119/04

ASSESSMENT REPORT for Modification Proposal P204 'Scaled Zonal Transmission Losses'

Prepared by: P204 Modification Group

Date of Issue:	8 November 2006	**Document Reference:**	P204AR
Reason for Issue:	For Panel Decision	**Version Number:**	2.0

This document has been distributed in accordance with Section F2.1.10 of the Balancing and Settlement Code.[1]

Proposed Modification P204 seeks to introduce a zonal scheme for the allocation of the variable (heating) element of transmission losses, whereby zonal Transmission Loss Factors (TLFs) would be calculated for each BSC Year on an ex-ante (forecast) basis for each GSP Group ('TLF Zone') using a Load Flow Model based on the solution for P198. Under P198, some BM Units in some TLF Zones (e.g. generators in southern GSP Groups and Suppliers in northern GSP Groups) would be credited with energy through the Transmission Loss Multiplier (TLM) as a result of the introduction of zonal TLFs, whilst the Metered Volumes of other BM Units would be scaled down (i.e. they would receive an energy debit to fund that credit). In contrast, P204 seeks to ensure that on average (as far as is practicable) no BM Units are credited with energy (i.e. receive payments), as a result of a zonal allocation of transmission losses, through the TLM. Under P198 a scaling factor of 0.5 is applied to the zonal TLFs. P204 proposes a different scaling factor calculated so that, on average only energy debits due to losses would be sought, with no debit (or credit) sought for the most favourable locations. Furthermore, P204 proposes that that both zonal TLFs and scaling factors are calculated and applied on a seasonal basis, by each BSC Season.

No Alternative Modification has been developed for P204.

MODIFICATION GROUP'S RECOMMENDATIONS

The P204 Modification Group invites the Panel to:

- **AGREE that Proposed Modification P204 should not be made;**
- **AGREE a provisional Implementation Date for Proposed Modification P204 of 1 April 2008 if an Authority decision is received on or before 22 March 2007, or 1 October 2008 if the Authority decision is received after 22 March 2007 but on or before 20 September 2007;**
- **AGREE the draft legal text for Proposed Modification P204;**
- **AGREE that Modification Proposal P204 be submitted to the Report Phase; and**
- **AGREE that the P204 draft Modification Report be issued for consultation and submitted to the Panel for consideration at its meeting of 9 November 2006.**

[1] The current version of the Code can be found at http://www.elexon.co.uk/bscrelateddocs/BSC/default.aspx.

CONTENTS TABLE

SUMMARY OF IMPACTED PARTIES AND DOCUMENTS

As far as the Modification Group has been able to assess, the following parties/documents would be impacted by P204.

Please note that this table represents a summary of the full impact assessment results in Appendix 3.

Parties		Sections of the BSC		Code Subsidiary Documents	
Distribution System Operators	☐	A	☐	BSC Procedures	☒
Generators	☒	B	☐	Codes of Practice	☐
Interconnectors	☒	C	☐	BSC Service Descriptions	☒
Licence Exemptable Generators	☒	D	☐	Party Service Lines	☐
Non-Physical Traders	☐	E	☒	Data Catalogues	☒
Suppliers	☒	F	☐	Communication Requirements Documents	☒
Transmission Company	☒	G	☐	Reporting Catalogue	☒
Party Agents		H	☒	Load Flow Model Specification*	☒
Data Aggregators	☐	I	☐	**Core Industry Documents**	
Data Collectors	☐	J	☐	Ancillary Services Agreement	☐
Meter Administrators	☐	K	☐	British Grid Systems Agreement	☐
Meter Operator Agents	☐	L	☐	Data Transfer Services Agreement	☐
ECVNA	☐	M	☐	Distribution Codes	☐
MVRNA	☐	N	☐	Distribution Connection Agreements	☐
BSC Agents		O	☐	Distribution Use of System Agreements	☐
SAA	☒	P	☐	Grid Code	☐
FAA	☐	Q	☐	Master Registration Agreement	☐
BMRA	☒	R	☐	Supplemental Agreements	☐
ECVAA	☐	S	☐	Use of Interconnector Agreement	☐
CDCA	☒	T	☒	**BSCCo**	
TAA	☐	U	☐	Internal Working Procedures	☒
CRA	☒	V	☒	**BSC Panel/Panel Committees**	
SVAA	☐	W	☐	Working Practices	☒
Teleswitch Agent	☐	X	☒	**Other**	
BSC Auditor	☒			Market Index Data Provider	☐
Profile Administrator	☐			Market Index Definition Statement	☐
Certification Agent	☐			System Operator-Transmission Owner Code	☐
Transmission Loss Factor Agent*	☒			Transmission Licence	☐
Other Agents				Network Mapping Statement*	☒
Supplier Meter Registration Agent	☐			Load Flow Model Reviewer*	☒
Data Transfer Service Provider	☐				

*New document/role introduced by P204

1 EXECUTIVE SUMMARY

The key conclusions of the P204 Modification Group ('the Group') are outlined below.

The Group:

- **AGREED** that the solution for the calculation of zonal Transmission Loss Factors (TLFs) under Proposed Modification P204 should be based on that developed for Alternative Modification P198 (i.e. seasonal TLFs) but without phasing;
- **AGREED** that the load-flow modelling exercise undertaken for P198 was also relevant for the assessment of P204;
- **COMMISSIONED** an independent consultant to provide a cost-benefit analysis of P204, including a projection of the likely future impact of scaled zonal TLFs on the market over ten years;
- **AGREED** by majority that the Proposed Modification would not better facilitate the achievement of the Applicable BSC Objectives;
- **AGREED** that no Alternative Modification be developed;
- **NOTED** that the central implementation costs for the Proposed were estimated to be £491,000 (additional £24,000 over P198 Proposed Modification), with ongoing annual operational costs in the region of £167,000 (additional £8,000 over P198); and
- **AGREED** that the Implementation Date for the Proposed Modification should be tied to Parties' contract rounds – giving the following proposed dates:
    - 1 April 2008, if an Authority decision is received on or before 22 March 2007; or
    - 1 October 2008, if an Authority decision is received after 22 March 2007 but on or before 20 September 2007; and
- **AGREED** that the draft legal text delivers the intended solution for the Proposed Modification.

It should be noted that the Assessment Report for P198 (Reference 1) and P204 Requirement Specification (Reference 2) contain further details on the zonal TLF methodology and an in-depth description of the scaling factor calculation requirements respectively. Parties are requested to refer to these two documents for further information in these areas.

Section 2 provides an explanation of the existing allocation of transmission losses, other related proposals in the area of transmission losses, and the zonal transmission losses scheme as proposed by P204. A description of the P204 solution is provided in Section 3. Further information regarding the Group's initial discussions of the areas set out in the P204 Terms of Reference is contained in Section 4.

A summary of the consultation responses and the Group's consideration thereof can be found in Section 5 (with the full consultation responses provided in Appendix 4). A copy of the Group's full Terms of Reference can be found in Appendix 2, whilst a summary of the responses to the Assessment Procedure impact assessment can be found in Appendix 3.

2 BACKGROUND

2.1 Types of Transmission Losses

The total metered energy which can be drawn from the Transmission System to meet demand will always be less than that delivered onto the Transmission System by generation, since some energy is used in the process of transporting electricity. The energy 'lost' from the Transmission System is commonly referred to as 'transmission losses'. Transmission losses can be considered to comprise two main elements: 'fixed' losses and 'variable' losses.

Fixed losses are those which do not vary significantly with the power flow. In transformers, the losses arise from magnetising the iron core. In overhead lines, they include losses dependent on the voltage levels, length of line and climatic conditions.

Variable losses arise through the heat caused by current flowing through the transformers and lines. Variable losses increase with the current (and associated power flow) and the length of line in which it flows.

References to 'fixed' and 'variable' losses throughout this document have the meaning given above, whilst the term 'total' transmission losses is used to represent the sum of fixed and variable losses (i.e. the total energy lost from the Transmission System in any given period, calculated as the difference between total generation and demand).

2.2 Existing Allocation Mechanism for Transmission Losses

The rules and calculations for allocating transmission losses to Parties are set out in Section T2 of the Balancing and Settlement Code ('the Code'). These involve the adjustment of individual BM Unit Metered Volumes in Settlement to allocate transmission losses, whilst ensuring that total adjusted generation matches total adjusted demand in any given Settlement Period. Transmission losses are thereby allocated to Parties as part of their Trading Charges.

Under the existing Code provisions, both fixed and variable transmission losses in each Settlement Period are allocated to Parties on a 'uniform' (non-locational) basis in proportion to each Party's metered energy. The current allocation of transmission losses therefore does not take account of the extent to which individual Parties give rise to such losses. Although a parameter for a 'differential' allocation of some or all transmission losses is included in the Code, this is currently set to zero so has no practical effect. In the Section T calculation, this parameter is represented by the Transmission Loss Factor (TLF=0). This value can only be amended through a modification to the Code.

The formula below represents a simplified version of the Section T calculation for each BM Unit's share of total transmission losses in any given Settlement Period:

$$TLM=1+TLF+TLMO^{+/-}$$

A Transmission Loss Multiplier (TLM) is generated for each individual BM Unit in each half hour, and represents the factor used to scale each BM Unit's Metered Volume in Settlement. The Transmission Losses Adjustment (TLMO) uniformly adjusts all generation delivery or all demand offtake to ensure an exact allocation of the actual level of total losses in a given Settlement Period. The calculation of TLMO also includes the application of an 'alpha (α) factor' of 0.45 such that 45% of these total losses are allocated across all delivering Trading Units in aggregate (through the $TLMO^{+}$) whilst 55% are allocated across all offtaking Trading Units in aggregate (through the $TLMO^{-}$).[2]

[2] In practice, this split is designed to be equivalent to a 50:50 allocation, but with allowance for the fact that metering for most generation connections is on the high voltage side of the supergrid transformer, whereas that for demand is on the low voltage side. The 45:55 allocation of transmission losses is intended to allow for supergrid transformer losses for demand connections which are in addition to the metered flow.

The formulae below represent simplified versions of the $TLMO^+$ and $TLMO^-$ calculations:

$TLMO^+$ = -(0.45(total transmission losses in Settlement Period) + total adjustment to generators' volumes due to application of TLF in isolation) / total volume of generation in Settlement Period*

$TLMO^-$ = (–0.55(total transmission losses in Settlement Period) – total adjustment to Suppliers' volumes due to application of TLF in isolation) / total volume of demand in Settlement Period*

The value of $TLMO^+$ is the same in each Settlement Period for every BM Unit in all delivering Trading Units. The value of $TLMO^-$ is the same for every BM Unit in all offtaking Trading Units.

Since under the existing Code baseline the value of TLF is set to zero, the TLMO is currently the only determining factor in the calculation of each BM Unit's TLM. Two uniform TLM values are therefore currently applied: one to all BM Units in delivering Trading Units, and one to all BM Units in offtaking Trading Units. Each Party's overall allocation of transmission losses is dependent on the Metered Volumes of the BM Units to which this TLM is applied. Metered Volumes for BM Units in 'delivering' (exporting) Trading Units are currently scaled down (multiplied by $1+TLF+TLMO^+$), whilst Metered Volumes for BM Units in 'offtaking' (importing) Trading Units are scaled up (multiplied by $1+TLF+TLMO^-$).

2.3 Related Modification Proposals

There are currently three other Pending Modification Proposals being progressed in the area of zonal transmission losses. These proposals are currently with the Authority for decision. They are:

- Modification Proposal P198 'Introduction of a Zonal Transmission Losses Scheme' (raised by RWE Npower on 16 December 2005);
- Modification Proposal P200 'Introduction of a Zonal Transmission Losses Scheme with Transitional Scheme' (raised by Teesside Power Limited on 21 April 2006); and
- Modification Proposal P203 'Introduction of a Seasonal Zonal Transmission Losses Scheme' (raised by RWE Npower on 26 June 2006).

In addition, the P198 and P200 Modification Groups developed Alternative Modifications for both proposals. All of the proposals seek to introduce a locational allocation of variable losses through the calculation of 'zonal' TLF values, although their precise calculations and application of these values differ. A summary of the solutions can be found in Table 1 on the following page, whilst further detail regarding the proposals and their Alternatives can be found in Sections 2.3.1-2.3.3.

Please note that:

- The Panel's recommendation to the Authority contained in the Modification Reports for Proposed Modifications and their Alternatives (where applicable) for P198, P200 and P203, is that they should not be made; and
- All Modification Proposals; P198 (Proposed and Alternative), P200 (Proposed and Alternative), P203 and P204 are mutually exclusive, such that only one could be approved by the Authority for implementation.

Table 1 – Summary of Transmission Losses Modification Proposals

The key aspects of Modification Proposals P198, P200 and P203 are outlined below, and are shown against the P204 solution for comparison.

ASPECT OF SOLUTION	P198 PROPOSED	P198 ALTERNATIVE	P200 PROPOSED	P200 ALTERNATIVE	P203 PROPOSED	P204 PROPOSED
Scope of Zonal TLF Calculation	Scaled Marginal (Variable Losses Only)	Scaled Marginal (Variable Losses Only)	Scaled Marginal (Variable Losses Only)	Scaled Marginal (Variable Losses Only)	Scaled Marginal (Variable Losses Only)	Scaled Marginal (Variable Losses Only)
Scaling Factor	0.5 (Single Scaling Factor Fixed in Code)	0.5 (Single Scaling Factor Fixed in Code)	0.5 (Single Scaling Factor Fixed in Code)	0.5 (Single Scaling Factor Fixed in Code)	0.5 (Single Scaling Factor Fixed in Code)	Scaling Factor calculated in advance, one for each BSC Season (same value for delivery and offtaking BM Units)
Aim of Scaling Factor	Ensure Total Variable Losses are Allocated Through Scaled TLFs in Isolation	Ensure Total Variable Losses are Allocated Through Scaled TLFs in Isolation	Ensure Total Variable Losses are Allocated Through Scaled TLFs in Isolation	Ensure Total Variable Losses are Allocated Through Scaled TLFs in Isolation	Ensure Total Variable Losses are Allocated Through Scaled TLFs in Isolation	Ensure Total Variable Losses are Allocated Through Scaled TLFs as part of TLM, with constraint that no BM Units are credited with variable losses
Applicable Period for TLFs	BSC Year	BSC Season	BSC Year	BSC Season	BSC Season	BSC Season
Nature of TLF Calculation	Ex-Ante	Ex-Ante	Ex-Ante	Ex-Ante	Ex-Ante	Ex-Ante
Frequency of TLF Calculation	Annual	Annual	Annual	Annual	Annual	Annual
Applicable Zones for Production BM Units	GSP Group	GSP Group	GSP Group	GSP Group	GSP Group	GSP Group
Applicable Zones for Consumption BM Units	GSP Group	GSP Group	GSP Group	GSP Group	GSP Group	GSP Group
Mitigation of Impacts?	No	Yes	Yes	Yes	No	No
Type of Mitigation	-	Linear Phasing	Hedging	Hedging	-	-
Period of Mitigation	-	4 Years	15 Years	15 Years	-	-

2.3.1 Modification Proposal P198

P198 is currently with the Authority for determination. The P198 Modification Report was issued to the Authority on 22 September 2006 with a recommendation from the Panel that neither the Proposed Modification nor Alternative Modification should be made.

a) Proposed Modification P198

The solution for Proposed Modification P198 involves the following 'scaled marginal' methodology for calculating zonal TLFs:

1) An electrical model of the Transmission System (a 'Load Flow Model') would be built, containing 'Nodes' to represent points where circuits connect with each other and points where energy flows on or off the Transmission System. Each Node on the Transmission System would be identified by the Transmission Company, and those where flows on or off the system can occur would be allocated to a specific Zone on the transmission network on the basis of a 'Network Mapping Statement' maintained by BSCCo. The TLF Zones would be set by the Panel, based on the geographic areas covered by GSP Groups. Since there are currently 14 GSP Groups, there would therefore be 14 TLF Zones.

2) TLFs would be calculated on an ex-ante basis (i.e. forecasted) for each BSC Year, using Metered Volumes and Network Data for Sample Settlement Periods from a preceding 12-month period (the 'Reference Year'). The required Metered Volumes and Network Data would be provided by the Central Data Collection Agent (CDCA) and the Transmission Company respectively.

3) Prior to the start of each BSC Year (1 April – 31 March), the Load Flow Model would be run by a Transmission Loss Factor Agent ('the TLFA') to calculate how an incremental (or 'marginal') increase (or 'injection') in power at each individual Node, delivered to a fixed 'slack node' near the centre of the system, would affect the variable losses from the Transmission System. The output of the Load Flow Model would be a TLF value for each Node in each of the Sample Settlement Periods. Positive TLF values would be produced for Nodes where an incremental increase in generation (or reduction in demand) had the effect of decreasing variable losses. Negative TLF values would be produced for Nodes where an incremental increase in generation (or reduction in demand) had the effect of increasing variable losses. For example, if an injection of an extra unit of energy at a Node increased variable losses by 0.02 kWh, the TLF for that Node in that Settlement Period would be 0.02.

4) The TLFA would average these raw Nodal TLFs across all the Nodes in each TLF Zone by 'volume-weighted' averaging, to give 14 Zonal TLF values for each Sample Settlement Period (one per TLF Zone). The TLFA would then convert these to Annual Zonal TLFs by 'time-weighted' averaging.

5) The TLFA would adjust the Annual Zonal TLFs by a 0.5 scaling factor such that the volume of energy allocated via the TLFs alone was comparable to the volume of variable losses calculated by the Load Flow Model (P204 is similar to P198 but would use a different scaling factor). These 14 Adjusted Annual Zonal TLFs (one per TLF Zone) would be made publicly available by BSCCo no less than three months prior to their use in the TLM Settlement calculation for the applicable BSC Year.

6) Each BM Unit would be allocated to a specific TLF Zone by BSCCo on the basis of the Network Mapping Statement, with any question or dispute over their zonal allocation to be resolved by the Panel. Using the Network Mapping Statement, the TLFA would determine the TLF value to be applied to each BM Unit in the TLM Settlement calculation for the applicable BSC Year. This BM Unit-Specific TLF would be the Adjusted Annual Zonal TLF value for the Zone in which the BM Unit was located. All BM Units within a Zone would therefore receive the same single TLF value (the Adjusted Annual Zonal TLF for that Zone), for every Settlement Period within the applicable BSC Year. A positive TLF value would increase the value of TLM used to scale a BM Unit's Metered

Volume (a benefit to generators and disadvantage to Suppliers), whilst a negative TLF value would decrease the value of TLM (a benefit to Suppliers and disadvantage to generators).

7) The BM Unit-Specific TLFs calculated by the TLFA would be registered in BSC Systems by the Central Registration Agent (CRA), and would be used by the Balancing Mechanism Reporting Agent (BMRA) and the Settlement Administration Agent (SAA) within the Balancing Mechanism Reporting Service (BMRS) and Settlement calculations respectively.

8) The remaining 'fixed' element of transmission losses would continue to be allocated to Parties on a non-locational basis through the TLMO, and the overall 45:55 allocation of total transmission losses to generation and demand would be retained.

9) There would be no phased implementation or 'hedging' of exposure to the new zonal TLFs, which would therefore take full effect from the first Settlement Period on the Implementation Date.

Further detail regarding Proposed Modification P198 can be found in the P198 Assessment Report in Appendix 7.

b) Alternative Modification P198

Alternative Modification P198 is the same as Proposed Modification P198, except that it comprises:

- An annual ex-ante calculation of four Adjusted Seasonal Zonal TLF values for each TLF Zone, one for each BSC Season; and
- A linear phased implementation of these Adjusted Seasonal Zonal TLF values over the first four BSC Years of the scheme, such that TLFs would be applied at 20% of their full value in BSC Year 1, 40% in BSC Year 2, 60% in BSC Year 3, 80% in BSC Year 4, and 100% in BSC Year 5 and all subsequent years.

Further detail regarding Alternative Modification P198 can be found in the P198 Assessment Report in Appendix 7.

2.3.2 Modification Proposal P200

P200 is currently with the Authority for determination. The P200 Modification Report was issued to the Authority on 22 September 2006 with a recommendation from the Panel that neither the Proposed Modification nor Alternative Modification should be made.

a) Proposed Modification P200

Proposed Modification P200 seeks to introduce zonal TLFs under the same methodology as Proposed Modification P198 (i.e. an annual ex-ante calculation of one Adjusted Annual Zonal TLF value per TLF Zone), but with the addition of an F-factor 'hedging' scheme to mitigate the impact of TLFs on existing generators over 15 years.

Further detail regarding Proposed Modification P200 can be found in the P200 Assessment Report (Reference 3).

b) Alternative Modification P200

Alternative Modification P200 seeks to introduce zonal TLFs under the same methodology as Alternative Modification P198 (i.e. an annual ex-ante calculation of four Adjusted Seasonal Zonal TLF values per TLF Zone), but with the addition of a 15-year F-factor 'hedging' scheme for existing generators.

Further detail regarding Alternative Modification P200 can be found in the P200 Assessment Report (Reference 3).

2.3.3 Modification Proposal P203

P203 is currently with the Authority for determination. The Modification Report was issued to the Authority on 22 September 2006 with a recommendation from the Panel that the Proposed Modification should not be made.

Proposed Modification P203 seeks to introduce an annual calculation of seasonal TLF values which is identical to Alternative Modification P198, except that (unlike P198 Alternative) there would be no phased implementation of these values. No Alternative Modification was developed for P203.

Further detail can be found in the P203 Assessment Report (Reference 4).

2.4 Application of a Scaling Factor in Zonal Transmission Losses

Transmission Losses consist of a fixed element and a variable element which varies with power flow. The Load Flow Model only establishes the relationship between variable losses and power flow (the TLF) at the margin (i.e. for a marginal injection of power at each Node). The nature of the relationship between power flow and variable loss is such that applying unadjusted TLFs to whole Metered Volumes would result in an over-allocation of variable losses. Under P198 (Proposed and Alternative Modifications), P200 (Proposed and Alternative Modifications) and P203, a scaling factor of 0.5 would be used in the TLF calculation to seek to ensure that the losses allocated through TLFs in isolation would be comparable to the level of variable losses calculated by the Load Flow Model.

The detailed modelling exercise carried out by an external consultant on behalf of the P198 Modification Group concluded that 0.5 was the appropriate scaling factor to achieve this intention. One member of the P198 Group – whilst not disagreeing with this conclusion – suggested an 'alternative scaling' approach based on a different principle, whereby it would attempt to ensure that no BM Units were credited with energy through the TLM. This was considered by the Group as a potential option for an Alternative Modification to P198. However, whilst some members were sympathetic to this approach, the Group agreed by majority not to assess it further as part of P198. Some members noted that there could be more than one way of achieving the intention of such an approach, and believed that it would be more appropriate for 'alternative scaling' to be raised as a Standing Issue or a separate Modification Proposal to allow the industry to consider the most appropriate solution. Other members supported this suggestion, believing that the 'alternative scaling' approach would require a substantive assessment in its own right to investigate its impact on the allocation of losses. Other members believed that such an approach would be seeking to address a different defect to P198, and was therefore outside the scope of any P198 Alternative Modification.

P204 was subsequently raised as a separate Modification Proposal. Further detail regarding the P198 Group's discussions can be found in the P198 Assessment Report in Appendix 7.

P204 was raised on 3 July 2006 by British Energy ('the Proposer'). Like P198, P204 argues that the Code's existing uniform allocation of losses fails to allocate the cost of losses appropriately between BM Units at different locations. Like P198, P204 seeks to introduce a zonal scheme for the allocation of variable losses. However, the principle behind the application of a scaling factor in P204 would be different to that in P198.

a) Principle of P198

Under P198, some BM Units in some TLF Zones (e.g. generators in southern GSP Groups and Suppliers in northern GSP Groups) would be credited with energy through their resulting TLMs. The adjusted Metered Volumes (credited energy) of these BM Units would be made more positive, which would be a benefit to both generators and Suppliers since it would respectively increase their adjusted volume of generation or decrease their adjusted volume of (negative) demand. The adjusted Metered Volumes (credited energy) of other BM Units would be made more negative (i.e. they would receive an energy debit). This would be a disbenefit to both generators and Suppliers since it would respectively decrease their adjusted volume of generation or increase their adjusted volume of (negative) demand. On average, the intention would be that the amount of downward (more negative) adjustment would exceed the amount of upward adjustment by an amount exactly equal to the magnitude of actual losses.

This can be seen in Figures 1 and 2 below, which show the estimated TLMs for delivering and offtaking Trading Units which would have been likely to apply in 2006/2007 under Proposed Modification P198.

Figure 1 – P198 TLMs for 2006/2007 'Peak' Settlement Period

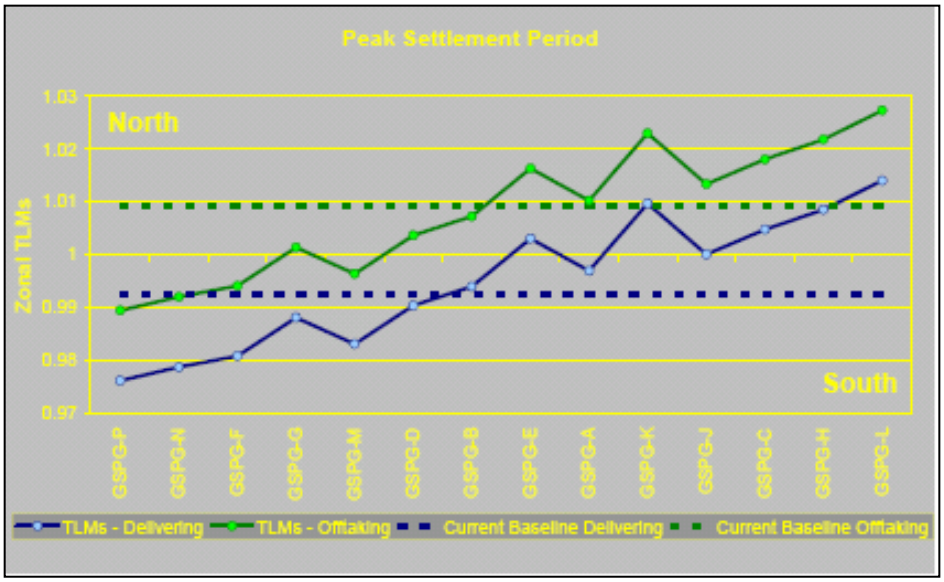
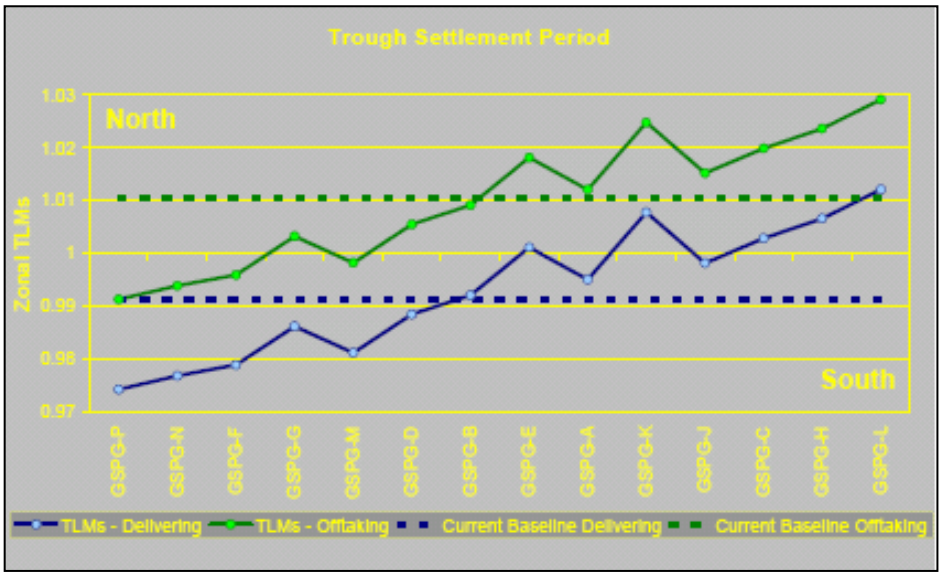


Figure 2 – P198 TLMs for 2006/2007 'Trough' Settlement Period



At a simple level, under P198 southern generation and northern demand would be 'rewarded' for helping to reduce losses, whilst northern generation and southern demand would be 'penalised' for contributing to an increase in losses. Table 2 indicates the likely initial distributional effects of P198 had the scheme been in place for the year 2006/7, estimated as part of the P198 cost-benefit analysis by an external consultant on behalf of the P198 Modification Group. This analysis was based on annual TLFs.

Table 2 – Assumed Distributional Impacts of P198 (for year 2006/2007, annual TLFs)

	North	South
Generators (Total)	Increase payments by: £43m in Scotland £42m in Northern England	Decrease payments by £85m
Suppliers (Total)	Decrease payments by: £41m in Scotland £40m in Northern England	Increase payments by £81m

These distributional effects are consistent with the belief of the Proposer of P198 that the existing uniform allocation of losses constitutes a 'cross-subsidy', whereby southern generators and northern Suppliers pay part of the costs of transporting electricity to the south. For the Proposer of P198, the above distributional effects are therefore appropriate – since they are believed to represent the removal of this cross-subsidy, whilst providing economic signals to incentivise the short-term despatch and long-term location of generation closer to demand. Opposing views to this are that these distributional impacts represent windfall gains and losses to Suppliers and generators. Further detail regarding these arguments can be found in the P198 Assessment Report in Appendix 7.

b) Principle of P204: Alternative Scaling Factor(s)

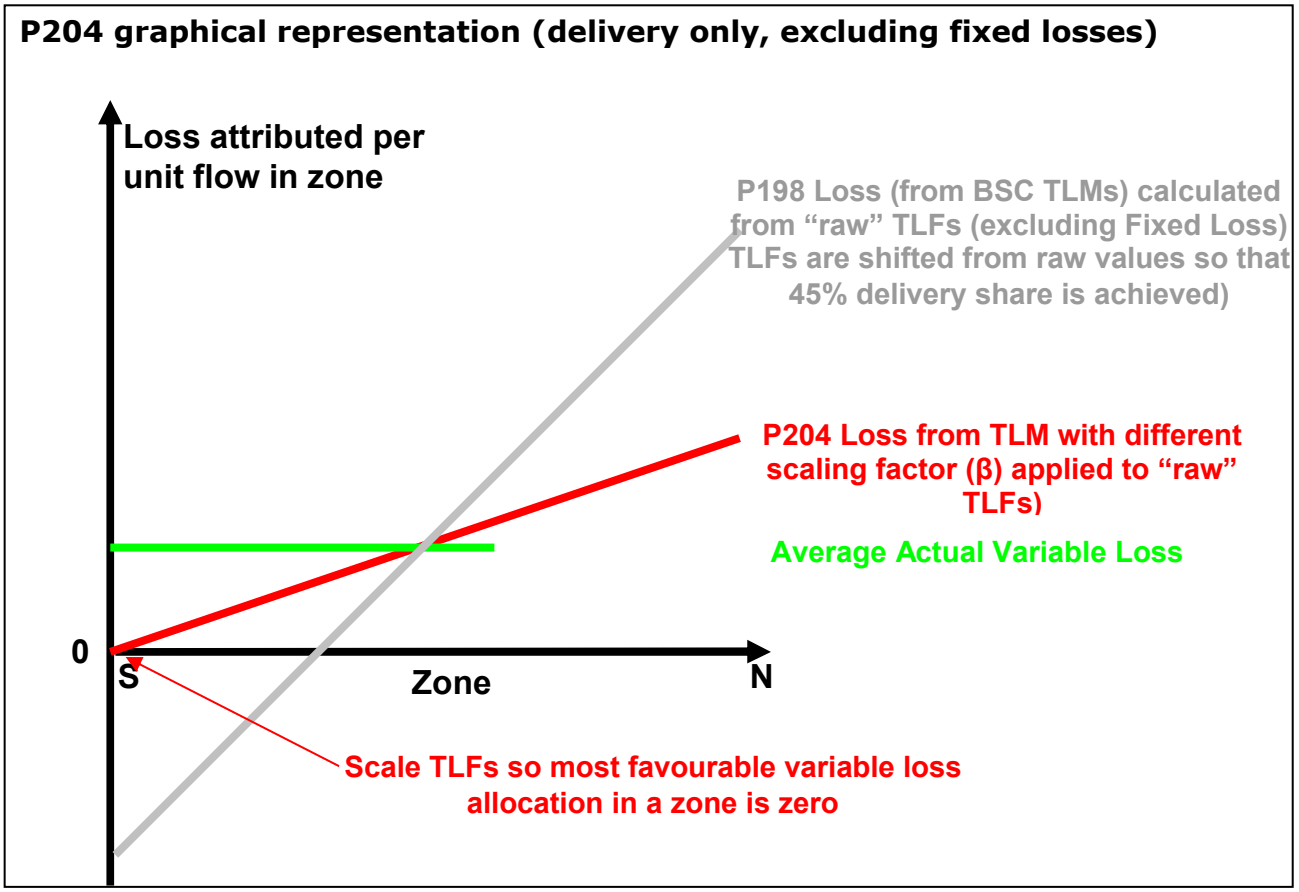
The Proposer of P204 does not believe that such large gross transfers of credited energy between locations are appropriate or necessary to achieve the intention of a zonal transmission losses scheme. The Proposer of P204 believes that:

- The gross volume transfers created by P198 could be comparable or greater than the net actual amount of losses;
- The averaging inherent in an annual zonal TLF calculation could create significant material errors in loss allocation and signals under P198; and
- The economic rationale behind P198 is weakened by the fact that losses are a second-order consideration for most long-term investment and operation, which would therefore be subject to windfall gains and losses.

However, the Proposer believes that it is possible to address the defect of the existing uniform allocation, and create a more appropriate allocation of costs, without creating such large distributional effects. Under the solution proposed by P204, zonal TLF values would still be calculated to allocate variable losses to BM Units on a locational basis, and the existing uniform allocation of fixed losses would be retained (45% to generation and 55% to demand overall). However, TLF values would be scaled such that, as far as is practicable, no BM Units were credited with energy (i.e. effectively received payments for losses) through the application of TLM.

Under this approach, the most favourable outcome for a BM Unit would be a uniform allocation of fixed losses with no allocation of variable losses. This outcome would apply to BM Units in the most advantageous TLF Zone for the flow direction of the BM Unit – and would be a more favourable outcome for these BM Units than at present, where a uniform allocation of total losses (fixed and variable) applies. The least favourable position for a BM Unit would be in the Zone with the 'worst' scaled TLF (i.e. the most negative for generation and most positive for demand), where BM Units would be allocated fixed losses on a uniform basis and variable losses on a zonal basis, with a larger variable loss allocation than under the current uniform baseline. This would be a less favourable outcome for these BM Units than at present, where they receive a uniform allocation of both fixed and variable losses. Other Zones would have intermediate effects depending on the scaled TLF for the Zone. This is illustrated in Figure 3.

Figure 3 - Principle of P204 Scaling Factor



It should be noted that this graphical representation illustrates the principle behind P204 and not its detailed application in Settlement. P204 can be considered to represent the P198 solution with a different scaling factor (or factors) calculated and applied. The scaling factor β reduces the spread of zonal TLFs. Example calculations from the Proposer showed under P198 (0.5 scaling factor): -1.5% < zonal TLMs < 2.5% and under P204 (β = 0.125) 0.2% < zonal TLMs < 1.3%, as compared with current values of about 0.7% for delivery and 0.9% for offtake. Further diagrammatical representations of P204 can be found in the Proposer's presentation at the Panel meeting on 13 July 2006 (Panel meeting July 2006) and ELEXON's presentation at the Panel meeting on 14 September 2006 (Panel meeting September 2006).

2.5 Allocation of Losses

BSC Section T describes how each BM Unit's Metered Volume is multiplied by the TLM to determine the Credited Energy Volume for the relevant Party Energy Account. Also, Bid-Offer Volumes are multiplied by the TLM for the BM Unit for the purposes of Bid-Offer Payments and in determining the Energy Imbalance Price. The applicable TLM for a BM Unit depends on whether it is in a delivering Trading Unit or an offtaking Trading Unit. In this section, the term generation is used to describe the usual case of generation in a delivering Trading Unit and demand in an offtaking Trading Unit. The explanations below operate in reverse where generation is in an offtaking Trading Unit or demand in a delivering Trading Unit.

Under the current rules losses are allocated on a uniform basis and:

- For generation, TLM is less than one and reduces the credited energy derived from metered output; and
- For demand (negative), TLM is greater than one and increases effective demand.

Under P198, the zonal TLFs alter the value of the TLM (see equation in Section 1.2). In the most favourable Zones for each of generation or demand, the TLM could be such that (if the full value of the TLF is applied):

- For generation, TLM is more than one and increases effective output; and
- For demand (negative), TLM is less than one and reduces effective demand.

This would mean that the relevant generation or demand is effectively allocated a negative amount of losses, in other words a 'credit'.

Under P204, the application of the β scaling factor would mean that in the most favourable Zone for each of generation and demand:

- For generation, TLM is less than one and reduces effective output, but only as a proportion of fixed losses, i.e. generated less but more than currently; and
- For demand, TLM is more than one and increases effective demand, but only as a proportion of fixed losses, i.e. consumed more, but less than currently.

Conversely, under P204, it would mean that in the least favourable zone for each of generation and demand:

- For generation, TLM is less than one and reduces effective output, by a proportion of fixed losses plus a larger than average share of variable losses, i.e. effective generation reduced more than currently but less than under P198; and
- For demand, TLM is greater than one and increases effective demand, by a proportion of fixed losses plus a larger than average share of variable losses, i.e. effective demand increased more than currently but not as much as under P198.

3 SUMMARY OF P204 SOLUTION

3.1 P204 Proposed Modification

3.1.1 Scaling Factor β

The key feature of the P204 solution (over and above the solution for P198) is the requirement to calculate a scaling factor β, and apply it to the zonal TLF values before they are used in Settlement. As explained in the attachment to Modification Proposal P204, the intent of the scaling factor is that no BM Units are credited with energy (i.e. receive payments) through the application of locational TLFs in TLM. The term 'avoiding credits due to losses' is used as shorthand for this principle within this document. However, it should be noted that the proposal does not alter the Code's treatment of BM Units in Trading Units whereby BM Units with opposite flow direction to the Trading Unit as a whole may receive a credit. This constraint is depicted by the following mathematical equations for calculating scaling factors $\boldsymbol{\beta^+_j}$ and $\boldsymbol{\beta^-_j}$ that will achieve the intent of P204 in a given Settlement Period (j):

$$\beta^+_j = \min(1, \alpha * VL_j / [\ \mathrm{Max}(TLF) * \Sigma^+(QM) - \Sigma^+(TLF*QM)\ ])$$

$$\beta^-_j = \min(1, (1-\alpha) * VL_j / [\ \mathrm{Min}(TLF) * \Sigma^-(QM) - \Sigma^-(TLF*QM)\ ])$$

where:

- α is the parameter (equal to 0.45) defined in Section T2.2.1(b) of the Code;
- VL_j is the level of Variable Losses in the Settlement Period;
- Max(TLF) and Min(TLF) are the maximum and minimum unscaled TLF values for any BM Unit in that period;
- $\Sigma^+(QM)$ and $\Sigma^-(QM)$ are the total metered volumes for BM Units in delivering and offtaking Trading Units respectively; and
- $\Sigma^+(QM*TLF)$ and $\Sigma^-(QM*TLF)$ are the sum of $QM_{ij}*TLF_{ij}$ over delivering and offtaking Trading Units respectively.

Note that the above equations cap the scaling factors at 1, so that they would not scale up any zonal TLFs.

3.1.2 Key Features of Proposed Modification

The key features of the Proposed Modification are:

a) An annual calculation of Adjusted Seasonal Zonal TLFs so that as far as is practicable, on average, no BM Unit should expect to be credited with variable losses through the TLM mechanism (such that the most favourable outcome for a BM Unit would be a uniform allocation of fixed losses with no allocation of variable losses), see Section 4.3.1;

b) Calculation of scaling factors (β). This would utilise a calculation of four seasonal values of scaling factor in advance for each year, determined using calculated variable heating losses and zonal average TLFs and TLF weighted flows. The same values would be applied to both delivery and offtaking BM Units in each season, see Section 4.3.2;

c) Application of scaling factors in Settlement. The scaling factors would be applied to the seasonal zonal TLFs prior to input into Settlement (as for seasonal values under P198 Alternative); see Section 4.3.2; and

d) Publication of scaling factors: this would be an annual process, similar to publication of zonal TLFs under P198, see Section 4.3.2.

3.1.3 Process Description of Proposed Modification

Proposed Modification P204 requires the following steps to be undertaken in addition to the requirements under P198 to calculate zonal TLFs:

1. Estimate total variable losses (in accordance with the methodology in the LFM Specification) in each Sample Settlement Period used by the TLFA for the zonal TLF production. This step would be carried out by the TLFA as part of the calculation of TLF values;
2. TLFA to receive from BSCCo a file containing the total Metered Volumes for each Zone, split by delivering and offtaking Trading Units, for use in the calculation of scaling factors. The file will contain values of Zonal Delivering Metered Volume QM^{+}_{Zj} and Zonal Offtaking Metered Volume QM^{-}_{Zj} for each Zone and Sample Settlement Period. The data it contains will be sourced from the SAA-I014 Settlement Report (which ELEXON receives from the SAA, and loads into the TOMAS system);
3. TLFA to determine a scaling factor for delivery and one for off-take for each Sample Settlement Period. This would be based on using seasonal zonal TLFs (in accordance with the equation in paragraph 7.5 of the draft legal text in Appendix 1 of this document);
4. TLFA to calculate four time-weighted average seasonal scaling factors (in accordance with the equation in paragraph 7.6 of the draft legal text in Appendix 1 of this document). These overall scaling factors are the average of the minimum of the two scaling factor values above in each Sample Settlement Period; and
5. TLFA to apply the scaling factors to seasonal zonal TLFs before they are input in to the central systems. Therefore, there is no impact on central systems.

For a more in-depth description of the requirements please refer to the P204 Requirement Specification (Reference 2).

4 AREAS RAISED BY THE TERMS OF REFERENCE

This section outlines the conclusions of the Modification Group regarding the areas set out in the P204 Terms of Reference (see Appendix 2).

4.1 Applicability of Solution for P198 Proposed and P198 Alternative Modifications

The Group considered the applicability of the solutions put forward for the P198 Proposed Modification and P198 Alternative Modification. The Group agreed that the methodology and solution for calculating the raw zonal TLFs proposed in P198 are appropriate for P204. As P204 builds upon this solution, with a different calculation of the scaling factor, this document will not repeat any of the sections covering the description of the P198 solution. Therefore, respondents are asked to refer to the P198 Assessment Report in Appendix 7 for further details.

The P204 Group noted that the P198 Modification Group also agreed an Alternative for P198 which is based on the Proposed Modification, but with:

- zonal TLFs varying by BSC Season (four values per year instead of one annual value); and
- linear phasing of the new zonal TLF values over 4 years (20%, 40%, 60% and 80%).

The Group noted the benefits of seasonal zonal TLFs contained within the P198 Alternative Modification, e.g. providing more accurate despatch signals. The Group considered these benefits in the determination of the solution for the P204 Proposed Modification, see Section 4.3 below. The Group also considered the benefits and disbenefits of the phasing element of P198 Alternative under options for a P204 Alternative Modification, see Section 4.9.

4.2 P198 Load Flow Modelling and Cost-Benefit Analysis Results

The Group noted the results of the P198 load-flow modelling under by Siemens PTI (PTI). The Group agreed that these results were also applicable to P204 (see Appendix 6), and that no further load-flow modelling was therefore required for Proposed Modification P204.

The Group noted the results of the P198 cost-benefit analysis exercise undertaken by OXERA Consulting (OXERA). The Group agreed that a further external cost benefit analysis was required for determining the effects/impacts of the scaling factor approach under P204. The scope and results of the P204 cost-benefit analysis are covered in Section 4.5.

4.3 Consideration of the Key Definitions of Modification Proposal P204

The Group at its first meeting on 14 July 2006, considered the Modification Proposal's suggested approaches for the calculation and application of scaling factors under P204 as follows:

- Option 1: Single Average Scaling Factor;
- Option 2: Different Scaling Factor for Delivery and Offtake varied by Settlement Period;

The Group also considered the use of different scaling factors for delivery and offtake which would be calculated in advance and would not vary by Settlement Period, as referred to in Table 3 below.

In the Group's considerations of these options it discussed the following factors:

- The options above depend on the determination of fixed or variable losses. This determination is considered further in Section 4.3.1;
- The actual TLF values used could be annual (i.e. a single average value per Zone for each BSC Year), or seasonal (i.e. a single average value per Zone for each BSC Season), see Section 4.3.2;
- Separate scaling factors β^+ and β^- could be used in Settlement for delivering and offtaking BM Units; or a combined β value (equal to the minimum of the two) could be used for both, see Section 4.3.3; and
- The calculation of scaling factors could be carried out after the event ('*ex post*') for each Settlement Period; or in advance ('*ex ante*') at the same time as the TLF values are calculated. In the former case, the scaling factors would need to be calculated by the SAA, and reported to Parties for each Settlement Period. In the latter case, the scaling factors would be calculated by the TLFA for each Sample Settlement Period used in the TLF calculation, and then averaged (over each BSC Year or BSC Season) to derive annual or seasonal scaling factors. These scaling factors would then be incorporated into the published TLF values before they were passed to SAA for use in Settlement, see Section 4.3.4.

The Group considered the above factors at its meeting on 1 August 2006 and initial agreement was reached regarding the definition of the following options.

Table 3 – Options for the Calculation and Application of P204 Scaling Factors

Option	Zonal TLF	Scaling Factor Option	Separate values for Delivery and Off-take	Impact on Settlement Process for Calculation
1a	Annual	Ex-ante Annual	No	No
1b	Annual	Ex-ante Annual	Yes	Yes: SAA
1c	Seasonal	Ex-ante Seasonal	No	No
1d	Seasonal	Ex-ante Seasonal	Yes	Yes: SAA
2	Seasonal	Ex-post Settlement Period	Yes	Yes: SAA

The following sections describe the deliberations of the Group in reaching its agreement of the final solution for P204.

4.3.1 Determination of Fixed or Variable Losses

P204 Proposed Modification defines a constraint for the calculation of the scaling factor that on average no Trading Unit is credited with energy through the TLM mechanism such that "the most favourable outcome for a Trading Unit would be an allocation of its uniform proportion of fixed losses". This can be translated into "the most favourable outcome for a BM Unit is that it receives no proportion of variable losses". In order to satisfy this constraint the amount of fixed or variable losses needs to be estimated. Estimation is required because only total losses are directly measurable, not the separate variable or fixed components. The appropriate method for doing this depends on whether the calculation is performed *ex ante* (i.e. Options 1a, 1b, 1c or 1d) or *ex post* (i.e. Option 2):

a) If the calculation of scaling factors is carried out *ex post* (Option 2), the variable losses can be estimated by subtracting an estimate of fixed losses from the total metered losses in each Settlement Period. The Group agreed that under this option, the estimate of fixed losses (the 'Fixed Loss Parameter', FLP) would be set by the Panel in consultation with Parties. Analysis presented to the Modification Group by both National Grid and BSCCo suggested that a value of approximately 100 MWh would be appropriate, although the actual level of fixed losses does vary from Settlement Period to Settlement Period, depending primarily on weather-related variables (e.g. humidity). For further information see Appendix 1 of the P204 Requirements Specification. Some members noted that due to impact of weather on the level of fixed losses, it might be more appropriate for the value to be determined more regularly, for example on a monthly basis; and

b) If the calculation of scaling factors is carried out *ex ante* (Options 1a, 1b, 1c and 1d), the Group agreed that the variable losses calculated by the TLFA using the Load Flow Model could be used. This matches the Sample Settlement Periods which are used to calculate the zonal TLFs.

The above approaches have been used by the Group in the various options for calculating the scaling factor, considered by the Group below.

4.3.2 Ex-ante Annual (Option 1a) or Seasonal (Option 1c) Scaling Factors with Same Value for Delivering and Offtaking Trading Units

Under Options 1a or 1c, the scaling factors would be incorporated into the TLF values provided to the Central Registration Agent (CRA), and there would therefore be no impact on BSC central processes (e.g. Central Registration Service, Settlement Administration Agent or Balancing Mechanism Reporting Agent).

The Group noted that the calculation of scaling factors could in principle be carried out either by the Transmission Loss Factor Agent (TLFA), or by BSCCo. However, the Group agreed that it was more efficient within the TLFA role, and therefore agreed that the TLFA should perform the calculation. The steps to be undertaken would be as follows:

1. TLFA would calculate the total variable losses (in accordance with the methodology in the LFM Specification) in each Sample Settlement Period used by the TLFA for the zonal TLF production. This step is already carried out as part of the calculation of TLF values, and there is no additional impact;

2. TLFA would receive from BSCCo a file containing the total Metered Volumes for each Zone, split by BM Units in delivering and offtaking Trading Units, for use in the calculation of scaling factors. The file would contain values of Zonal Delivering Metered Volume QM^{+}_{Zj} and Zonal Offtaking Metered Volume QM^{-}_{Zj} for each Zone and Sample Settlement Period. The data it contains will be sourced from the SAA-I014 Settlement Report (which BSCCo receives from SAA, and loads into its Trading Operations Market Analysis (TOMAS) system);

3. TLFA would determine a scaling factor for delivery and one for off-take for each Sample Settlement Period. For Option 1a this would be based on using annual zonal TLFs, for option 1c it would use seasonal zonal TLFs;

4. For Option 1a, the TLFA would calculate a time-weighted average annual scaling factor. This overall scaling factor would be the average of the minimum of the two scaling factor values above in each Sample Settlement Period;

5. For Option 1c, the TLFA would calculate four time-weighted average seasonal scaling factors (in accordance with the equation in paragraph 7.5 of the draft legal text in Appendix 1). These overall scaling factors would be the average of the minimum of the two scaling factor values above in each Sample Settlement Period in each season;

6. For both Options 1a/c, the TLFA would apply scaling factors to zonal TLFs before they are input into the BSC central systems. Therefore, there would be no impact on central systems; and

7. Scaling factors would be published by BSCCo on the BSC Website at the same time as zonal TLFs (3 months before their application in Settlement).

4.3.3 Ex-Ante Annual (Option 1b) or Seasonal (Option 1d) Scaling Factors with Separate Values for Delivering and Offtaking Trading Units

These two options are similar to Options 1a and 1c respectively, with the difference that separate scaling factors (and hence separate TLF values) would be calculated for BM Units in delivering and offtaking Trading Units. Therefore, these options would require amendments to BSC central systems (i.e. CRA, SAA and BMRA) in order to use these separate TLF values.

As for 1a and 1c, these two options would be applied with Annual (1b) or Seasonal (1d) Zonal TLFs. The steps to be undertaken by the TLFA and BSC central systems would be as follows:

1. The TLFA would calculate the total variable losses for each Sample Settlement Period (as for options 1a/1c);

2. The TLFA would receive from BSCCo Zonal Delivering Metered Volume QM^{+}_{Zj} and Zonal Offtaking Metered Volume QM^{-}_{Zj} for each Zone and Sample Settlement Period (as for Options 1a/1c);

3. The TLFA would determine a scaling factor for delivery and one for offtake for each Sample Settlement Period. For Option 1b this would be based on using annual zonal TLFs, for Option 1d it would use seasonal zonal TLFs (as for Options 1a/1c);

4. For Option 1b, the TLFA would calculate two time-weighted average annual scaling factors, one for delivery and one for off-take and apply these to the annual zonal TLFs to create TLF^{+} and TLF^{-}, where TLF^{+} and TLF^{-} are the Delivering and Offtaking Transmission Loss Factors;

5. For Option 1d, the TLFA would calculate eight time-weighted average seasonal scaling factors, four values for delivery and four values for off-take and apply these to the seasonal zonal TLFs to create TLF^{+} and TLF^{-}, where TLF^{+} and TLF^{-} are the Delivering and Offtaking Transmission Loss Factors;

6. BSCCo would send these TLF^{+} and TLF^{-} values to the CRA. CRA would then send them to the BMRA and the SAA;

7. The BMRA and SAA applications would need to be amended to allow them to use TLF^{+} and TLF^{-} values in the TLM calculations; and

8. Scaling factors would be published by BSCCo on the BSC Website at the same time as zonal TLFs.

There are additional impacts under these two options such that BSC central systems are impacted as follows:

- The CRA must receive and store two TLF values (TLF^{+} and TLF^{-}) for each BM Unit rather than one;
- The CRA must send TLF^{+} and TLF^{-} values to the BMRA and SAA;

- The BMRS must be amended to use the appropriate TLF value for each BM Unit (based on the registration data provided by CRA); and
- The SAA Settlement system must be amended to use the appropriate TLF value for each BM Unit (based on whether it is in a Delivering or Offtaking Trading Unit in any given Settlement Period).

4.3.4 Option 2: Ex-Post Settlement Period Based Scaling Factors

In this option, the scaling factors would not be incorporated into the seasonal TLF values, but would instead be calculated for each Settlement Period by the SAA.

Under this option, the TLFA would have no involvement in the calculation of scaling factors. The TLFA process would therefore be unchanged from P198, except that P204 would not include the P198 requirement to apply a 0.5 adjustment factor to the calculated TLF values.

A potential difficulty of this option is that (unlike the other options described above) it does not allow the BMRS to use the same scaling factors as the SAA (as the SAA will not calculate the scaling factors until after the event). Approaches that could be taken to solving this problem include:

- Option A - Duplicate the Option 1(d) process described above, to derive scaled TLF+ and TLF- values, but purely for use in BMRA. SAA would use a single TLF value and calculate its own scaling factor. This has the disadvantage that it requires completely different TLF values in BMRA and SAA, which has a potentially large impact on central systems; or
- Option B – Define additional parameters, the Estimated Scaling Factors $E\beta^+$ and $E\beta^-$, for use by BMRA.

The Group considered that Option B was the most appropriate way forward. The key process steps for this option are therefore as follows:

1. In order to allow the SAA to estimate the level of variable losses, a Fixed Losses Parameter (FLP, representing the level of fixed losses in each Settlement Period) would be required. As for other similar Code parameters this would be set by the BSC Panel (after consultation with Parties, and with the approval of the Authority). The minimum requirement is for FLP to be determined as one value that is applied throughout the year. One member of the Group suggested that FLP be varied on a monthly basis, as its calculation is dependent on weather. Therefore, the Group considered that this parameter should be capable of being specified by month;
2. In order to provide BMRA with scaling factor values, estimated scaling factors ($E\beta^+$ and $E\beta^-$) would be required. These would be calculated by BSCCo and approved by the Imbalance Settlement Group (ISG), in the same way (and at the same time) as the Estimated Transmission Losses Adjustments ($ETLMO^+$ and $ETLMO^-$);
3. The TLFA would issue to CRA the seasonal zonal TLFs and BSCCo would send the FLP to the CRA;
4. The SAA would need to amend its calculations to:
    a. Use FLP to calculate variable losses in each Settlement Period;
    b. Use the results of the calculation of variable losses in each Settlement Period to calculate separate scaling factors (β^+_j and β^-_j) for delivery and off-take;
    c. Apply scaling factors to the calculation of TLM_{ij}, $TLMO^+_j$ and $TLMO^-_j$ for each Settlement Period;
5. The SAA would need to amend existing Settlement reports to identify scaling factors (β^+_j and β^-_j) by Settlement Period; and
6. The BMRA would need to amend its calculations to make use of the $E\beta^+$ and $E\beta^-$ scaling parameters provided.

4.3.5 Proposed Modification Solution

At the meeting on 23 August 2006, the Group considered the above options and agreed the solution for the Proposed Modification. This was based on the results of the impact assessment (see Section 4.7), the results of the P204 cost-benefit analysis (see Section 4.6), the results of the data analysis performed under Section 4.4 and the assessment of annual and zonal TLFs under P198 (see P198 Assessment Report in Appendix 7).

The Group considered that using zonal TLFs on a seasonal basis would provide more accurate despatch signals over annual zonal TLFs and therefore discounted Options 1a and 1b. Additionally, the Group believed that there was not enough evidence to support Options 1b, 1d and Option 2 on a cost-benefit basis. They felt that:

- The low materiality in application of different scaling factors for delivery and offtaking BM Units did not warrant separate values for delivery and offtake;
- The data analysis did not show sufficient justification for different scaling factor values or Settlement Period based scaling factors;
- For Option 2 there would be volatility and unpredictability in a ex-post calculation of scaling factors and hence TLF values; and
- The implementation costs for these options, which were approximately £1m, outweighed any perceived benefits.

At the meeting on 23 August 2006, the Group also noted that the cost-benefit analysis (see Section 4.6) illustrated higher benefits for a seasonal TLF approach over an annual approach based on the one year's worth of data (generation redespatch benefit for 2006/7: annual approach £3.4m and seasonal approach £8.3m). The Group requested that further cost-benefit analysis be undertaken to estimate 10 years' worth of benefits.

Therefore, the Group agreed that Option 1c, with seasonal zonal TLF values and an ex-ante calculation of seasonal scaling factors (same value for delivery and offtaking BM Units), should form the solution for the Proposed Modification.

The further cost-benefit analysis was presented to the Group at its meeting on 20 September 2006. The Group noted that the Net Present Value of future benefits to 2015/16 (net of costs) for the annual approach was £3.8m and for the seasonal approach £32.4m. Based on these results, the Group confirmed that the solution for the Proposed Modification should be based on a seasonal approach.

4.4 Impact of the P204 Scaling Factor on the Allocation of Losses

The Group were tasked with undertaking analysis of the P204 proposed scaling approaches, in particular to determine an indication of the likely values of the scaling factors under the proposed options; and analysis of the impact of each option on the allocation of transmission losses. At the Group's meeting on the 12 July 2006, the Group agreed that BSCCo should perform analysis to:

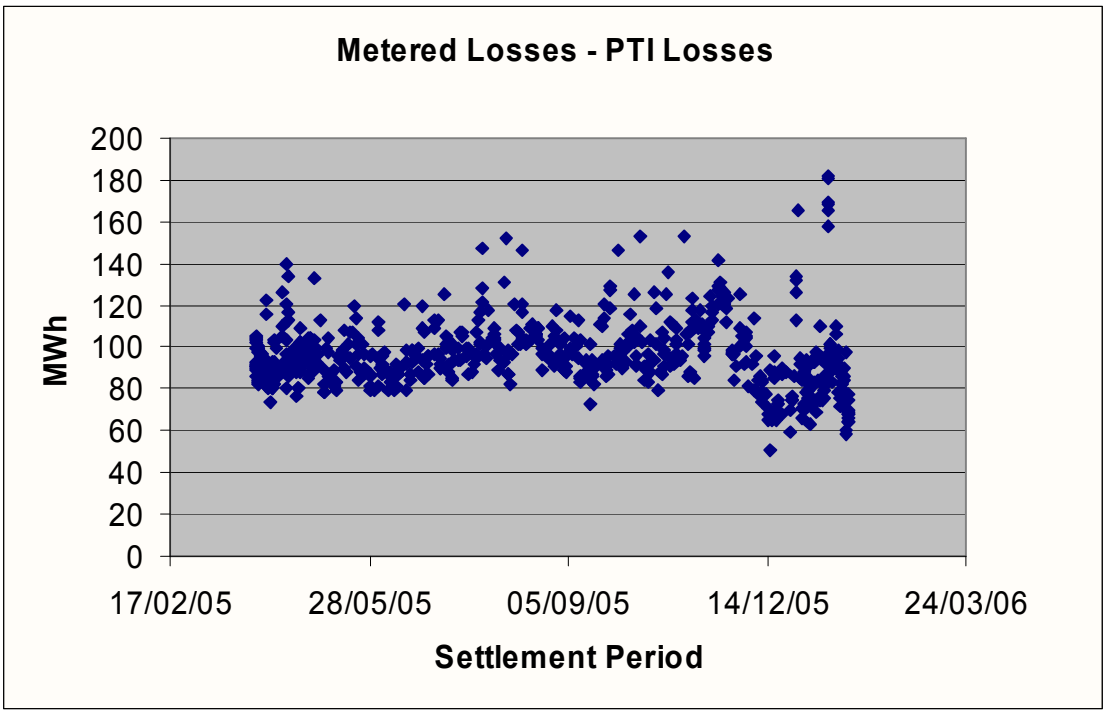
- Determine the level of fixed losses. The Group requested a view from National Grid on the level of fixed losses and an explanation of the information in the Seven Year Statement. BSCCo was asked to analyse the load flow modelling results and compare implied fixed losses with values suggested by National Grid;
- Calculate indicative scaling factors for all identified options: for annual and seasonal based values; different values for delivery and offtake; and Settlement Period specific values. Also, to illustrate Settlement Period variability in scaling factors and the difference for delivery and offtake. Finally, to conduct a sensitivity analysis of the effect of the level of fixed losses on scaling factors; and
- Demonstrate the impact on allocation of transmission losses, using the scaling factors calculated above (annual, seasonal, Settlement Period based, etc.) using the data in P200 TLM analysis (this was based on 16 Sample Settlement Periods).

4.4.1 Level of Fixed Losses

National Grid presented some indicative values at the Group's meeting on 1 August 2006. These showed that the level of fixed losses varied, National Grid believed it was dependent primarily on weather conditions, and could vary from 85-170MWh per Settlement Period (170-340 MWh). Based on data taken from the Seven Year Statement for 2006/7 a figure of 134MWh (268 MW) for a peak demand period could be expected.

BSCCo estimated fixed losses by subtracting heating losses calculated by PTI for the 623 Sample Settlement Periods used in the load-flow modelling exercise from measured (metered) total losses in those periods. This gave the following scatter plot, Figure 4, with an average value of 96.5MWh per Settlement Period (193 MW). The Group noted that this corresponded approximately with values presented by National Grid. Some members of the Group felt that if Option 2 was to be implemented (scaling factors calculated for each Settlement Period in the Settlement system using an input estimate of fixed losses) then a monthly value for fixed losses should be used to account for different weather conditions.

Figure 4 – Estimated Fixed losses (Using 623 Sample Settlement Periods)



4.4.2 Indicative Scaling Factors

At the Group's meeting on 1 August 2006 BSCCo presented the results of the data analysis as follows. Figures 5 and 6 show the scaling factor for delivery BM Units (β^+) and offtaking BM Units (β^-) respectively.

Figure 5 – Indicative Scaling Factors β+ (Using 623 Sample Settlement Periods)

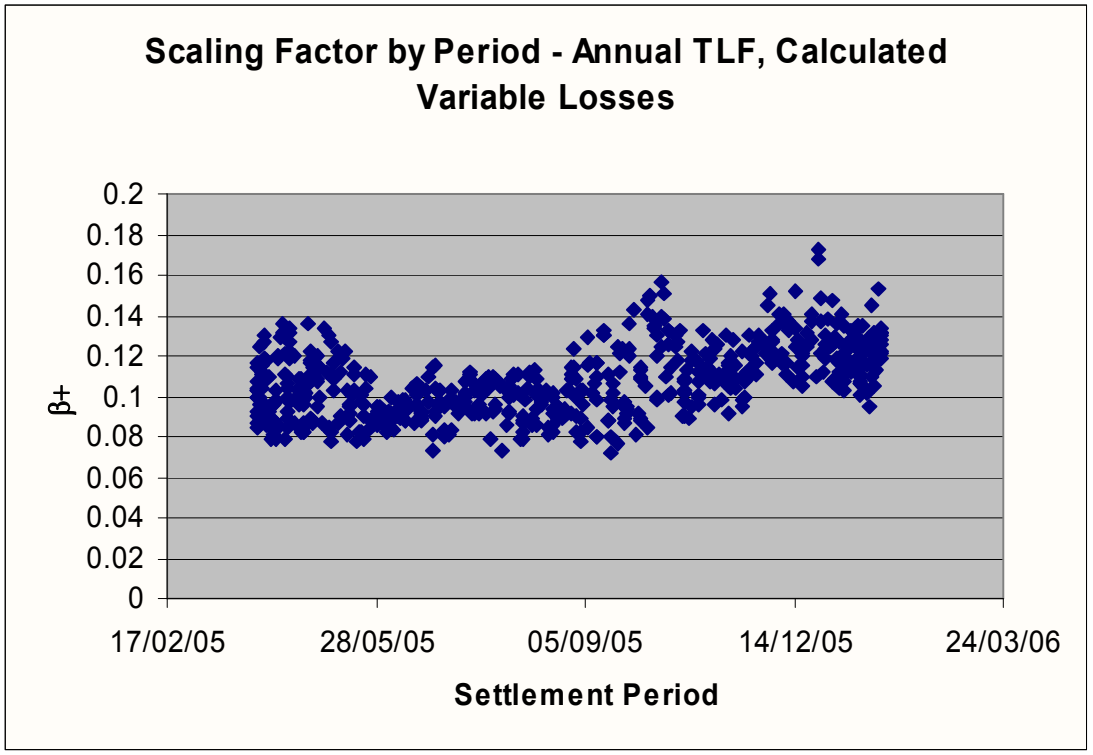
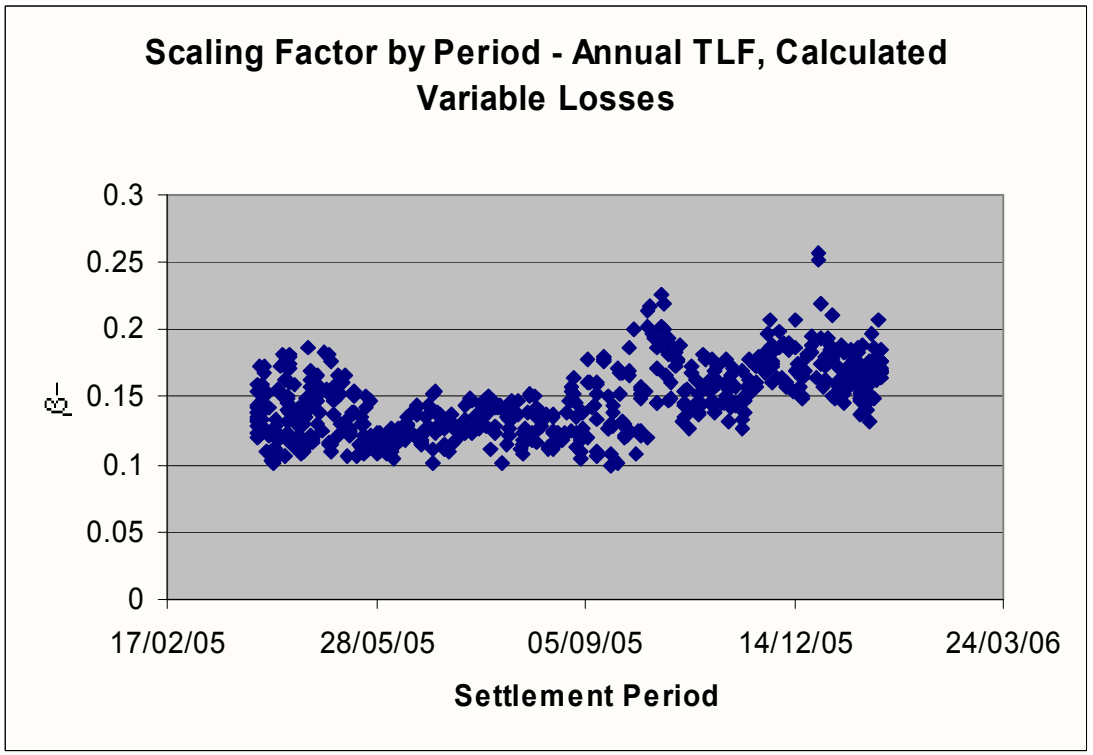


Figure 6 – Indicative Scaling Factors β- (Using 623 Sample Settlement Periods)



The Group noted that the scaling factors β+ and β- were strongly correlated with the level of variable losses and each other. These values also exhibited noticeable seasonal and within day variations. Table 4 depicts scaling factors calculated from both annual and seasonal zonal TLFs. The Group noted that the variation in scaling factor was greater for variations in TLF values than for variations in the level of variable losses.

Table 4 – Scaling factors β (Using 623 Sample Settlement Periods)

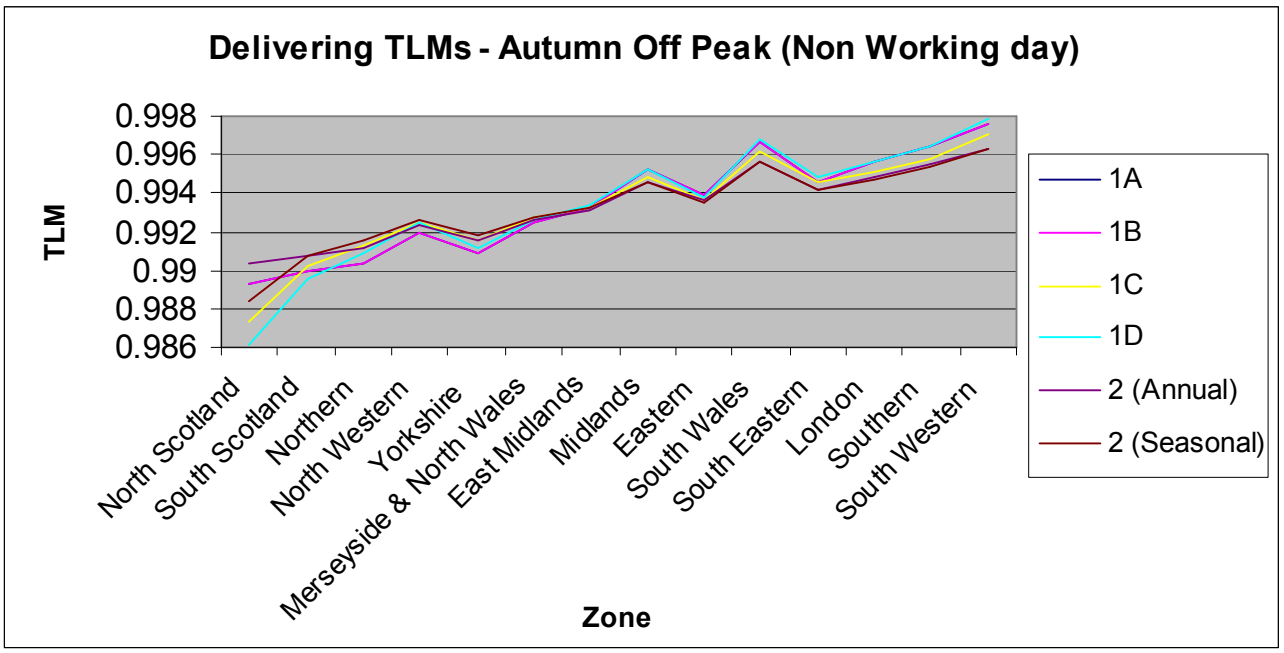
	Annual TLFs		**Seasonal TLFs**	
	β+	**β-**	**β+**	**β-**
Spring	**0.1033**	**0.1389**	**0.1380**	**0.0862**
Summer	**0.0970**	**0.1301**	**0.1198**	**0.2025**
Autumn	**0.1136**	**0.1590**	**0.0946**	**0.0785**
Winter	**0.1235**	**0.1725**	**0.0862**	**0.1277**

One member of the Group questioned the justification for different scaling factor for delivery and offtake. The Group noted that the Code distinguishes between delivering and offtaking Trading Units with 45% of losses allocated to delivering Trading Units and 55% to offtaking Trading Units. However, the Group noted that the materiality in different scaling factors and resultant TLMs was small and concluded that one scaling factor for delivery and offtake would provide a sufficient signal.

4.4.3 Impact on Transmission Losses (TLMs)

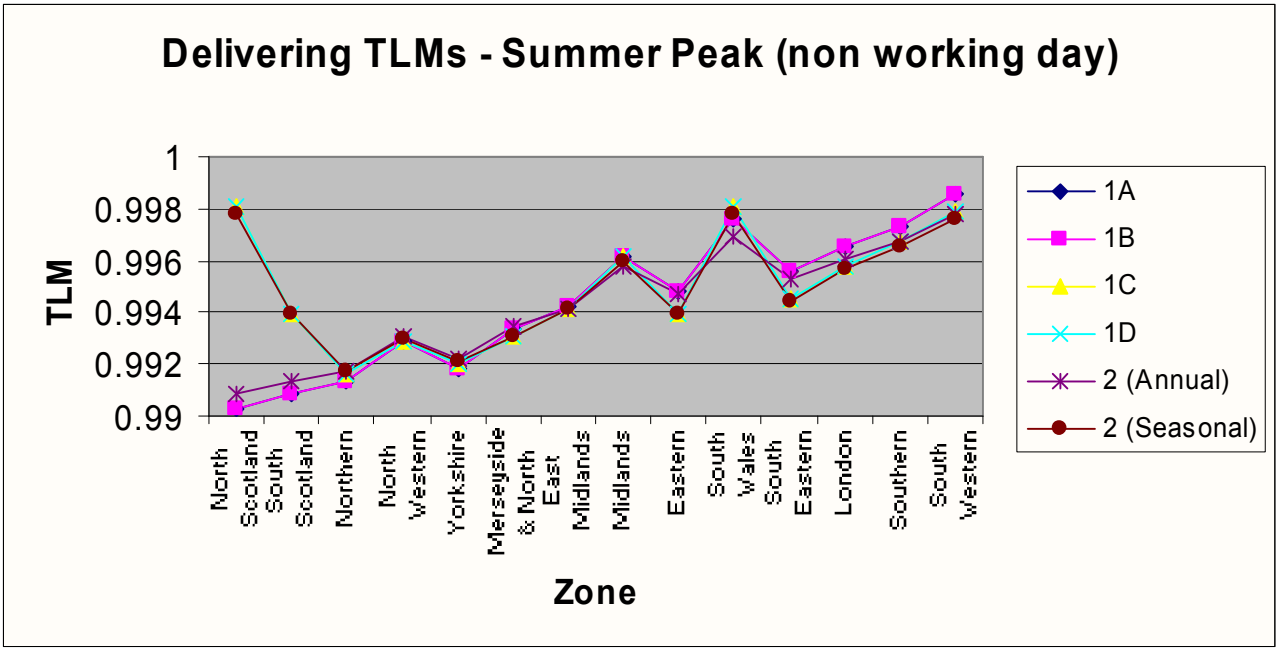
The Group further considered the impact of the scaling factor approach on transmission losses through TLM values. The Group noted the impact of the scaling factor on reducing the range of values of TLM, thereby reducing the distributional effects of zonal TLMs in comparison to P198. Figure 7 shows the effect of different options for calculating scaling factors for delivering TLMs in an autumn off peak non-working period (P198 Proposed Modification is shown for comparison). The Group noted the relatively small difference in impact between the various options, especially when compared with P198 or the current baseline.

Figure 7 – Delivering TLM values for an autumn off peak and non working period



The Group noted the same seasonal effects under P204 as for P198 for the Summer Peak for North Scotland zone as shown in Figure 8. This is where in some Settlement Periods, increased northern generation could actually decrease the level of transmission losses. For the analysis undertaken in P198 it was clarified that, in some Sample Settlement Periods, the North Scotland zone had switched from net export to net import.

Figure 8 – Delivering TLM values for summer Peak (non working)



4.5 Incorporation of P204 Algebra in the Code

At its meeting on 1 August 2006, the Group considered how the P204 algebra would be implemented in the Code. The Group agreed a set of equations for the calculation and application of the scaling factor. These have been incorporated into the draft legal text in Appendix 1.

4.6 Cost-Benefit Analysis

At the Group's meeting on 1 August 2006, the Group noted the approach to, and results of, the P198 external cost-benefit analysis (see P198 Assessment Report in Appendix 7) and commissioned a further external cost-benefit analysis to examine the potential effect of P204 on transmission losses. In particular, focus was placed on the impact on generation despatch and demand response, distributional effects and the overall level of losses. The Group agreed the following scope for the initial P204 cost-benefit analysis:

1. Adopt the same approach as for the cost-benefit analysis performed for P198 using the same central scenario market assumptions, and the same 10-year study period from 2006/07 to 2015/16 for practical reasons (since the latest full year of available Settlement data for calculating the first year's TLFs is 2005/06) and to facilitate comparison with P198;

2. Repeat the central scenario using the annual TLF values but with the P204 scaling factor (using Option 1a) re-calculated for each of the ten years based on the TLF values calculated for that year; and

3. Repeat the seasonal scenario using four seasonal TLF values and four seasonal scaling factors per year (Option 1c). Due to time constraints this work was undertaken just for the first year.

The Group considered the results of this initial cost-benefit analysis at its meeting on 23 August 2006. At that meeting the Group agreed that completion of the ten years' worth of analysis for the seasonal approach was required, with the results to be presented at its meeting on 20 September 2006. The following sections set out the key conclusions on both sets of cost-benefit analysis. The full analysis report is contained in Appendix 5.

4.6.1 Net Benefit to Market

The cost-benefit analysis estimated a total net benefit over 10 years from the introduction in 2006/07 of P204 annual approach (Option 1a) of £3.8 million.[3] This compares with an equivalent estimated benefit of £21.1m under P198 annual approach. For P204 with a seasonal approach (Option 1c) the estimated benefit was £32.4m compared to £65.7m for P198 seasonal. A breakdown of figures for P204 compared with P198 is shown in Table 5 below. Note that the Assumed Operating Costs and Assumed Implementation Costs are costs which are taken off the Generation Redespatch and Demand Response benefits to give the Net Present Value (discount rate used).

Table 5 - OXERA Assumed Future Benefits Over Ten-Year Period 2006/07 - 2015/16 (£m)

OXERA Assumed Future Benefits	P198 Annual TLFs	P204 Annual TLFs	P198 Seasonal TLFs	P204 Seasonal TLFs
Generation Redespatch (per annum)	2.9	1.0	8.9	4.7
Demand Response (per annum)	0.6	0.2	0.7	0.4
Assumed Operating Costs (per annum)	0.3	0.3	0.3	0.3
Assumed Implementation Costs	2.0	2.1	2.0	2.1
Net Present Value of Future Benefits to 2015/16, Net of Offsetting Cost Increases	**£21.1m**	**£3.8m**	**£65.7m**	**£32.4m**

The Group noted that although the implementation costs are very similar for P198 and P204, they are a much higher proportion of the benefits of P204 and have a relatively greater impact on its Net Present Value (NPV). The Group agreed that OXERA had calculated the NPVs of perceived benefits over the 10 years as requested. One member noted that, on reflection, only 8 years worth of benefit may be realised. This was due to the proposed implementation date being 1 April 2008, with the benefits in the first years of the cost-benefit analysis 2006/7 and 2007/8 not being obtainable. Therefore, they considered that the figures quoted could over-estimate the benefits from P204. Other members agreed with this view, and believed that it was also applicable to P198, P200 and P203. However, the Group noted that it could not quantify what the 10 years' benefit may have been if it had started in 2008/9 and indeed may have been higher in 2016/17 and 2017/18. One member considered that different assumptions might have been required for a cost-benefit analysis starting in 2008, although other members disagreed since they believed there was no long-term signal from the scheme and the annual benefits by 2015/16 would be very small or negative. The Group also noted that it had agreed for the cost-benefit analysis to start in 2006/7 as it needed to calculate the first year's TLF values using historic data (with 2005/06 being the latest year Settlement data was available). The Group noted that the cost-benefit analysis therefore delivered its requirements. The NPVs based on 2006 prices for eight years starting in 2008 are estimated to be P204 – Annual £2.3m, P204 - Seasonal £23.7m (with P198 - Annual £14.9m and P198 - Seasonal £48.8m).

The following Table 6 shows the generation redespatch benefit for 2006/7 for both annual and seasonal TLFs and scaling factors. The Group noted that the redespatch benefit is approx. 2.4 times higher under P204 seasonal TLFs compared with P204 annual TLFs in 2006/07.

[3] This is based on annual zonal TLFs and annual scaling factors (Option 1a).

Table 6 - Illustrative Comparison of OXERA Assumed Benefits under P204 Annual (Central) and Seasonal Scenarios in First Year of Scheme (£m)

OXERA Assumed Future Benefits	P204 Annual (Central) Scenario (2006/07 Only)	P204 Seasonal Scenario (2006/07 Only)
Generation Redespatch (per annum)	£3.4m	£8.3m

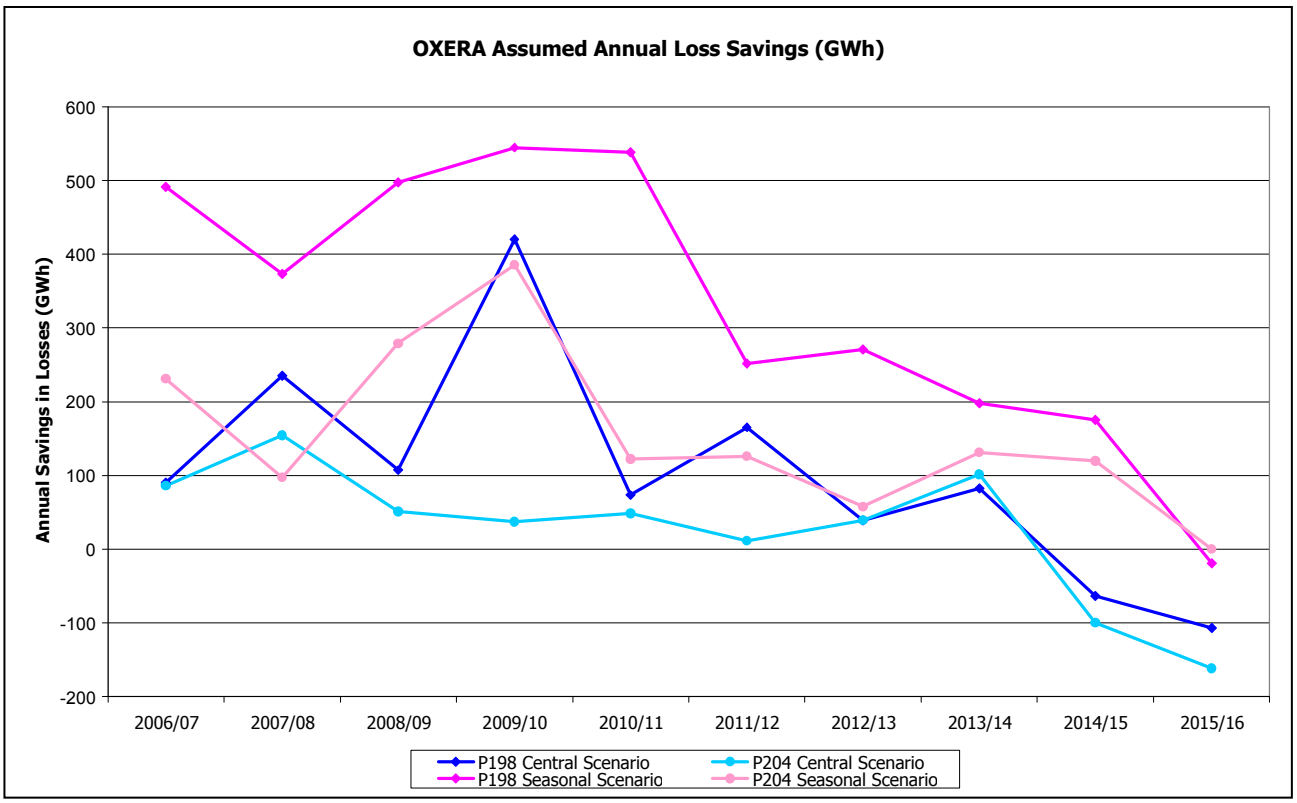
One member queried whether seasonal gas/fuel prices had been used for the seasonal cost-benefit analysis. It was confirmed that seasonal fuel prices had been used by OXERA.

4.6.2 Impact on Transmission Losses

The Group considered the impact of the P204 scaling factor on the level of variable losses, see Figure 9 below. The Group noted the reduction in loss savings in comparison to P198 which was due to the reduced spread in TLM values. The Group questioned the marked difference between the annual loss savings for P198 (annual and seasonal) and P204 (annual and seasonal) in the year 2009/10. OXERA noted that the difference was due to the switching of Longannet's production in the north to southern generation for some periods. This change in location of generation occurs under the stronger despatch signals in P198 (annual and seasonal) and P204 seasonal, but not under P204 annual (for further explanation see section 3.7 of the Cost-Benefit Analysis Report in Appendix 5).

The Group noted that small changes in zonal TLFs and hence TLMs can have noticeable effects on expected despatch and hence the overall reduction in loss savings. Some members considered that the estimated net savings were a small proportion of total losses, and that the modelled variations represented rather small and uncertain behaviours and outcomes. The Group noted that the TLMs calculated from the OXERA modelling did not include fixed losses as was also the case for the cost-benefit analysis undertaken for P198.

Figure 9 - OXERA Assumed Annual Loss Savings under P204 compared with P198.



The Group noted that the P204 reduction in losses (seasonal 0-8% and 0-385GWh) was a small percentage of the variable losses and that in 2014/15 and 2015/16 the loss savings were negative for the P204 annual approach (as was the case for P198 annual and seasonal). The Group noted OXERA's view that these negative savings in later years were due to:

- Overall reduction in system losses brought about by the planned build in the south of England, independent of P198 or P204;
- The ex-ante approach to the calculation of zonal TLFs (as per P198). This is where for each BSC Year, Metered Volumes and Network Data for Sample Settlement Periods from a preceding 12-month period, were used; and
- The approximations and assumptions in the cost-benefit analysis modelling approach. This is primarily the snap-shot approach (using peak, mid and trough demand periods) that was used to reduce the computational burden over the modelling horizon.

4.6.3 Distributional Impacts

The following set of figures depicts data for the year 2006/7. The Group noted that the same pattern of movement of money between Zones for P204 as for P198 were seen, but with reduced amounts.

i) Impacts by Zone

The geographical pattern of the transfers between Zones is very similar to P198; however the amounts transferred are considerably less. The total gross distributional effect of P204 is approximately 20% of that indicated under P198 (for both central and seasonal scenarios). The gross distributional effects for each Zone under P204 average about 80% less than P198 (reductions per Zone range from 70-90%). NB: negative transfers represent an increase in payments; positive transfers a decrease. Note that the following figures for each Zone are rounded totals, and may therefore not exactly sum to zero.

Figure 10 - OXERA Annualised Distributional Impacts on Generators (2006/7)

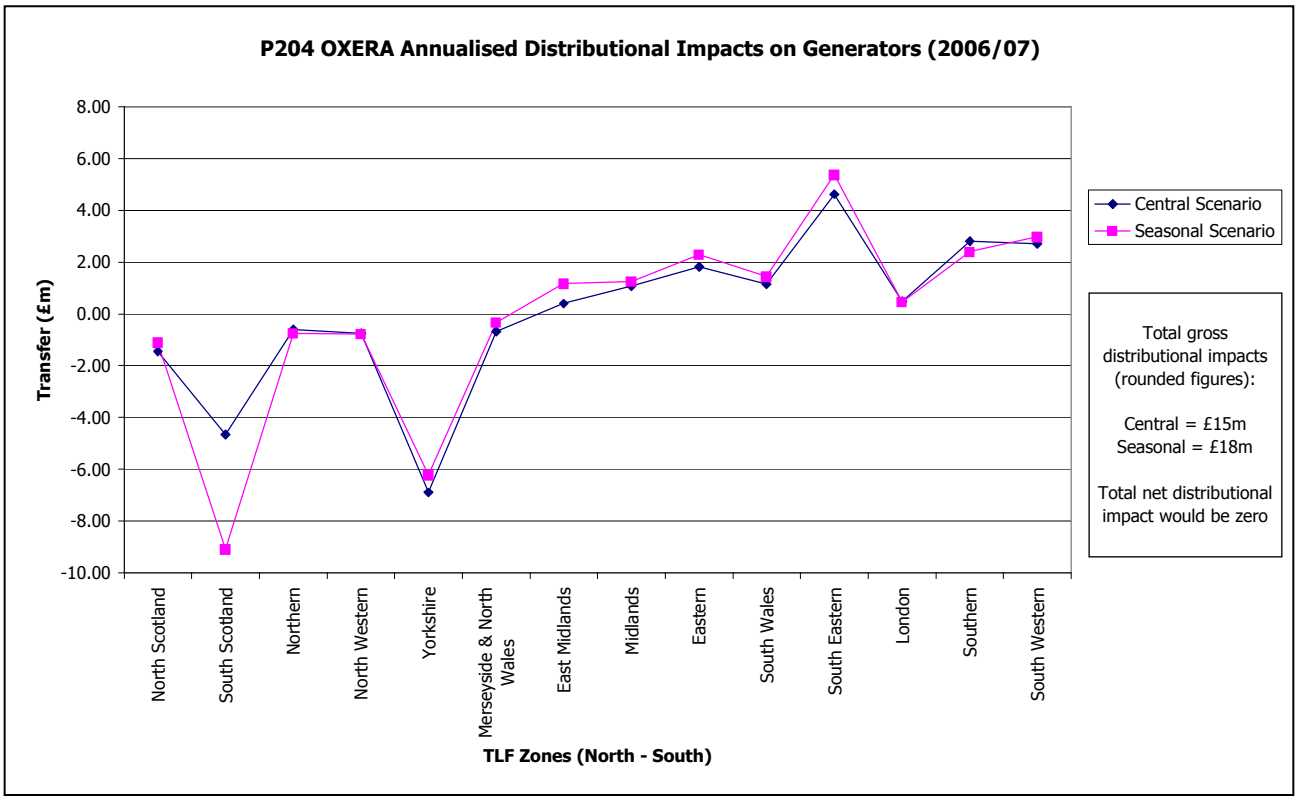


Figure 11 - OXERA Annualised Distributional Impacts on Supplier (2006/7)

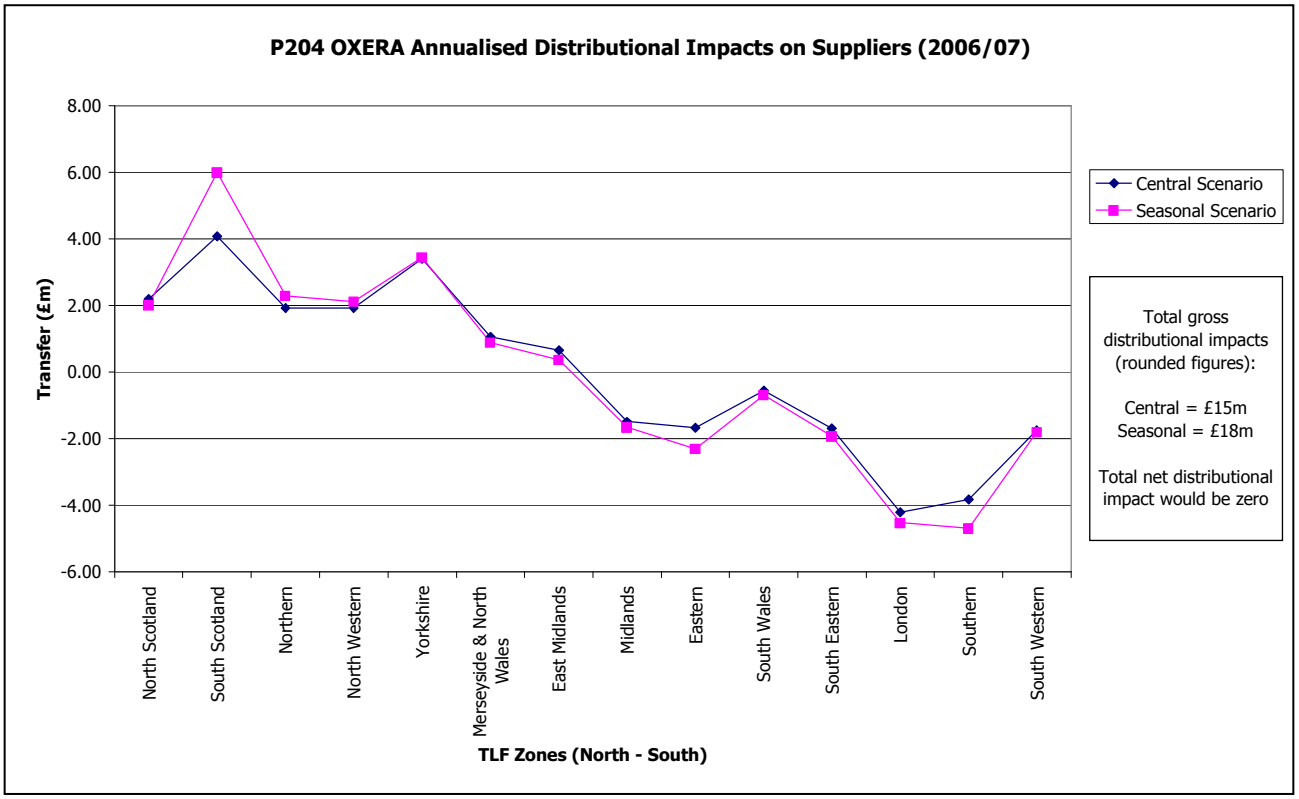


Figure 12 - OXERA Seasonal Distributional Impacts on Generators (2006/7)

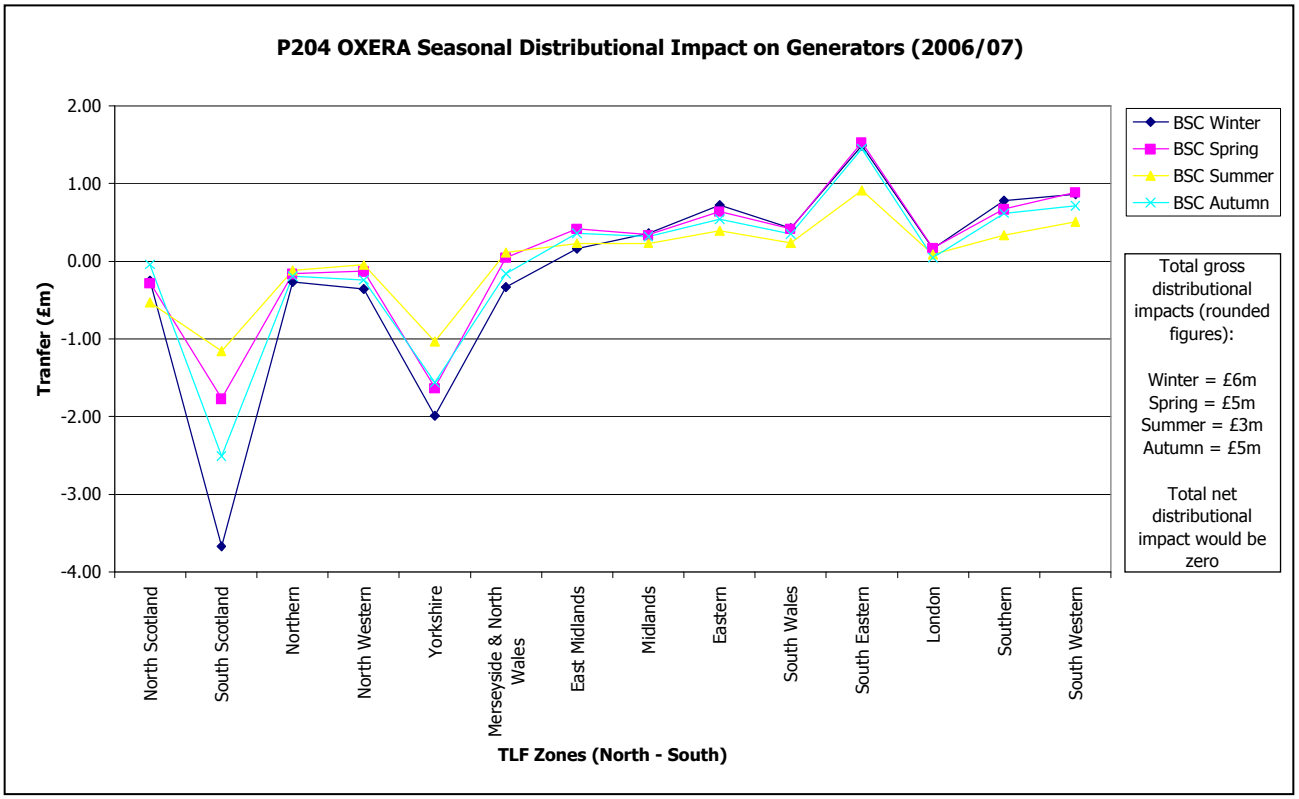
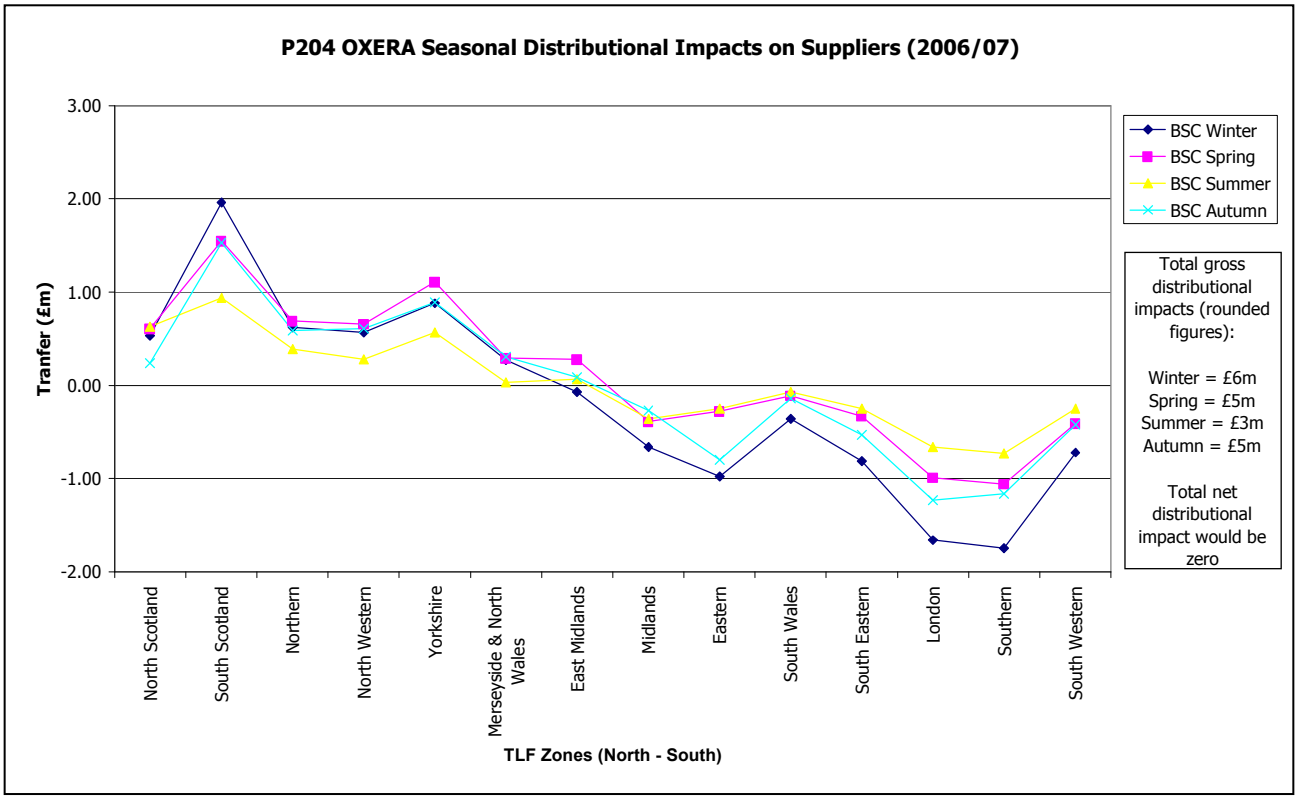


Figure 13 - OXERA Seasonal Distributional Impacts on Suppliers (2006/7)



ii) Impact by Geographic Region (North/South)

To assist in collating the data, high level aggregations of transfer amounts for generation/demand in Zones have been undertaken as under P198. These groupings were used by OXERA to aggregate the TLF Zones:

- Scotland: North Scotland and Southern Scotland (GSP Groups P and N);
- Northern England: Northern, North Western and Yorkshire (GSP Groups F, G and M); and
- South: Merseyside & North Wales, East Midlands, Midlands, Eastern, South Wales, South Eastern, London, Southern and South Western (GSP Groups A, B, C, D, E, H, J, K, and L).

Note that the totals may not exactly sum, as they are based on rounded totals for each Zone. The distributional effects of seasonal TLFs have been annualised, so that they can be compared with the use of annual TLFs.

Table 7- OXERA Annualised Northern Distributional Impacts (2006/07)

	P198 Central Scenario (Annual TLFs)	P204 Central Scenario (Annual TLFs)	P198 Seasonal Scenario	P204 Seasonal Scenario
Generators (Net Total)	Increase payments by: £43m in Scotland £42m in Northern England	Increase payments by: £6m in Scotland £8m in Northern England	Increase payments by: £45m in Scotland £36m in Northern England	Increase payments by: £10m in Scotland £8m in Northern England
Suppliers (Net Total)	Decrease payments by: £41m in Scotland £40m in Northern England	Decrease payments by: £6m in Scotland £7m in Northern England	Decrease payments by: £35m in Scotland £37m in Northern England	Decrease payments by: £8m in Scotland £8m in Northern England

Table 8 - OXERA Annualised Southern Distributional Impacts (2006/07)

	P198 Central Scenario (Annual TLFs)	P204 Central Scenario (Annual TLFs)	P198 Seasonal Scenario	P204 Seasonal Scenario
Generators (Net Total)	Decrease payments by: £85m	Decrease payments by: £14m	Decrease payments by: £80m	Decrease payments by £17m
Suppliers (Net Total)	Increase payments by: £80m	Increase payments by: £14m	Increase payments by: £72m	Increase payments by: £16m

4.6.4 Modification Group's Conclusions

The Group noted that P204 did produce a number of perceived benefits, mainly short-term redespatch benefits and a small demand response, which leads to a reduction in variable transmission losses. Scaled zonal transmission loss adjustments result in transfers between market participants, effectively increasing payments for loss adjustments for generators in the north and Suppliers in the south, and decreasing loss payments by generators in the south and Suppliers in the north. It also noted that the application of the scaling factor under P204 to zonal TLFs:

- Produced a weaker despatch signal than under the P198 zonal transmission losses scheme; and, for the years up to 2014/15 gave smaller estimated loss reductions; and
- Reduced the distributional effect between Zones of zonal transmission losses in comparison to P198.

4.7 Impact Assessment and Costs

A Requirements Specification for P204 was issued on the 11 August 2006 for impact assessment. At the Group's meeting on 23 August 2006, the Group discussed the impact assessment results (see Appendix 3). The Group noted the following key points regarding the Proposed Modification (Option 1c):

- The inclusion of a scaling factor calculation would result in approximately £9k additional BSC Agent implementation costs compared with P198 Proposed Modification, this was due to the inclusion of the scripted approach to loading of seasonal TLF data (giving a total P204 BSC Agent implementation cost of £45k);
- The inclusion of a scaling factor calculation in the calculations performed by the TLFA is estimated to result in approximately an additional £10k cost compared with P198 Proposed Modification (£250k), therefore giving a total P204 TLFA implementation cost of £260k;
- The inclusion of a scaling factor calculation would result in approximately 20 additional ELEXON man days' implementation effort (additional cost £4k) compared with P198 Proposed Modification (600 man days, £132k), giving a total P204 ELEXON implementation cost of £136k or 620 man days;
- Those Parties who had previously stated that they would need to amend their systems for P198 stated that there would be a minimal additional impact on these systems under P204;
- There would be no additional impact from P204 on the Transmission Company compared with P198; and
- There would be an additional operational costs for P204 of £8k compared with P198 Proposed Modification (cost of £158k per year), as the scaling factor calculation would require an annual data exercise, giving a total operational cost for P204 of £167k per BSC Year.

Therefore, the Group noted the total implementation cost for P204 Proposed Modification (Option 1c) would be £491k compared with a cost of £467k for P198.

The Group also noted the ELEXON and central costs for Options 1a 1b, 1c, 1d and 2 as shown in Table 9 below. N.B the solution for the P204 Proposed Modification is Option 1c.

Table 9. Summary of Implementation and Operational Costs for P204.

	P204 Cost Option 1a/c	P204 Cost Option 1b/d	P204 Cost Option 2	P198 Cost	P204 Tolerance	P198 Tolerance
Central and ELEXON Implementation Cost	**£490,576**	£966,357	£1,049,696	£467,170	+/- 35% (Option 2: +/- 45%)	+/- 35%
Total Operational Cost per BSC year	**£166,500**	£166,500	£156,500	£158,045	+/- 45%	+/- 45%

The Group noted the increased implementation costs for Options 1b, 1d and 2 in comparison to Options 1a and 1c. This is due to the BSC Agent costs for system changes to accommodate two values for the TLF (instead of one value under Option 1a/1c) and the calculation of the scaling factor under Option 2. The Group also noted that there would be additional BSC Party costs to support the reporting of two TLF values under these options (with one respondent quoting an additional cost of up to £200k for Option 2).

a) Breakdown of P204 Implementation Costs

The following Table 10 shows the breakdown of implementation costs for all Options considered under the assessment of P204. N.B the solution for the P204 Proposed Modification is Option 1c.

Table 10. Implementation Costs for P204 Options.

		P204 Cost Option 1a/c	P204 Cost Option 1b/d	P204 Cost Option 2	P204 Tolerance
Logica CSA Cost	Change Specific Cost	£26,568[4]	£197,118	£248,072	Nil (Option 2: 15%)
	Release Cost	£17,923	£202,079	£219,543	Nil (Option 2: 15%)
	Total Logica CSA Cost	£44,491	£399,197	£467,615	Nil (Option 2: 15%)
TLFA/LFMR Cost	Development, Testing and Deployment	£250,000	£250,000	£250,000	+/- 50%
	Scaling Factor calculation	£10,000	£10,000	Nil	+/- 50%
BSC Audit Cost	Planning and Development	£15,000	£15,000	£15,000	+/- 50%
Implementation Cost	External Programme Audit	£0	£0	£0	Nil
	Design Clarifications[5]	£15,225	£32,960	£35,881	+/- 100%
	Additional Resource Costs	£0	£0	£0	Nil
	Additional Testing/Audit Support Costs	£20,000	£20,000	£20,000	+/- 50%
Total Demand Led Implementation Cost		**£354,716**	**£727,157**	**£788,496**	**+/- 50% (Option 2: +/- 55%)**
ELEXON Implementation Resource Cost	Internal procedures/systems implementation	620 man days, £136,400	860 man days, £189,200	960 man days £211,200	+/- 5%
	TOMAS development/ consultancy costs[6]	£0	£50,000	£50,000	+/- 50%
Total Implementation Cost		**£490,576**	**£966,357**	**£1,049,696**	**+/- 35% (Option 2: +/- 45%)**

[4] This cost includes a scripted approach for loading the TLF values.
[5] Based on 5% of combined Logica/TLFA/LFMR development costs.
[6] P204 options 1b/1d/2 will incur some additional external consultancy costs to amend ELEXON's TOMAS system for separate delivery and offtake scaling factors and TLFs. An impact assessment of these costs has indicated they are likely to be in the region of £50,000.

b) Breakdown of P204 Operational Costs

The following Table 11 shows the breakdown of operational costs for all options considered under the assessment of P204.

Table 11. Operational Costs for P204 Options.

	P204 Option 1a/c Cost	P204 Option 1b/d Cost	P204 Option 2 Cost	P204 Tolerance
Logica CSA Operation Cost Per BSC Year Logica CSA Maintenance Cost Per BSC Year	£0 £0	£0 £0	£0 £0	Nil Nil
TLFA/LFMR Operational Cost Per BSC Year	£110,000	£110,000	£100,000	+/- 50%
BSC Auditor Cost Per BSC Year	£40,000	£40,000	£40,000	+/- 50%
ELEXON Operational Cost Per BSC Year	75 man days £16,500	75 man days £16,500	75 man days £16,500	+/- 5%
Total Operational Cost Per BSC Year	**£166,500**	**£166,500**	**£156,500**	**+/- 45%**

4.8 Implementation Approach

The Group at its meeting on 23 August 2006 considered the results of the impact assessment undertaken and noted that P198 has a 12-month lead time, driven largely by the timescales required for the TLFA procurement and development and the 3-month publication lead time for TLF values. The Group noted that this approach would be identical for the P204 Proposed Modification as the additional scaling factor requirements could be implemented within the 12 month window. Furthermore, the Party impact assessment responses indicated that any additional impacts could be accommodated within this time frame. Therefore, the proposed Implementation Date for P204 would be same as for P198:

- 1 April 2008, if an Authority decision is received on or before 22 March 2007; or
- 1 October 2008, if an Authority decision is received after 22 March 2007 but on or before 20 September 2007.

4.9 Consideration of an Alternative Modification

The Group noted that a standard part of the Assessment Procedure was to consider whether there was any Alternative Modification which might better facilitate the achievement of the Applicable BSC Objectives when compared with the Proposed Modification.

The Group at its meeting on 23 August 2006 noted that potential Alternatives could be formed from one of the other options considered earlier in the definition of the Proposed Modification (see Section 4.3). The Group noted that the Modification Proposal did not specify the granularity of the TLFs to be used and this area was for the consideration of the Group.

The Group agreed, subject to confirmation by further cost benefit analysis, that a solution based on annual TLFs and scaling factor would not bring about the same despatch benefits as a seasonal approach. At the Group's meeting on 20 September the benefits of the seasonal approach to TLFs and scaling factor were confirmed as £32.4m in comparison to £3.8m for the annual approach (NPV over 10 years). Therefore, the Group concluded that an Alternative based on an annual approach would not better facilitate the Applicable BSC Objectives when compared to the Proposed Modification.

Furthermore, the Group agreed that other potential options which were based on separate scaling factors for delivery and off-take or an ex-post calculation approach would be too costly to implement in comparison to the perceived benefits. Therefore these approaches would not better facilitate the Applicable BSC Objectives when compared to the Proposed Modification.

The Group also considered whether a phasing or hedging approach could form part of an option for an Alternative Modification. The Group agreed that with the P204 scaling factor there would be a relatively modest step change in the allocation of losses (compared with P198/P203), therefore any requirement for, or perceived benefit of, phasing or hedging would be reduced (in particular to small Suppliers). The Group did not consider this further as a potential alternative.

One member suggested a potential alternative where the zonal TLFs and scaling factors would be differentiated by peak and off peak periods. The majority of the Group considered this was not an appropriate alternative for P204 as this represented a fundamentally different approach to zonal TLFs. Furthermore, difficulties could be encountered in the 'shoulder periods' surrounding the peak.

In conclusion, the Group did not identify any Alternative Modification to P204 which it believed would better facilitate the achievement of the Applicable BSC Objectives compared to the Proposed Modification.

4.10 Legal Text

The Group discussed the draft legal text at its meeting on 20 September 2006, and subsequently by correspondence. The Group noted that the P204 text had been based on that for P203 (i.e. the determination of seasonal unphased TLF values), with changes made only to reflect the different P204 TLF scaling requirements (i.e. the calculation and application of the β scaling factor).

A number of comments were received from members of the Group regarding the P204 draft legal text. Some of these comments concerned parts of the text which were identical to the legal text for P198, P200 and P203 – which are now with the Authority for decision, and which were in turn derived largely from the P82 legal text. None of these comments had previously been raised during the progression of the other transmission losses proposals, and it was noted that this therefore made their consideration more difficult. The Group noted that the comments related to points of style and clarity rather than the technical correctness of the text. In addition, one member suggested the inclusion of an additional P204-specific solution requirement which had no interaction with the legal text for P198, P200 and P203. By majority, the Group agreed that no changes to these areas of the text were required. Further details on the comments received can be found below.

One member of the Group raised a number of questions regarding the legal text as follows:

1) The member queried the use of the term "Relevant Implementation Date" in paragraph 1.3(h) in the draft text for Annex T-2, as this was not defined in the legal text. BSCCo clarified that the term Relevant Implementation Date is an existing term which is already defined in the Code. The Group therefore noted that no change to the text was required.

2) The member queried whether it was appropriate to use 'j' in the legal text equations to represent Sample Settlement Periods, as this is used elsewhere in the Code to represent actual Settlement Periods. BSCCo clarified that it did not believe this to be problematic, since Sample Settlement Periods would still be 'real' Settlement Periods (albeit a subset of the actual total number of Settlement Periods in the Reference Year). Moreover, BSCCo believed this usage to be consistent with the use of subscripts elsewhere in the Code (for example, the subscript 'i' means BM Unit but does not have to refer to all BM Units – T4.1.1 for instance uses it to refer to Interconnector BM Units only). The member believed that it would be clearer if a different subscript was used, but acknowledged that there was little chance of misinterpretation. The Group by majority agreed that no change to the text was required.

3) The member queried the circumstances in which the TLFA could modify the Load Flow Model, and believed that the wording of paragraph 3.8 in the Annex T-2 drafting was unclear as to whether Panel approval of such modifications was required. BSCCo advised that it believed the text to be clear, as paragraph 3.2 states that the TLFA shall not modify the Load Flow Model unless instructed or agreed by the Panel. The Group agreed by majority that no change was required to the legal text.

4) The member queried the last point at which the Panel could amend the TLF Zones in order for this to be effective in that year's TLF calculation, noting that paragraph 4.1(b) in the Annex T-2 drafting stated that changes would only apply to those BSC Years "for which TLFs have not already been determined". BSCCo clarified that the details of the Zone to which each BM Unit is mapped form part of the Network Mapping Statement, which paragraph 4.4(c) of Annex T-2 of the legal text requires to be approved and sent to the TLFA by 19 October in the preceding BSC Year to the one in which TLFs will apply. The TLFA then uses this 'initial' version of the Network Mapping Statement to calculate TLFs by 30 November in the preceding BSC Year. Therefore any changes made to the Zones after 19 October would not take effect in the TLF calculation for the forthcoming BSC Year, but would be incorporated in the 'prevailing' Network Mapping Statement such that they would be effective in the following year. BSCCo acknowledged that the wording of 4.1(b) taken in isolation could be construed as unclear, but advised that it believed the intention to be clarified when read in conjunction with paragraphs 4.3(b), 4.4(c), 7.2(d) and 7.3 of the Annex T-2 drafting. A minority of members disagreed, and believed that it was not problematic for further clarifications to be included in the P204 legal text (noting that they had not been included for the text for P198, P200 or P203). However, the Group by majority agreed that the text was sufficiently clear, and therefore that this aspect of the text should be left unchanged for consistency with the legal text for P198, P200 and P203.

5) The member noted that the legal text left a month between the calculation of TLFs by the TLFA and their publication. The Group noted that this was consistent with P198, P200 and P203, and that this period allowed time for BSCCo to check the data. In the first year of implementation, this month would also include validation by the Load Flow Model Reviewer (including a report to the Panel). It was noted that this formed part of the solution agreed by the Group, and that the legal text therefore delivered this solution.

6) The member noted that the proposed text for paragraph V4.6.2 referred to existing paragraph V3.2, but that the heading number of this paragraph in the existing version of the Code was incorrectly numbered 3.1. The Group noted that this was the case, although the subparagraphs of this section make clear that it is paragraph 3.2. BSCCo advised that it would correct the existing incorrect Code numbering via a housekeeping modification prior to the Authority's decisions on P198, P200, P203 and P204, but that the reference in the legal text to paragraph V3.2 was correct and therefore did not itself require change.

7) The member suggested that the total calculated heating losses for each Sample Settlement Period should be added to the reports listed in Table V-9 of the draft legal text, such that this data should also be made available to Parties on request. The Group noted that this would represent a new solution requirement not previously agreed by the Group, and that it was only applicable to P204 (where the total calculated heating losses are used in the derivation of the P204 scaling factors). A minority of members supported the inclusion of this additional requirement, since they believed that it would help Parties in their own TLM modelling. However, by majority, the Group agreed that no change should be made to the legal text in this area, since these members either did not see the need for such a requirement or believed that it was inappropriate to add new solution requirements at such a late stage of the assessment process.

8) The member queried whether the term 'total calculated heating losses' needed to be defined in Section X. BSCCo advised that the term was defined within the Annex T-2 drafting, and that it believed this to be legally robust and consistent with other definitions within the text. The Group by majority agreed that no change was required.

9) The member suggested that the definitions and references to Nodal TLFs and nodal data within the legal text did not make clear the intention that TLFs are only calculated and used for Nodes where a power flow on to or off the network can occur. BSCCo advised that it believed the text was clear in this regard, since paragraph 4.3 of the Annex T-2 drafting specifies that only those Nodes which represent Volume Allocation Units shall be mapped to Zones and BM Units. Even if Nodal TLFs were calculated for any Nodes at which a net flow could not occur, such Nodes would have a zero weighting in (and therefore no effect on) the calculation of Zonal TLFs. The Group by majority agreed that no change was required.

10) The member queried whether the definition of the slack node in paragraph 1.3(e) of the Annex T-2 legal drafting was correct. This paragraph states that:

"The slack node is a node that acts:

(i) for the purposes of a load flow model, as a sink for power flow surpluses or deficits arising from inaccuracies in the load flow model; and

(ii) in relation to adjacent nodes, as the reference node for calculating the phase angle of the power flow between the nodes".

The member queried the use of the words "in relation to adjacent nodes" in (ii), and whether this implied that the slack node only acted as a reference node for those nodes which were adjacent to the slack node (rather than all the nodes in the load flow model). The Group noted that this definition had been taken from the original P82 legal text, and was also used in the legal text for P198, P200 and P203.

BSCCo advised that the slack node definition is required as the definition of a Nodal TLF in 1.3(c) refers to "network balance being maintained by the slack node", but that the term slack node is then not used again in the legal text. The Group noted that the definition of 'slack node' in the legal text only refers to its use in load-flow models generally (i.e. the generalised uncapitalised definition in paragraph 1.3(b)) and not the specific definition of the TLFA's Load Flow Model in paragraph 3 of Annex T-2. It also noted that the aim of the paragraph 1.3 definitions were to provide a high-level explanation of how a load-flow model works – and that the actual detailed technical Load Flow Model equations used in the Nodal TLF calculation (including the use of the slack node) would be set out in the Load Flow Model Specification as required by paragraph 3 of the Annex T-2 drafting.

BSCCo advised that its legal interpretation of (ii) is that the slack node acts as the reference node for calculating the phase angle of the power flow between each pair of adjacent nodes in the model (i.e. it covers all the nodes in the model). This is consistent with the legal text's definition of a load flow model in paragraph 1.3(b) which states that "a load flow model is a mathematical model of an electrical network which represents power flows between pairs of adjacent nodes on the network". BSCCo advised that its legal view is therefore that, when read in context with the definitions of 'load flow model' and 'nodal TLF', the ambiguity resulting from the use of the words "in relation to adjacent nodes" in the definition of the slack node is removed such that the intention of the text is clear. BSCCo also advised that it had confirmed with PTI that the intention of the text is clear and technically correct. The member continued to believe that further clarity should be added to this area of the P204 legal text, although they acknowledged that it was unlikely to lead to dispute. However, as the query related to style and clarity rather than technical correctness, the Group by majority agreed to keep this aspect of the P204 text unchanged for consistency with the legal text for P198, P200 and P203.

Another member of the Group noted that the legal text for P204 did not specify the location of the slack node, which had been set as Cowley in the P198 PTI modelling and P82 implementation. The Group noted that this was in accordance with the solution agreed by the Group for P204 – which was consistent with that for P82, P198, P200 and P203, and which allowed the TLFA to choose the slack node location. The Group noted that the legal text therefore delivered the requirements previously agreed by the Group, and that the inclusion of a Code process for setting the location of the slack node would represent a new solution requirement. One member believed that there should either be an annual industry consultation on the most appropriate location (with the final location to be approved by the Panel) or that the location of the slack node should be rotated such that it fell within a different Zone each year. The arguments expressed by this member were that:

- Although Cowley has historically been used, this does not mean that it should continue to represent the slack node in perpetuity; and
- Requiring the TLFA to move the slack node once a year around each of the 14 Zones would ensure that all parts of GB were covered.

Another member expressed support for the Panel setting the slack node location, whilst one member suggested that the slack node should be set as Cowley in the first year and then at the discretion of the TLFA thereafter.

The other members of the Group argued that Panel approval, an industry consultation and/or the annual rotation of location for the slack node was not appropriate. The following arguments were expressed by these members in support of no change to the legal text:

- The location of the slack node in a DC model makes no difference to the differentials between TLF values (as confirmed during the previous PTI P75/P82 load-flow modelling analysis), and therefore makes no difference to the resulting TLM values and Parties' Trading Charges;
- It is difficult to see how the Panel or the industry would decide the slack node location other than on advice from the TLFA (who would have the greatest experience in load-flow modelling);
- Moving the location of the slack node from year to year could cause confusion for Parties as it affects the absolute values of TLFs (i.e. locating it in the extremities would give TLFs which were predominantly either positive or negative), and would therefore make it difficult for Parties to see how the pattern of TLFs evolves from year to year;
- Moving the slack node location from year to year may add an extra level of complexity for the ISG in agreeing the methodology for deriving ETLMOs;
- A requirement for an annual industry consultation would add to the required operational effort for the scheme; and/or
- A requirement to make the slack node a Panel-set parameter would make the P204 solution and legal text inconsistent with that for P198, P200 and P203 (the P204 Terms of Reference state that the non-scaling elements of the P204 solution shall be based on P198).

By majority, the Group therefore agreed that no change to the legal text was required in this area.

However, some members did believe that BSCCo and the Transmission Company should be consulted and informed by the TLFA regarding any change to slack node location. The Group therefore agreed by majority that the Load Flow Model Specification (which would be established by the Panel as a new Code Subsidiary Document) and the TLFA systems specifications should state that the slack node shall either be Cowley or such other Node as agreed between the TLFA, BSCCo and the Transmission Company – providing that the same slack node location is used for the entire TLF calculation in a given year. The Group agreed that this would leave the flexibility for the location to be changed in the future, if this should be required (for instance, to reflect any future changes to the Transmission System such as the potential inclusion of

offshore transmission). The member queried whether there would be a 'hook' to this lower-level requirement in the Code. BSCCo confirmed that this was the case – since paragraph 3 of the Annex T-2 drafting states that the Load Flow Model must comply with the Load Flow Model Specification, and requires the Panel to agree the Load Flow Model Specification.

Two members, whilst agreeing with this way forward, considered that BSCCo should publicise the slack node location to Parties. It was agreed that this would form part of BSCCo's working practices, should a zonal transmission losses scheme be approved.

By majority, the Group therefore agreed that the draft P204 legal text delivered its intended solution. However, the Group noted that, if P198, P200, P203 or P204 was approved, there would be a twelve-month implementation timetable in which to re-examine in detail the clarity of the drafting. BSCCo agreed that, should the text prove to cause confusion during implementation, it would seek to address the source of any such confusion via a 'housekeeping' modification at that time.

5 RESULTS OF CONSULTATION

This section outlines the views of consultation respondents and Modification Group's consideration thereof.

5.1 Summary of Responses

16 responses (representing 69 Parties and 2 non-Parties) were received to the P204 Assessment Procedure consultation. The Group noted that a number of respondents had reiterated their arguments regarding the zonal transmission losses scheme put forward under the consultations on P198 but taking on board the impact of the scaling approach under P204. The Group believed that no new arguments had been made in these responses.

Numbers in bold represent the majority view. Bracketed numbers show the number of BSC Parties represented by the respondent(s), whilst numbers preceded by a + show the number of non-Parties represented.

	Question	Yes	No	Neutral	No Comment
1.	Do you believe that Proposed Modification P204 would better facilitate the achievement of the Applicable BSC Objectives compared with the current Code baseline?	6(35+0)	**8(33+1)**	2(1+1)	-
2.	Do you believe that P204 would have a disproportionate impact on any class or classes of Parties?	**10(42+1)**	5(27+0)	1(0+1)	-
3.	Do you believe that P204 would have an impact on perceptions of regulatory risk and/or the cost of capital?	6(28+1)	6(35+0)	3(5+1)	1(1+0)
4.	Do you support the implementation approach described in the consultation document?	**13(67+1)**	1(1+0)	1(0+1)	1(1+0)
5.	Do you believe there are any alternative solutions that the Modification Group has not identified and that should be considered?	1(1+0)	**14(68+1)**	1(0+1)	-
6.	Does P204 raise any issues that you believe have not been identified so far and that should be progressed as part of the Assessment Procedure?	1(1+0)	**13(67+1)**	1(0+1)	1(1+0)

The following sections summarise the detailed responses and rationale given by the respondents for each consultation question. For a full copy of the responses see Appendix 4.

5.2 Proposed Modification versus Code Baseline

The majority of respondents did not believe that the Proposed Modification would better facilitate the Applicable BSC Objectives when compared with the current Code baseline. The majority questioned whether the efficiency benefits would materialise and believed that its distributional effects would lead to windfall gains/losses. They also felt that it added costs and complexity in the central arrangements and to participants' systems.

A number of respondents did believe that P204 would better facilitate the Applicable BSC Objectives when compared with the current Code baseline. These respondents noted the reduction in overall losses due to the more efficient despatch signal.

A minority of respondents expressed a neutral view.

Arguments Against P204

Some respondents felt that P204 would not better facilitate BSC Objective (a) as it discriminates against certain parties. However some respondents felt that there would be a neutral effect on (a).

Points raised against P204 regarding BSC Objective (b) were:

- It provided an inconsistent, contradictory and uncertain despatch signal;
- Certain parties could not respond to the economic signals and that the efficiency benefit would not materialise;
- The redespatch benefits were unlikely to be realised and that long terms signals already exist with other mechanisms such as TNUoS which would outweigh P204;
- P204 could confuse the existing locational signals and the effect would be ambiguous due to TNUoS; and
- One respondent believed that Objectives (b) and (c) were better facilitated than for P198 and P203, but under P204 there were still negative distributional effects without significant redespatch benefits.

Points that were raised against P204 regarding BSC Objective (c) were:

- There would be windfall gains and losses due to substantial redistribution of wealth for little benefit;
- The distributional effects would discourage new investment and create a barrier to entry;
- Large industrial players could not respond to the short term pricing signals and there would be more of an impact on non-portfolio players as these also cannot respond;
- Small Suppliers and renewables would be disproportionately impacted;
- There would be unpredictable shifts in the cost base of Suppliers which would cause instability and create a barrier to entry;
- Some respondents noted that the potential benefits of (b) were outweighed by the disbenefits of (c); and
- One respondent outlined the same reasons for not supporting P198 – (a) the methodology and modelling is flawed and the proposal provides no signal; (b) there is no need for zonal losses; (c) the adverse financial impact and effect on the market; (d) the adverse impact on the Government's Climate Change objectives; (e) there has been no expectation of change; and (f) Ofgem's wider duties.

A number of respondents believed that P204 adversely affected Objective (d), as it introduced additional cost and complexity to the balancing and settlement arrangements and participants' systems.

Even though the majority of respondents did not support P204, a number of respondents stated that they believed that P204 was the 'most reasonable' out of all zonal transmission losses modifications.

Arguments For P204

Some respondents felt that P204 would better facilitate Objective (a) as it would remove the current discrimination.

Points raised for P204 regarding BSC Objective (b) were:

- The results of the cost-benefit analysis showed an estimated reduction in losses with Net Present Value of £32m over the ten year period;
- It would result in more cost-reflective allocation of losses;
- It would provide an investment signal, but acknowledging that TNUoS and proximity of fuel are bigger factors; and
- It would improve despatch efficiency without creating barriers to entry.

Points raised for P204 regarding BSC Objective (c) were:

- It would remove the distortions that arise under the current arrangements, with benefits for competition;
- It would reduce the distributional effects relative to the overall cost of losses and hence would reduce any cost misallocations due to the zonal scheme (from zonal averaging, seasonal averaging and an ex-ante determination of TLFs); and
- One respondent who supported P204 had not responded to the consultations on P198, P200 or P203. it believed that P204 delivered good despatch benefits without the large cash-flows between Parties that were present under P198. It also stated that the Alternatives under P198 and P200 and the Proposed Modification P203 had sought to address the disproportionate impacts but had instead created further elements of unfairness.

5.3 Disproportionate Impact on Classes of Parties

The majority of respondents believed that P204 would have a disproportionate impact on certain classes of Parties.

Points that were raised by respondents who believed there would be a disproportionate impact were that:

- Due to the distributional effects, northern generators and southern Suppliers would be impacted by 'windfall gains and losses'. However, some respondents believed that the impact would not be as great as in the case for P198 and P203 as there were no energy credits;
- Specific technologies and class of market participants who cannot respond or change their operating regime (e.g. CHP, renewables, nuclear, demand) would be impacted more;
- Parties without generation cannot offset any disbenefits. In addition, small or niche Suppliers cannot easily pass on the additional costs to their customers;
- The additional complexity of P204 would affect smaller players and those who cannot diversify their risk;
- Parties connected at 132kV would be disproportionately affected; and
- One respondent felt that P204 was better than P198, P200 and P203 for embedded generators as there were no negative losses for Suppliers. It felt that under P198, P200 and P203 Suppliers could be credited with energy which would change the benefit for a northern embedded generator to a disbenefit.

Points that were raised by respondents who believed there was no disproportionate impact were that:

- Even though there were distributional effects, all classes of Party were treated the same;
- P204 creates the right balance of despatch efficiency without windfall gains and losses; and
- Other alternatives to zonal transmission losses modifications which attempted to combat the alleged disproportionate effects introduced other elements of unfairness, such as the hedging scheme under P200.

5.4 Impact on Regulatory Risk/Cost of Capital

The respondents were split on whether P204 would have an impact on perceptions of regulatory risk and/or the cost of capital.

Respondents who believed there would be an impact raised the following points:

- There would be an increased risk for energy intensive users;
- Some participants would not be able to respond to the new signals, as investment decisions were made decades ago;
- P204 would impact adversely on risk and competition in the market and could be regarded as creating a further barrier to entry;
- There is an increased risk every time a major change is made, especially to stand alone Suppliers and new entrants;
- P204 would change the cost signals which would undermine Parties' confidence; and
- The shift from uniform loss allocation to a zonal scheme would create uncertainty.

Respondents who believed there was no impact raised the following points:

- Parties have been aware of the introduction of a zonal transmission losses scheme since 1990;
- The change in risk is negligible; and
- The impact of high despatch benefits without high distributional effects would therefore not impact the perception of risk.

5.5 Implementation Approach

All but one respondent supported the proposed implementation approach for P204. The respondent who did not agree with implementation approach believed that the Proposed Modification should not be implemented in the proposed timescales as it should reflect its customers' contracts which have 3 year duration.

The Group noted the response and that it had been previously expressed during consultation for P198, P200 and P203. The Group concluded that P204 should be implemented in accordance with the implementation timescales set out in section 4.8.

One respondent who supported the implementation approach believed that it may be prudent to factor in the possibility of a legal challenge.

The Group noted that it had taken this argument into account when considering the most appropriate implementation approach, but had concluded that adding extra implementation time to cover the possibility of a legal challenge was not necessary or appropriate, as there is already a process in the Code to cover this situation.

5.6 Alternative Solutions

The majority of respondents did not propose any other alternative solutions other those already considered by the Group.

One respondent proposed an alternative solution based on a rolling average of TLF values. This option was originally raised in a P198 consultation response by the same party.

The Group noted the P198 Modification Group's consideration of this suggestion i.e. that it would not be possible to model the resulting TLFs under this approach, since only one year of post-BETTA metered data was currently available. The Group therefore agreed not to progress this option, although some members noted that it could form a potential Modification Proposal in the future once more years of GB-wide data were available.

5.7 Issues Not Yet Identified

Only one respondent highlighted an issue which should be assessed by the Group. The respondent stated that the cost-benefit analysis had not assessed the materiality of P204 on specific types of Supplier. They believed that the impact of P204 would vary on the generation ownership and size and type of Supplier.

The Group noted that this issue had been raised under P198 and agreed with the P198 Modification Group that the cost-benefit analysis had examined the distributional effects on three hypothetical Suppliers of the same size, but whose customer base was respectively concentrated in the north, south or balanced across the whole country (see Section 7.1 of the Cost-Benefit Analysis Report). The Group noted that, for the purpose of this exercise, these hypothetical Suppliers had been assumed not to own any generation assets. The Group noted that OXERA would not necessarily have had knowledge of individual Suppliers' actual portfolios, and also agreed that it would not have been appropriate for the cost benefit analysis or the Group to consider individual Parties' commercial positions.

5.8 Further Comments

The majority of respondents who provided further comments repeated their responses to earlier questions, namely whether they considered that P204 better facilitated the Applicable BSC Objectives or not. In addition, some respondents provided their views on how they thought P204 compared with other zonal transmission loss Modifications (P198, P200 and P203)

Points raised were:

- A majority of respondents considered P204 the 'most reasonable' of current zonal transmission losses Modification Proposals;
- A respondent gave their order of preference for a transmission loss scheme: current baseline, then P204, P198 Alternative, P200 Alternative, P200, P198 Proposed and finally P203;
- One respondent believed there to be no defect in the BSC;
- One respondent who supported a zonal transmission losses scheme stated that P203 was its preference of current transmission losses Modification Proposals;
- One respondent agreed in principle that P204 is a fairer scheme than P198 or P203, but felt that it was still worse than current baseline:
- Another respondent stated that P204 removed the 'credit of energy' problem of other current losses proposals;
- A respondent believed that P204 would better facilitate Objectives (b) and (c), but thought that P203 would be even better as it would be more cost reflective. They believed the benefits of P204 under Objective (b) were limited as there would be less financial incentive to locate plant, and for Objective (c) there would be no positive incentive for those who reduce losses;

- A respondent who supported P198/P203 thought that the benefits of P204 would be lower than those with P198 Alternative and P203, due to the scaling factor which would preserve an element of cross subsidy and reduce the cost reflective allocation of losses. This would have a detrimental impact on Parties that contribute to the reduction of losses overall;
- One respondent suggested that the Group should consider an SO- or TO-focused approach to management of transmission losses. This approach may enable an optimal management of the cost of transmission losses. Several markets internationally apply downward pressure on the cost of transmission losses through mechanisms administered by the transmission entity, and are very compatible with the existing style of approach to setting transmission incentives in the UK. *The Group noted that this issue had been raised in the assessment of P198 and concluded it was outside the scope of P204*;
- One respondent did not support P204 due to the increased complexity or cost to the BSC arrangements which they thought were complex enough;
- One respondent felt that the benefits of P198/P200/P203/P204 under BSC objective (b) are outweighed by disbenefits of objective (c); and
- One respondent noted that the aggregated gross redistributional effect between Zones is more than twice the despatch benefit (£67m compared with £32m if all redistributional effects are grossed together).

6 ASSESSMENT OF MODIFICATION AGAINST APPLICABLE BSC OBJECTIVES

This section outlines the views of the Group regarding the merits of P204 against the Applicable BSC Objectives.

6.1 Proposed Modification

The **MAJORITY** view of the Modification Group was that the Proposed Modification **WOULD NOT** better facilitate the achievement of Applicable BSC Objectives when compared to the current Code baseline, for the following reasons stated below.

Table 1 – Modification Group's View of Proposed Modification

Proposed Modification better facilitates?	Applicable BSC Objectives				
	(a)	(b)	(c)	(d)	Overall
Yes	Minority	**Split**	Minority	None	Minority
No	None	**Split**	**Majority**	**Majority**	**Majority**
Neutral	**Majority**	Minority	None	Minority	Minority

Applicable BSC Objective (a) – The efficient discharge by the Transmission Company of the obligations imposed upon it by the Transmission Licence

The **MAJORITY** view of the Group was that the Proposed Modification would have a **NEUTRAL** effect on the achievement of Applicable BSC Objective (a). This was consistent with the view provided within the Transmission Company Analysis, where the Transmission Company concluded that P204 would have no impact on its ability to discharge its licence obligations (see Appendix 3).

The view of a **MINORITY** of members was that the Proposed Modification **WOULD** better facilitate the achievement of Applicable BSC Objective (a), by removing some of the market distortions and discrimination generated by the existing uniform allocation of variable losses. One member cited the view provided by the Authority in the P75 and original P82 decision letters that "addressing the cross-subsidy in the present transmission losses charging arrangements through more cost-reflective charging will also help to remove the discrimination that exists in the present arrangements", and believed that this argument was applicable to P204 to the extent that it removed part of this cross-subsidy.

No members believed that the Proposed Modification would have a negative effect on the achievement of Applicable BSC Objective (a).

Applicable BSC Objective (b) – The efficient, economic and co-ordinated operation of the GB transmission system

The Group were **SPLIT** on whether the Proposed Modification would or would not better facilitate the achievement of Applicable BSC Objective (b).

The members who believed that P204 **WOULD** better facilitate Objective (b) felt that the external cost-benefit analysis had indicated a reduction in the level of variable losses should the Proposed Modification be approved, as a result of more efficient short-term plant despatch – and that this would have a positive effect on Applicable BSC Objective (b). Although some of these members believed that the cost-benefit analysis demonstrated that the long-term signals provided by P204 might be ambiguous, they believed that the identified savings from redespatch would still deliver a net efficiency benefit.

One member considered that the benefits estimated by the cost-benefit analysis were very small compared to the overall level of losses, and that reality could be significantly different because of approximations or errors in the analysis. However, on the balance of evidence available, they believed that on average losses would be reduced relative to the baseline and therefore that Objective (b) would be better met.

One member of the Group also argued that, in addition to introducing more efficient short-term despatch, the Proposed Modification would introduce long-term signals influencing business decisions regarding investment in both generation and demand. This member believed that the results of the cost-benefit analysis demonstrated that Parties are already taking account of the possible introduction of a zonal transmission losses scheme in their planning decisions, since the introduction of such a scheme has been discussed for several years.

The members who believed that P204 **WOULD NOT** better facilitate the achievement of Applicable BSC Objective (b) did not believe that the Proposed Modification would lead to more efficient despatch. Noting that this was not necessarily supported by the cost-benefit analysis, these members considered that the analysis had been based on an economic despatch model which might not be representative of realistic market conditions.

One member stated that they did not believe that P204 would materially affect the Transmission Company's operation of the Transmission System. This member also noted that the seasonal TLF values calculated by OXERA for 2006/07 (prior to the application of the additional P204 scaling) were not identical to those calculated by PTI for that year. Although noting that this was a consequence of the cost-benefit analysis modelling approach (which calculated TLFs for three representative snapshots per season rather than the total 623 Sample Settlement Periods used by PTI across the four seasons), the member therefore questioned the despatch benefits identified by the cost-benefit analysis. The same member also considered that, at a time when the market is concerned over the security of supply, it was inappropriate to be considering changes which would impact the cost base of participants.

Two members believed that the benefits demonstrated by the cost-benefit analysis for the first two years 2006/7 and 2007/8 would not be realised as the Implementation Date for P204 was 1 April 2008. They also felt that as the loss savings for later years 2014/15 and 2015/16 showed a downward trend, the despatch benefits of P204 would be further reduced.

The view of one member was that the Proposed Modification would have a **NEUTRAL** impact on the achievement of Applicable BSC Objective (b). This view was generally based on the findings of the cost-benefit analysis that P204 would not result in the relocation of any existing generating plant. This member argued that this demonstrated that the Proposed Modification would not provide a long-term signal to the market relative to other existing signals, and that any efficiency benefit would therefore be negligible. They also considered that the short-term despatch signal of P204 remained unproven due to the fact that the cost-benefit analysis had been based on an economic despatch model which they believed might not be representative of realistic market conditions.

Applicable BSC Objective (c) – Promoting effective competition in the generation and supply of electricity, and (so far as consistent therewith) promoting such competition in the sale and purchase of electricity

The **MAJORITY** view of the Group was that the Proposed Modification **WOULD NOT** better facilitate the achievement of Applicable BSC Objective (c), and would have a negative effect on this Objective. These members noted the distributional effects of P204 highlighted in the cost-benefit analysis, and believed that these represented windfall gains and losses which would penalise existing investment decisions with a negative impact on competition. Some members disagreed with the findings of the cost-benefit analysis regarding renewables, which they argued would be disproportionately impacted by the Proposed Modification. Another member considered that it would be impractical for demand to respond to the P204 signals. Additionally, some members believed that the Proposed Modification would increase volatility and would raise the cost of capital for new entrants to the market, thereby representing a barrier to entry.

The view of a **MINORITY** of members was that the Proposed Modification **WOULD** better facilitate the achievement of Applicable BSC Objective (c). Some of these members believed that the distributional effects of the Proposed Modification were not significant, and that the allocation of variable losses which P204 would introduce would be more cost-reflective than the existing Code baseline. Some of these members also supported the principle of the Proposed Modification that no BM Units should be credited with energy (to have a collar) as a result of a zonal transmission losses scheme, since they believed that all BM Units contribute to the level of variable losses. The majority of the Group thought it was appropriate to have a collar as they agreed with the Proposer that each BM Unit considered in isolation causes losses on the system through the power flows associated with it.

One member did not believe that the distributional impacts of the Proposed Modification were a valid consideration against its approval, since they believed that these represented the partial removal of the cross-subsidy between Suppliers (north to south) and generators (south to north) which was inherent in the existing uniform allocation of variable losses. However, this member stated that – although they believed that the Proposed Modification would better facilitate the achievement of Applicable BSC Objective (c) compared with the existing Code baseline – P204 would only remove part of this existing cross-subsidy, since it would not be fully reflective of the contribution of each BM Unit to the level of variable losses. This member argued that collaring BM Units' allocation of losses to zero (such that no BM Units received energy credits) was arbitrary and inappropriate, since he believed that those BM Units whose actions contributed to a reduction in total system losses should receive payments in reflection of this contribution.

One member of the Group argued that the Proposed Modification would introduce long-term signals influencing business decisions regarding investment in both generation and demand. This member believed that the results of the cost-benefit analysis demonstrated that Parties are already taking account of the possible introduction of a zonal transmission losses scheme in their planning decisions, since the introduction of such a scheme has been discussed for several years. The same member also believed that the zonal nature of the scheme would ensure that individual BM Units were not unduly penalised, whilst basing the scheme on an ex-ante calculation would allow Parties to estimate the impact of TLFs on their charges and reflect these in their advance contracts. In addition, the member argued that Parties already took account of regulatory risk in becoming a Code signatory – and therefore did not believe that the Proposed Modification would have any impact in this area.

Applicable BSC Objective (d) – Promoting efficiency in the implementation and administration of the balancing and settlement arrangements

No members of the Group believed that the Proposed Modification would have a positive effect on Applicable BSC Objective (d). The **MAJORITY** of the Group believed that P204 would have a negative effect on this Objective. These members argued that the Proposed Modification would add cost and complexity to the BSC arrangements, reducing overall efficiency.

A **MINORITY** of members believed that the Proposed Modification would have a **NEUTRAL** effect on the achievement of Applicable BSC Objective (d). These members believed that the implementation costs of the proposal were not significant. Some members considered that increased cost and complexity in the balancing and settlement arrangements was not in itself a negative effect, if the process which was being introduced promoted efficiencies. One member believed that it was not necessarily inappropriate for money to be invested in administering the BSC arrangements.

Summary

On balance, a **MAJORITY** of members believed that any benefits under Applicable BSC Objective (b) would be limited and would be outweighed by a negative impact on Applicable BSC Objective (c). These members therefore believed that the Proposed Modification **WOULD NOT** better facilitate the achievement of the Applicable BSC Objectives overall, and should not be made. Some of these members also believed that the Proposed Modification would have a negative impact on Applicable BSC Objective (d).

A **MINORITY** of members believed that the Proposed Modification **WOULD** better facilitate the achievement of both Applicable BSC Objectives (b) and (c), and should therefore be made. Some of these members also believed that the Proposed Modification would better facilitate the achievement of Applicable BSC Objective (a).

One member believed that any potential benefit under Applicable BSC Objective (b) and any negative impact under Objective (c) would be finely balanced, and did not believe there to be any significant effects on Objectives (a) and (d). This member therefore stated that they remained **NEUTRAL** as to whether the Proposed Modification would better facilitate the achievement of the Applicable BSC Objectives overall.

6.2 Interaction with Modifications P198, P200 and P203

In accordance with the BSC Modification Procedures, P198, P200, P203 and P204 were assessed separately by their respective Modification Groups as to whether they would better facilitate the achievement of the Applicable BSC Objectives compared with the existing Code baseline – and not compared with each other.

The P204 Group noted that:

- the P198 Group, by majority, (which comprised a slightly different membership) had considered that both the Proposed and Alternative Modification would not better facilitate achievement of the Applicable BSC Objectives;
- the P200 Group, by majority, (which comprised a slightly different membership) had considered that both the Proposed and Alternative Modification would not better facilitate achievement of the Applicable BSC Objectives;
- the P203 Group, by majority, (which comprised a slightly different membership) had considered that the Proposed Modification would not better facilitate achievement of the Applicable BSC Objectives; and
- the Panel at its meeting on 14 September had endorsed the above Modification Group recommendations.

Furthermore, the P204 Group thought it would be useful to indicate a preference between P198, P200, P203 and P204, to inform the Authority when making its decision. Whilst recognising their recommendation that P204 should not be made, the P204 Group (by majority) believed that **P204** Proposed Modification would best facilitate the Applicable BSC Objectives in comparison with P198, P200 and P203 (both for their Proposed and Alternative Modifications where applicable). These members believed that P204 reduced the level of windfall gains and losses, whilst retaining the perceived benefits of a zonal transmission losses scheme. Furthermore, some of these members believed that a further benefit of P204 was that no BM Unit received energy credits (or payments for losses).

However, two members, who supported a zonal transmission loss scheme, believed that P203 Proposed Modification would best facilitate the Applicable BSC Objectives. One member believed that P200 would best facilitate the Applicable BSC Objectives due to its transitional hedging scheme. One member abstained since they maintained a neutral position on whether any of the proposals better facilitated the Applicable BSC Objectives.

7 TERMS USED IN THIS DOCUMENT

Other acronyms and defined terms take the meanings defined in Section X of the Code.

Acronym/Term	Definition
Eβ	Estimated Scaling Factors for use by BMRA in its calculations (Option 2 only)
ETLMO	Estimated Transmission Losses Adjustment
Ex-ante	Based on forecast data (i.e. values determined in advance of their period of applicability).
Scaling Factor (β)	The factor to be used in adjusting the Seasonal Zonal TLF instead of the 0.5 scaling factor value (employed in P198, P200 and P203).
Transmission losses	The energy lost from the Transmission System (calculated as the difference between total generation and total demand).
Transmission Losses Adjustment (TLMO)	The parameter for allocating an amount of transmission losses uniformly in proportion to volume independent of location to all BM Units or zones rather than specifically to individual BM Units or zones.
Transmission Loss Factor (TLF)	The parameter for allocating some or all transmission losses on a non-uniform basis (dependent on location as well as volume), and which is currently set to zero.
Transmission Loss Multiplier (TLM)	The factor used to scale individual BM Unit Metered Volumes in Settlement in order to allocate transmission losses to Parties (includes TLF and TLMO).
Variable losses	The element of transmission losses which occurs through the heating of transmission lines, cables and transformers, and which increases with the current (and associated power flow) and length of line in which it flows.

8 DOCUMENT CONTROL

8.1 Authorities

Version	Date	Author	Reviewer	Reason for Review
0.1	25/09/06	Justin Andrews	Modification Group	For Modification Group review
0.2	03/10/06	Justin Andrews	Kathryn Coffin	For incorporation of Group review comments
0.3	03/10/06	Kathryn Coffin	Sarah Jones	For technical review
0.4	05/10/06	Kathryn Coffin	Change Delivery	For quality review
1.0	06/10/06	P204 Modification Group	BSC Panel	For Panel decision
2.0	08/11/06	P204 Modification Group		Insertion of clarification for costs in Table 5

8.2 References

Ref.	Document Title	Owner	Issue Date	Version
1	P198 Assessment Report, P198 Modification Proposal.	BSCCo	18/08/06	2.0
2	P204 requirement specification, P204 Modification Proposal.	BSCCo	18/08/06	1.0
3	P200 Assessment Report, P200 Modification Proposal.	BSCCo	18/08/06	2.0
4	P203 Assessment Report, P203 Modification Proposal.	BSCCo	05/08/06	1.0
5	P198 Requirements Specification, P198 Modification Proposal	BSCCo	13/02/06	1.0

8.3 Intellectual Property Rights, Copyright and Disclaimer

APPENDIX 1: DRAFT LEGAL TEXT

Draft legal text for the Proposed Modification is attached as a separate document, Attachment 1A.

Details of the Group's discussion of the text can be found in Section 4.10.

APPENDIX 2: PROCESS FOLLOWED

Copies of all documents referred to in the table below can be found on the BSC Website at: P204 Modification Proposal.

Date	Event
03/07/06	Modification Proposal raised by British Energy Power & Trading Limited
13/07/06	IWA presented to the Panel
14/07/06	First Assessment Procedure Modification Group meeting held
01/08/06	Second Assessment Procedure Modification Group meeting held
02/08/06	External Cost Benefit Analysis commenced (OXERA)
11/08/06	Requirements Specification issued for BSC Agent impact assessment. Request for BSCCo, Party/Party Agent impact assessments and Transmission Company analysis issued
22/08/06	BSCCo, BSC Agent and Party/Party Agent impact assessment, Transmission Company analysis response and external Cost Benefit Analysis returned
23/08/06	Third Assessment Procedure Modification Group meeting held
24/08/06	Further external Cost Benefit Analysis commenced (OXERA)
04/09/06	Assessment Procedure Consultation issued
12/09/06	Further external Cost Benefit Analysis returned
13/09/06	Addendum to Assessment Procedure Consultation issued
14/09/06	Progress update given to BSC Panel
18/09/06	Responses received to industry consultation
20/09/06	Fourth Assessment Procedure Modification Group meeting held
12/10/06	Assessment Report presented to the Panel

ESTIMATED COSTS OF PROGRESSING MODIFICATION PROPOSAL[7]

Meeting Cost	£3,000 (based on sharing two meetings with P203)
Legal/Expert Cost	£30,500* (covering legal text support and external cost benefit analysis)
Impact Assessment Cost	£15,000
ELEXON Resource	75 Man days £39,500 (includes requirement for contract staff)

*This has been updated since the initial written assessment to show the increased cost of the external cost Benefit Analysis (increase of £20k, due to analysis requested by the Group).

MODIFICATION GROUP MEMBERSHIP

Member	Organisation	14/07	01/08	23/08	20/09
Martin Mate	British Energy (Proposer)	Y	Y	Y	Y
Andrew Truswell	National Grid	Y	Y	Y	Y
Bill Reed	RWE Npower	Y	N	Y	Y
Steve Drummond	EDF Trading	Y	N	N	Y
Garth Graham	Scottish and Southern	Y	Y	Y	Y
Ben Sheehy	E.ON	Y	Y	N	Y
Bob Brown	Cornwall Energy Associates	Y	Y	Y	Y
David Scott	EDF Energy	Y	Y	Y	Y
Keith Miller	KM Energy	N	Y	N	Y
Dave Wilkerson	Centrica	Y	Y	Y	Y
Man Kwong Liu	SAIC	N	Y	Y	Y
Sarah Jones	ELEXON (Chairman)	Y	Y	N	Y
Chris Rowell	ELEXON (Chairman)	N	N	Y	N
Kathryn Coffin	ELEXON (Lead Analyst)	Y	N	Y	Y

[7] Clarification of the meanings of the cost terms in this appendix can be found on the BSC Website at the following link: http://www.elexon.co.uk/documents/Change_and_Implementation/Modifications_Process_-_Related_Documents/Clarification_of_Costs_in_Modification_Procedure_Reports.pdf.

Attendee	Organisation	14/07	01/08	23/08	20/09
Richard O'Malley	ELEXON (Lawyer)	N	Y	N	Part
Justin Andrews	ELEXON (Technical Support)	Y	Y	Y	Y
John Lucas	ELEXON (Technical Support)	N	Part	Part	N
Steve Mackay	Ofgem	Y	N	Y	N
Cheryl Mundie	Ofgem	N	Y	Y	Y
Mark Gribble	Logica CMG	Y	N	N	N
Graham Shuttleworth	NERA	Y	N	N	N
Terry Ballard	RWE Npower	N	Y	N	N

Copy of Original Modification Group Terms of Reference

Modification Proposal P204 will be considered by the 'P204 Modification Group' (formed from members of the P198 and P200 Modification Groups), in accordance with the following Terms of Reference.

1.1 The Modification Group will carry out an Assessment Procedure in respect of Modification Proposal P204 pursuant to section F2.6 of the Balancing and Settlement Code.

1.2 The Modification Group will produce an Assessment Report for consideration at the BSC Panel Meeting on 12 October 2006;

1.3 The Modification Group shall:

- Base all non-scaling elements of the solution (including implementation approach) for Proposed Modification P204 on those developed by the P198 Modification Group for P198 Proposed Modification;
- Be mindful of the arguments expressed regarding potential Alternative options under P198 and the applicability of these arguments to any potential Alternative options under P204;
- Consider the results of the P198 load flow modelling that are applicable to P204, but shall not carry out any further load flow modelling for Proposed Modification P204;
- Develop the precise calculation for the determination and application of scaling factors under P204 for:
  - Option 1: Single Average Scaling Factor;
  - Option 2: Different Scaling Factor for Delivery and Off-take varied by Settlement Period;
- Undertake analysis of the P204 proposed scaling approaches, in particular:
  - Indication of the likely values of the Scaling Factors under either Option;
  - Analysis of the impact of each option on the allocation of transmission losses;

- Consider the appropriateness of P204 Scaling approaches, including:

  - whether the distributional effects of full P198 TLF values represent the removal of an existing cross-subsidy and are appropriate, or whether these constitute inappropriate windfall gains and losses;

  - The effect of the reduced TLF/TLM differentials under P204 on the costs and benefits of a zonal transmission losses scheme;

- Commission further external cost-benefit analysis to examine the effect of P204 on the signals provided by zonal transmission losses, in particular impact on despatch signals, distributional effects and level of losses;

- Undertake an impact assessment to determine the implementation costs and lead time for P204, and whether the same Implementation Dates are applicable for P204 as for P198;

- Carry out an industry consultation on the merits of P204 against the Applicable BSC Objectives; and

- Develop legal drafting for the implementation of P204.

APPENDIX 3: RESULTS OF IMPACT ASSESSMENT

This section shows the results of the impact assessment based on the P204 Requirements Specification issued on 11 August 2006.

a) Impact on BSC Systems and Processes

System / Process	Impact of Proposed Modification
BM Unit Registration	The CRA would be required to amend its BM Unit registration process so that Adjusted Seasonal Zonal TLF values for each BM Unit are obtained from the TLFA (via BSCCo) for each BSC Year, and are registered in BSC Systems. These values would be reported to the BMRA, SAA and BSCCo using existing data flows.
Central Data Collection	The CDCA would be required to provide the TLFA (via BSCCo) with Metered Volume data for the Sample Settlement Periods used in the Load Flow Model.
Balancing Mechanism Reporting Service	The BMRA would be required to receive Adjusted Seasonal Zonal TLF values for each BM Unit from the CRA, and to use these values in BMRA reporting during the applicable BSC Year.
Settlement Administration	The SAA would be required to receive Adjusted Seasonal Zonal TLF values for each BM Unit from the CRA, and to apply these values in Settlement calculations during the applicable BSC Year.
Derivation of Zonal TLFs	A new BSC process, with supporting systems, would be introduced for the TLFA to derive TLFs through the application of a Load Flow Model in accordance with a Network Mapping Statement, Load Flow Model Specification, and new calculations in Section T of the Code. The output of this new process would be a set of four Adjusted Seasonal Zonal TLF values (one per BSC Season in the year) for each of the 14 TLF

System / Process	Impact of Proposed Modification
	Zones. All BM Units within a Zone would receive the Adjusted Seasonal Zonal TLF value for that Zone in the relevant BSC Season.

All of the above processes would contain the flexibility to handle the following activities:

- Ad-hoc prospective registration of TLFs for new BM Units; and
- Ad-hoc retrospective recalculation of TLF values following an upheld Trading Dispute.

b) BSC Agent documentation (e.g. Interface Definition and Design, Design Specifications, System Specifications, Manual System Specifications and Operating System Manuals) would need to be amended/developed to reflect the changes outlined above. A copy of the full BSC Agent impact assessment can be found in the separate Attachment 3A.Impact on BSC Agent Contractual Arrangements

BSC Agent Contract	Impact of Proposed Modification
Transmission Loss Factor Agent	A full BSC Agent procurement exercise would need to be undertaken, and appropriate contractual arrangements created, for the TLFA in accordance with Section E of the Code.
BSC Auditor	The scope of the BSC Audit would need to be extended to include the new BSC Agent, the TLFA.

c) Impact on BSC Parties and Party Agents

Parties may wish to verify the allocation of their BM Units to Zones. Parties that have developed their own systems to monitor the Settlement calculations would also need to amend these to take account of the existence of non-zero TLF values which vary by BSC Season.

BSC Parties also indicated that there would be an additional impact due to changes to their own systems and processes to account for the scaling factor calculation. The majority of respondents indicated a minimal additional impact in both terms of cost and timescale over and above the base solution for P198.

There is no additional impact on Party Agents.

Full copies of the non-confidential Party and Party Agent impact assessment responses can be found in the separate Attachment 3A.

Please note that some respondents provided confidential cost information to support their assessments, which has been removed from the response tables and has not been provided to the Group. However, all confidential information received will be provided to the Authority, and will therefore be taken into account as part of the Authority's decision-making process.

d) Impact on Transmission Company

P204 would have the following impact on the Transmission Company:

- The Transmission Company would be required to support BSCCo and the Panel in establishing and maintaining the Network Mapping Statement – including the maintenance of an up-to-date list of all Nodes on the Transmission System, and assistance in resolving any question or dispute over the allocation of individual BM Units to Zones; and
- The Transmission Company would be required to support the TLFA and the Panel in maintaining the Load Flow Model, including the provision of relevant Network Data and any necessary information to aid the Panel in its determination of Load Periods.

A copy of the full Transmission Company analysis can be found in the separate Attachment 3A.

e) BSC Panel

P204 would have the following impact on the Panel:

- The Panel would be responsible for approving the Load Flow Model, the Load Flow Model Specification, the TLFA Service Description, the Load Flow Model Reviewer Terms of Reference and the Network Mapping Statement;
- The Panel would be responsible for establishing the definitive list of TLF Zones for use in the Network Mapping Statement and Load Flow Model, including the resolution of any question or dispute over the mapping of individual BM Units to Zones;
- The Panel would be responsible for establishing, for use in the Load Flow Model, a number of different Load Periods to represent varying levels of load on the Transmission System;
- The Panel would be responsible for establishing, for use in the Load Flow Model, the number of Sample Settlement Periods to be used in each Load Period;
- The Panel would be responsible for establishing a revised BSC Audit Scope incorporating the TLFA; and
- The Panel (aided by an independent Load Flow Model Reviewer) would be responsible for ensuring that the Load Flow Model complies with the Load Flow Model Specification – including retrospectively, where the calculation or use of TLFs is the subject of a Trading Dispute.

f) Impact on BSCCo

Area of Business	Impact of Proposed Modification
BSC Website	BSCCo would be required to publish the following TLF data and documents on the BSC Website: • The four Adjusted Seasonal Zonal TLF values for each TLF Zone in the applicable BSC Year; • The version of the Network Mapping Statement used in the annual TLF calculation, and any subsequent amendments to that statement to take account of changes in BM Unit registrations; and • The Load Periods and Sample Settlement Periods used in the TLF calculation for the applicable BSC Year. Any existing website references to TLF=0 would also need to be amended.

Area of Business	Impact of Proposed Modification
	BSCCo would be required to publish the scaling factors on the BSC Website
Communications	BSCCo would produce an information sheet for Parties explaining the new P204 process, for publication on the BSC Website.
Working Procedures	BSCCo would need to put in place appropriate working practices to support its Code obligations regarding the derivation and use of TLFs. These would include processes for requesting Node information and Network Data from the Transmission Company, requesting Metered Volume data from the CDCA, and allocating new BM Units to Zones. BSCCo would need to put in place appropriate working practices to support its Code obligations regarding the derivation and use of scaling factors. These would include processes for requesting Metered Volume data from the CDCA
BSC Panel/Panel Committee Support	BSCCo would be required to assist the Panel in its determination of TLF Zones, Load Periods and Sample Settlement Periods. BSCCo would be required to support the Panel in its determination of any question or dispute over the mapping of individual BM Units to TLF Zones (potentially including the development of appeal guidelines). BSCCo would be required to develop a revised methodology for Estimated Transmission Losses Adjustment (ETLMO) values to reflect zonal TLFs, and to support the ISG in its approval of that methodology. Any potential incorrect calculation or use of TLF values in Settlement would form the subject of a Trading Dispute, under the normal process administered by BSCCo on behalf of the Trading Disputes Committee (TDC). BSCCo and TDC working practices regarding such Disputes would require additional steps for the TDC to decide whether to obtain a report from the Load Flow Model Reviewer on the compliance of the Load Flow Model with its specification, and for the Panel to determine whether TLFs should be recalculated.
Change and Configuration Management	BSCCo would be required to maintain the Network Mapping Statement on behalf of the Panel, under a specific change process to be detailed in the Code.
Procurement and Contract Management	BSCCo would be required to procure the TLFA and Load Flow Model Reviewer, and to manage the resulting contracts. BSCCo would also be required to manage the escrow arrangements for the Load Flow Model.
Performance Assurance	BSCCo would be required to provide any necessary additional support to the BSC Auditor and the Panel in extending the scope of the BSC Audit to incorporate the TLFA.

g) Impact on Code

Code Section	Impact of Proposed Modification
Section E 'BSC Agents'	The TLFA would need to be added to the list of existing BSC Agents in Section E.
Section H 'General'	The Load Flow Model Specification would need to be added to the list of Code Subsidiary Documents in Section H.
Section T 'Settlement and Trading Charges'	Section T would require amendments to detail the rights and obligations of all relevant parties regarding the derivation of Adjusted Seasonal Zonal TLFs and scaling factors and their use in Settlement.
Section V 'Reporting'	Section V would require amendment to detail the provision by BSCCo of the following TLF data to Parties on request: • The Network Data and Metered Volumes used in the TLF calculation for the applicable BSC Year; • The circuit and transformer power flows generated by the Load Flow Model; • The raw nodal power flows calculated by the Load Flow Model and used in the TLF calculation for the applicable BSC Year; and • The raw Nodal TLFs calculated by the Load Flow Model and used in the TLF calculation for the applicable BSC Year.
Section X 'Definitions and Reporting'	Section X would require amendment to detail any new Code-defined terms or acronyms required for P204.

h) Impact on Code Subsidiary Documents

Document	Impact of Proposed Modification
BSCP01 'Overview of the Trading Arrangements'	Amendments would be required to reflect the derivation of non-zero TLFs and Scaling Factors and their use in Settlement calculations.
BSCP15 'BM Unit Registration'	Amendments would be required to include the process for allocating four Adjusted Seasonal Zonal TLF values to each BM Unit in the applicable BSC Year.
BSCP38 'Authorisations'	Amendments would be required to include an authorisation process for Parties to request input and output data files relating to the Load Flow Model (Network Data, Metered Volumes, power flows and Nodal TLFs).
BSCP41 'Report Requests and Authorisations'	As above.
Reporting Catalogue	Amendments would be required to reflect the new/amended reporting requirements introduced by P204.
Communications Requirement Document	Amendments would be required to reflect the rules for communicating with the TLFA via BSCCo.

Document	Impact of Proposed Modification
BSC Agent Service Descriptions	The BMRS, BSC Auditor, CDCA, CRA and SAA Service Descriptions would need to be amended to reflect the new obligations on these Agents in respect of zonal TLFs. A new Service Description would need to be developed for the TLFA.
Load Flow Model Specification	The specification for the TLFA Load Flow Model would be established as a new Code Subsidiary Document.

i) Impact on Core Industry Documents/System Operator-Transmission Owner Code

No impact.

j) Impact on Other Configurable Items

Document	Impact of Proposed Modification
User Requirements Specifications	The BMRS, BSC Website, CDCA, and CRA URSs would need to be amended to reflect the new obligations on these Agents in respect of zonal TLFs. A new URS would need to be developed for the TLFA.

k) Impact on BSCCo Memorandum and Articles of Association

No impact.

l) Impact on Governance and Regulatory Framework

The P204 Group noted that the P198 Modification Group agreed that the following potential impacts of P198 fell outside the vires of the Code, and could therefore not form part of its assessment against the Applicable BSC Objectives:

- Impact on the environment (through changes in carbon emissions, plant-mix, or the location of generation and demand);
- Impact on consumers (through the passing on of costs or cost-savings by Parties, or changes in the location of demand);
- Impact on the existing locational signals provided by the Transmission Company's TNUoS charging.

The P198 Group noted that these areas could be taken into account by the Authority as part of its wider statutory duties when making its decision whether to approve P198. The P204 Modification Group agreed that the same arguments applied to P204.

APPENDIX 4: RESULTS OF ASSESSMENT PROCEDURE CONSULTATION

Full copies of the consultation responses are attached as a separate document, Attachment 4A.

APPENDIX 5: P204 COST-BENEFIT ANALYSIS

A copy of the P204 OXERA cost-benefit analysis report is attached as a separate document, Attachment 5A.

APPENDIX 6: RESULTS OF P198 TLF MODELLING EXERCISE

A copy of the PTI load-flow modelling report can be found on the BSC Website at ELEXON - Modification Proposal 198.

APPENDIX 7: P198 ASSESSMENT REPORT

A copy of the P198 Assessment Report can be found on the BSC Website at ELEXON - Modification Proposal 198.