that the difference in losses between the original and corrected samples is generally well-explained by the volumes associated with the identified BM Units, and the average Settlement Period difference between the level of losses implied by the corrected sample and the BM Unit data is 0.21 MWh across the 623 sample Settlement Periods. Whilst some differences still remain (particularly for more recent dates), this is believed to be due to II Run data being used to generate the original sample and more recent Reconciliation Run information being used in the BM Unit data and corrected sample.
- 2.3.11 ELEXON therefore believes that the Aggregation Rules for those GSPs shared between a GSP Group and a directly-connected BM Unit can be demonstrated to be the root cause of the overstated level of losses in the TLF metered data sample.

3 Proposed Solution

3.1 Revised Aggregation Rules for GSPs/GSP Groups

- 3.1.1 ELEXON proposes to revise the existing LDSO Aggregation Rules for those GSPs which are shared between a GSP Group and a directly-connected BM Unit, in order to fully align them with the Code requirements. Under the proposed new Aggregation Rules for such GSPs, any directly-connected BM Unit flow at the GSP will be subtracted from the GSP flow such that it is not counted in the GSP Metered Volume.
- 3.1.2 A corresponding change will also be required to the Aggregation Rules by which the CDCA determines the GSP Group Take, such that these no longer net off the directly-connected BM Unit flow. Through this change, the GSP Group Take calculation will also be fully aligned with the Code requirements.

3.2 Clarification of Example Aggregation Rules in BSCP75

- 3.2.1 BSCP75 contains examples of typical configurations and Aggregation Rules for Volume Allocation Units. However, it does not currently contain an example of Aggregation Rules for a GSP which is shared between a GSP Group and a directly-connected BM Unit, and this is believed to have contributed to ambiguity as to how such GSPs should be treated.
- 3.2.2 ELEXON proposes to add an additional example to the BSCP, illustrating how the Aggregation Rules submitted by LDSOs for such GSPs should net off the directly-connected BM Unit flow in accordance with the Code requirements.

4 Costs and Benefits of Proposed Solution

- 4.1 ELEXON believes that amending the Aggregation Rules for shared GSPs and for GSP Group Take as proposed above will align working practice with the Code requirements, and thereby increase the transparency of the aggregation process. As the actual value of the GSP Group Take will remain the same, these changes will have no impact on Settlement.
- 4.2 ELEXON also believes that an additional worked example for participants within BSCP75 regarding these revised rules will remove any existing ambiguity as to how such GSPs should be treated within the aggregation process, and will therefore increase the clarity and transparency of the rules.
- 4.3 In addition, a secondary benefit of the changes will be the removal of any potential for the accuracy of TLF values (and therefore Settlement accuracy) to be challenged, were a zonal transmission losses scheme to be approved. The four transmission losses Modification Proposals are currently still with the Authority for decision. The earliest possible implementation date for any of the proposals is 1 April 2008 (if an Authority decision is received by 22 March 2007), with the next possible implementation being 1 October 2008 (if an Authority decision is received by 20 September 2007).
- 4.4 A Change Proposal (CP) is not required to amend Aggregation Rules, since the Code allows the CDCA to request the resubmission of these rules at any time (and LDSOs must comply with such a request). Although the Code places the requirement on LDSOs to submit GSP Aggregation Rules, in practice ELEXON provides a service to LDSOs to support this requirement – whereby the rules are prepared by ELEXON and passed to the relevant LDSOs for agreement. For this reason, the proposed rule changes are anticipated to have a minimal impact on LDSOs, whose obligations will be limited to agreeing the revised rules prior to submission to the CDCA. The costs to ELEXON of preparing the rules for LDSO agreement will be less than 5 man days' effort.
- 4.5 Logica has confirmed to ELEXON that processing the revised Aggregation Rules will incur zero cost – providing that it only adopts the revised rules for future Reconciliation Runs, and is not required to repeat any runs which have already been carried out using the existing rules. Since the metered data sample which would be used in the TLF calculation under P198, P200, P203 or P204 would cover the period 1 September 2006 – 31 August 2007 (for both an April and October 2008 implementation), Logica has advised that the cut-off point for implementing the revised Aggregation Rules and avoiding such reruns under any of the losses proposals is 1 April 2007.

- 4.6 Postponing the changes until the Authority has reached its decision on the Modification Proposals would therefore risk incurring greater costs should one of the proposals be approved, and would not address the divergence between working practice and the Code requirements. For these reasons, ELEXON proposes to implement the revised Aggregation Rules as soon as possible following the February 2007 ISG meeting, and no later than 31 March 2007. The changes would therefore be progressed independently of the implementation project for any zonal transmission losses scheme. The ISG is invited to endorse this approach.
- 4.7 ELEXON believes that the changes to BSCP75 are not required to be implemented at the same time as the revised Aggregation Rules – since the BSCP is currently silent on the rules for those GSPs which are shared between a GSP Group and a directly-connected BM Unit, and the proposed changes are limited to providing examples illustrating the existing Code requirements. ELEXON therefore proposes to raise a CP to progress the BSCP75 changes via the normal BSCP40 'Change Management' process, for inclusion in the next available release.
- 4.8 Under this approach, the BSCP changes will be implemented after the actual Aggregation Rules have been amended – such that the revised BSCP will support both the Code requirements and what will be existing practice by the time that the CP is implemented. The incremental implementation costs of including the BSCP changes within an existing release will be in the region of 1-2 man days of ELEXON effort, and will be limited to implementing the redlined changes which will have been agreed as part of the CP process. The ISG is invited to endorse the proposed approach for progressing and implementing the changes to BSCP75. Further detail regarding the intended scope of the CP can be found below.

5 Scope of Draft CP

- 5.1 ELEXON has prepared a draft CP and accompanying redlined changes to BSCP75, copies of which are provided as Attachments 1 and 2 to this paper.
- 5.2 The main change proposed by the CP is to add the additional clarifications regarding shared GSPs described in Section 3 of this paper. However, in preparing the redlined drafting, ELEXON has also identified other instances where it believes that further clarity would be beneficial in the example GSP and GSP Group Aggregation Rules provided in the BSCP. These changes have been included in the redlined drafting. These additional changes will have no impact on the obligations of Parties, since they will be beneficial to Parties' understanding of the aggregation process and will reflect both existing industry practice and the Code requirements.
- 5.3 Finally, the opportunity has been taken to correct a small number of minor and self-evident typographical and formatting errors within the BSCP which ELEXON has identified during the drafting of the redlined changes (although the drafting does not constitute a full review of the BSCP). ELEXON believes that it will promote efficiency to correct these errors as part of the CP.
- 5.4 ELEXON proposes to raise the CP following the February 2007 ISG meeting. The ISG is invited to endorse this next step (noting that the CP and draft redlined changes will be subject to further impact assessment, review and approval under the normal BSCP40 change process).

- 5.5 The CP has been drafted using the current live version of the CP form in BSCP40 (which is effective till 21 February 2007). The ISG is asked to note that, should the CP be raised after the implementation of the revised BSCP40 for CP1170 on 22 February 2007,⁷ its contents will be transferred to the new CP form.

6 ELEXON Recommendations and Next Steps

6.1 The ISG is invited to:

- a) **ENDORSE** ELEXON's proposed revisions to the shared GSP and GSP Group Take Aggregation Rules as set out in this paper;
- b) **ENDORSE** ELEXON's recommendation that the revised Aggregation Rules should be implemented as soon as possible and no later than 31 March 2007;
- c) **ENDORSE** ELEXON's recommendation to raise a CP to provide an additional example of shared GSP Aggregation Rules, clarify other examples of GSP and GSP Group Aggregation Rules, and address other minor identified typographical and formatting errors within BSCP75; and
- d) **ENDORSE** ELEXON's proposed scope and implementation approach for the CP, and **NOTE** the accompanying draft redlined changes for BSCP75 (noting that these will be subject to further impact assessment, review and approval under the normal BSCP40 process).

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List of attachments

Attachment 1 – Draft CP 'Clarification of GSP and GSP Group Aggregation Rules'

Attachment 2 – Redlined draft BSCP75 'Registration of Meter Aggregation Rules for Volume Allocation Units'

⁷ CP1170 'Improving the BSC change process'.