105/005

INITIAL WRITTEN ASSESSMENT for Modification Proposal P198 'Introduction of a Zonal Transmission Losses Scheme'

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This document has been distributed in accordance with Section F2.1.10 of the Balancing and Settlement Code.[2]

There are two types of losses from the Transmission System: fixed losses and variable losses. Variable losses increase with the distance travelled by electricity, while fixed losses do not.

Currently, the costs of both fixed and variable transmission losses are recovered from BSC Parties on a 'uniform' basis. P198 seeks to allocate the costs of variable losses to Parties on a 'zonal' basis, according to the extent to which each Party gives rise to them. The solution proposed by P198 is based closely on Modification Proposal P82.

BSCCO'S RECOMMENDATIONS

On the basis of the initial assessment, BSCCo recommends that the Panel:

- **DETERMINE that Modification Proposal P198 should be submitted to the Assessment Procedure;**
- **AGREE the Assessment Procedure timetable such that an Assessment Report should be completed and submitted to the Panel for consideration at its meeting of 11 May 2006;**
- **DETERMINE that the P198 Modification Group should be formed from members of the P82 Transmission Loss Factor Modification Group as far as possible, supplemented by the expertise of current Standing Modification Group members and a representative of the System Operator-Transmission Owner Code Committee;**
- **AGREE the Modification Group Terms of Reference; and**
- **AGREE the expenditure required to commission relevant external consultants as set out in Section 2.**

[1] ELEXON Ltd fulfils the role of the Balancing and Settlement Code Company ('BSCCo'), pursuant to Annex X-1 of the Balancing and Settlement Code (the 'Code').
[2] The current version of the Code can be found at http://www.elexon.co.uk/bscrelateddocs/BSC/default.aspx.

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SUMMARY OF IMPACTED PARTIES AND DOCUMENTS

As far as BSCCo has been able to assess, the following parties/documents are potentially impacted by Modification Proposal P198.

Please note that this table represents a summary of the full initial impact assessment results contained in Appendix 2.

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	☐
Other Agents				Transmission Licence	☐
Supplier Meter Registration Agent	☐			Transmission Loss Factor Agent/Service Provider*	☒
Data Transfer Service Provider	☐			Network Mapping Statement*	☒

*New document/role introduced by P198

1 DESCRIPTION OF PROPOSED MODIFICATION

1.1 Background

1.1.1 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 up in the process of transporting electricity. This 'lost' energy is commonly referred to as 'transmission losses'. Transmission losses can be considered to comprise two main elements: 'fixed' losses and 'variable' losses.

Fixed losses occur in both transformers and lines. In transformers, the losses arise from magnetising the iron core, and do not vary significantly with the power flow through the transformer. Fixed losses in lines are dependent on the voltage levels and climatic conditions. Fixed losses are independent of the distance travelled by electricity.

Variable losses arise through the heat caused by current flowing through the transformers and lines. Variable losses therefore increase with the distance travelled by electricity.

References to 'fixed' and 'variable' losses throughout this report 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 at any given point in time, calculated as the difference between total generation and demand).

1.1.2 Existing Cost-Recovery Mechanism for Transmission Losses

The rules and calculations for recovering the cost of transmission losses are set out in Section T2 of the Balancing and Settlement Code ('the Code'). Under the existing Code provisions, the costs of both fixed and variable transmission losses in each Settlement Period are allocated to BSC Parties ('Parties') on a 'uniform' basis in proportion to each Party's metered energy.

The current allocation of transmission losses does not take account of the extent to which individual Parties give rise to losses. Although a parameter for a non-uniform, '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 a Party'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, and represents a factor used to scale the BM Unit's Metered Volumes in Settlement. Each Party's share of transmission losses is therefore recovered as part of its Trading Charges. The purpose of the **Transmission Losses Adjustment** (TLMO) is to allocate the proportion of transmission losses which has not already been allocated through the TLF. Metered Volumes for BM Units in 'delivering' (production) Trading Units are scaled up (multiplied by $1+TLF+TLMO^{+}$), whilst Metered Volumes for BM Units in 'offtaking' (consumption) Trading Units are scaled down (multiplied by $1+TLF+TLMO^{-}$).

The value of $TLMO^{+/-}$ is produced by a separate calculation in Section T. This includes the application of an 'α factor' of 0.45, which adjusts the total transmission losses for the Settlement Period such that 45% of losses are allocated across all delivering Trading Units whilst 55% are allocated across all offtaking Trading Units.[3]

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

> *$TLMO^{+}$ = (0.45*(generators' share of total transmission losses in Settlement Period) – generators' share of transmission losses already recovered through TLF in Settlement Period) / total volume of generation in Settlement Period*
>
> *$TLMO^{-}$ = (0.55*(Suppliers' share of total transmission losses in Settlement Period) – Suppliers' share of transmission losses already recovered through TLF in Settlement Period) / total volume of demand in Settlement Period*

The values of $TLMO^{+}$ and $TLMO^{-}$ are therefore identical for each BM Unit to which they apply.

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 TLMs 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 share of transmission losses is dependent on the Metered Volumes of the BM Units to which this TLM is applied.

1.1.3 Previous Modification Proposals

Three previous Modification Proposals have sought to introduce a Code mechanism to calculate non-zero TLF values:

- P75 'Introduction of Zonal Transmission Losses' (raised by Powergen in April 2002);
- P82 'Introduction of Zonal Transmission Losses on an Average Basis' (raised by First Hydro in May 2002); and
- P105 'Introduction of Zonal Transmission Losses on a Marginal Basis Without Phased Implementation' (raised by Powergen in October 2002).

These proposals were assessed by the Transmission Loss Factor Modification Group (TLFMG) during 2002. The TLFMG also developed Alternative Modifications for P75 and P82, resulting in five mutually-exclusive TLF methodologies being put forward to the Authority for decision. A summary of the key aspects of these solutions is provided in Appendix 3.

In addition, Modification Proposal P109 'A Hedging Scheme for Changes to TLF in Section T of the Code' was raised by British Energy in November 2002. P109 proposed that a voluntary 'hedging scheme' should be introduced in Section T, which Parties could opt into in order to mitigate the impact of TLFs on their BM Units over a 15-year period. Unlike the other proposals, P109 did not itself seek to stipulate a methodology for calculating non-zero TLFs. Instead, it proposed to include the hedging mechanism in the Code such that it could be used were non-zero TLFs to be introduced by another Modification Proposal.

P75, P105 and P109 were rejected by the Authority, whilst Proposed Modification P82 was approved in January 2003 for implementation in April 2004. However, the approval of P82 was quashed by the High Court in January 2004 following a judicial review, and P82 was remitted to the Authority for redecision where it was subsequently rejected. As a result, the value of TLF remains set to zero within the Code.

[3] In practice, this is designed to be equivalent to a 50:50 allocation, since metering for 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 therefore includes supergrid transformer losses for demand connections but excludes them for generation.

Although P82 was never fully implemented, the majority of the implementation work had already been completed prior to the conclusion of the judicial review. Much of the original P82 functionality (legal text, system development, Code Subsidiary Document changes and BSCCo working procedures) therefore remains intact and under the ownership of BSCCo. However, a key exception is the software developed by the Transmission Loss Factor Agent (TLFA), the new BSC Agent created by P82 to operationally calculate non-zero TLFs. Although an organisation was initially procured by BSCCo to fulfil the TLFA role, the subsequent P82 judicial review ruling meant that it was no longer required. The TLFA contract was consequently terminated, and the Intellectual Property Rights to the TLFA software remain with the organisation concerned.

The scope and assessment of P75, P82, P105 and P109 was limited to transmission losses occurring on the England and Wales Transmission System. Following the Authority's approval of P82, a defect was identified in the P82 legal text relating to the application of a zonal TLF to the Scottish Interconnector. Modification Proposal P125 'Apportionment of the Scottish Interconnector flows to the Northern and North Western GSP Groups for the purposes of calculating losses' was raised by Scottish and Southern in March 2003 to correct this defect, and was approved by the Authority in August 2003. Following the P82 judicial review ruling, the P125 changes served no practical purpose and were 'backed out' of the Code by Modification Proposal P165 'Housekeeping Modification – Removal of Approved Modification P125' in April 2004. Since then the introduction of the British Electricity Trading and Transmission Arrangements (BETTA) in April 2005 has extended the scope of the Code to incorporate Scotland, such that it now covers the GB-wide Transmission System. It should be noted that the defect identified by P125 could therefore no longer arise under a GB transmission losses scheme, since the Scottish Interconnector no longer exists under BETTA.

Further detail regarding P82 can be found within Section 1.3 of this IWA, the joint P75/P82 Assessment Report (Reference 1) and the P82 Modification Report (Reference 2). For more information regarding P75, P105, P109 and P125 please refer to the respective Modification Reports (References 3-6).

1.2 Modification Proposal P198

P198 was raised on 16 December 2005 by RWE Npower ('the Proposer').[4] The Proposer argues that the existing locational split between northern generation and southern demand is neither economic, efficient nor good for the environment, since it results in the transportation of electricity over large distances – increasing the amount of energy lost through variable (heating) losses, and thereby the amount of carbon emissions. The Proposer argues that the Code's current uniform allocation of variable losses does not provide the appropriate economic signals to site new generation closer to existing demand (and vice versa), since it fails to target the costs of such losses on those Parties who give rise to them (i.e. those Parties who cause electricity to be transported the furthest distance). The Proposer considers that this results in a cross-subsidy, whereby southern generators and northern consumers have to pay part of the costs of transmitting electricity to the south.

P198 seeks to allocate the costs of variable losses to Parties on a 'zonal' basis, according to the extent to which each Party gives rise to them. In the short-term, the Proposer believes that this would remove existing cross-subsidies and lead to more efficient despatch (i.e. more efficient use of existing generation closer to demand). In the longer-term, the Proposer believes that cost-reflective zonal charging would encourage more efficient siting of new plant and load in areas where generation or demand is respectively limited – ultimately reducing the distance travelled by electricity, and thereby the overall amount of losses and carbon emissions.

[4] A copy of the Modification Proposal can be found in Appendix 1.

The solution proposed by P198 is based closely on Proposed Modification P82, and involves the following methodology for calculating non-zero TLFs:

- An electrical model of the Transmission System (a '**Load Flow Model'**) would be built, containing 'nodes' to represent points where energy flows on or off the system. Each node would be allocated to a specific zone on the network. These **TLF zones** would be set by the Panel, based on the geographical areas covered by existing GSP Groups.
- Prior to the start of each BSC Year (1 April – 31 March), the Load Flow Model would be run by a TLF agent/service provider to calculate how a variation in generation or demand at each individual node would affect the total transmission losses from the Transmission System. This 'marginal' methodology would be applied using Metered Volumes and network data for sample Settlement Periods from a preceding 'reference' year. 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 increase in generation (or reduction in demand) had the effect of decreasing total transmission losses. Negative TLF values would be produced for nodes where an increase in generation (or reduction in demand) had the effect of increasing total losses.
- These raw **nodal TLFs** would be averaged across all the nodes in each TLF zone by 'volume-weighted' averaging, to give a **zonal TLF** for each sample Settlement Period. These would then be converted to **annual zonal TLFs** by 'time-weighted' averaging.
- The annual zonal TLFs would be adjusted through a 'scaled marginal' methodology, using an appropriate scaling factor such that they represented only the variable element of transmission losses. These **adjusted annual zonal TLFs** would be endorsed by the Panel before being used in the TLM cost-recovery calculation for the applicable BSC Year. A positive TLF value would increase the value of TLM used to scale a BM Unit's Metered Volumes (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).
- The remaining 'fixed' element of transmission losses would continue to be recovered under the Code's existing uniform calculation of $TLMO^{+/-}$. The existing overall 45% production / 55% consumption allocation of total transmission losses would also be retained within the TLMO calculation.

2 AREAS FOR CONSIDERATION IN PROGRESSING MODIFICATION PROPOSAL

An initial assessment of P198 has identified the following areas which BSCCo recommends should be considered further by a Modification Group during the progression of the Modification Proposal.

2.1 Appropriateness of Aspects of the Proposed Modification Solution

BSCCo recommends that the Modification Group considers each of the following key aspects of the solution proposed by P198, in order to assess their appropriateness and to identify any potential Alternative Modifications. BSCCo recommends that the Modification Group considers the TLFMG's previous assessment of P75, P82, P105 and P109, but notes that this may no longer be applicable to P198 due to the period of time passed and the introduction of BETTA.

2.1.1 Nature of TLF Calculation

P198 proposes an 'ex-ante' calculation of TLFs (i.e. the Load Flow Model would forecast TLFs for the BSC Year using data from a previous 'reference' year), which was the approach followed under P82. An alternative method would be to use an 'ex-post' calculation (i.e. to retrospectively calculate TLFs using actual data), as put forward under Proposed Modification P75. The TLFMG's assessment of P75 concluded that an ex-post scheme was inappropriate, since the resulting variation in TLF values would create an 'unhedgable risk' for Parties.

BSCCo recommends that the P198 Modification Group considers the respective merits (costs, risks and benefits) of ex-post and ex-ante calculations. Any ex-post methodology would form an Alternative Modification.

2.1.2 Applicable Period and Reference Period for TLFs

P198 proposes that TLFs should be calculated for each BSC Year (1 April – 31 March), as under P82. Alternative approaches could be to calculate TLFs for a Settlement Period, Settlement Day, Calendar Month or BSC Season. Some of these alternative applicable periods were previously considered under P75 and P105. BSCCo recommends that the P198 Modification Group considers whether a BSC Year is the most appropriate period for which to calculate TLFs. Any variation from this applicable period would need to be progressed as an Alternative Modification.

P198 proposes that the TLF calculation should use data from a previous 'reference' year. Under P82, the reference year ran from 1 October – 31 September, due to the timescales required to derive and publish the TLFs before the start of the BSC Year on 1 March. BSCCo recommends that the P198 Modification Group considers the most appropriate reference period for the P198 calculation.

2.1.3 Basis of TLF Zones

P198 proposes that the zones used in the allocation of TLFs should be determined by the Panel, based on the geographical areas covered by GSP Groups. As for P82, the method of zonal allocation for Production and Consumption BM Units under P198 would therefore be identical. A potential alternative method was originally put forward by P75, which proposed that only transmission losses for Consumption BM Units should be averaged by GSP Group – with those for Production BM Units to be averaged according to the Transmission Network Use of System Charging (TNUoS) Zones set by the Transmission Company outside the BSC. The TLFMG concluded that this approach could result in perverse economic signals, since the TLFs for generation and demand would not be equal and opposite, and could be open to 'gaming' (i.e. it might be possible to arbitrage between supply and generation at a particular location due to the different zones).

BSCCo recommends that the P198 Modification Group considers whether GSP Groups would be the most appropriate basis for establishing the TLF zones. Any variation in the method of zonal allocation would need to be progressed as an Alternative Modification.

2.1.4 Value of Scaling Factor

Like P82, P198 proposes to scale zonal TLFs such that they recover only the variable element of transmission losses. The rationale for the P82 scaling factor was that the remaining 'fixed' losses would not vary according to the distance travelled by electricity, and that seeking to recover these on a zonal basis could therefore result in reverse cross-subsidies. An alternative approach was put forward by P75, which proposed to recover all transmission losses on a 'fully marginal' zonal basis. BSCCo recommends that the Modification Group considers the appropriateness of the 'scaled marginal' approach proposed by P198. Any variation in this approach would form an Alternative Modification.

P198 does not stipulate a value for the scaling factor, although the Proposer notes that a factor of 0.5 was used under P82 (i.e. half the total transmission losses were allocated on a zonal basis through the TLF, with the remaining half allocated on a uniform basis through the TLMO). The modelling undertaken by the TLFMG during the P75 and P82 Assessment Procedure indicated that a 0.5 scaling factor was an appropriate (though not exact) approximation of the heating element of transmission losses. Since the TLFMG's conclusion was based on the proportions of variable and fixed losses which existed in 2002, BSCCo recommends that the Modification Group considers the most appropriate scaling factor to be used for P198.

P198 states that the value of the scaling factor would be fixed under the governance of the Code. BSCCo recommends that the Modification Group considers whether this should be 'hard-wired' into the Code such that it could only be changed via a Modification Proposal, or whether it should be a parameter which could be periodically reviewed by the Panel (and if so, whether changes to that parameter should require Authority agreement).

2.1.5 Process and Timescales for TLF Approval

P198 proposes that the Panel would endorse the adjusted annual zonal TLFs prior to their application in Settlement, and that the TLF values and TLF zones allocated to each BM Unit should be published on the BSC Website at least one month prior to the start of the BSC Year to which they would apply. BSCCo recommends that the Modification Group considers the most appropriate approval and publication timescales. Any variation from the minimum timescales set out in the Modification Proposal would require an Alternative Modification.

2.1.6 Nature of TLFA Role

P198 proposes that the calculation of non-zero TLFs should be carried out by a 'TLF agent or service provider'. For P82, the TLFA was established as a new BSC Agent; however, the Market Index Data Provider represents an example of data being submitted into Settlement by a non-BSC Agent under Section T1.5 of the Code. BSCCo recommends that the Modification Group considers the potential advantages and disadvantages of establishing the TLFA as a full BSC Agent, when developing the nature and scope of the TLFA role for P198.

2.2 Modelling of Magnitude and Variability of TLFs

2.2.1 Explanation of Load Flow Modelling Principles

In order to aid its choice of the methodologies and types of Load Flow Model to be used in the P75 and P82 TLF calculations, the TLFMG procured an external consultant during the Assessment Procedure to build a sample Load Flow Model. The purpose of this modelling exercise was to ascertain the likely magnitude and variability of the TLFs generated by the proposals over time and location. The conclusions of this modelling exercise can be found in the P75/P82 Assessment Report.

Load flow models are widely used in the analysis of electrical power flows. Different types of model are available, and the choice of model can affect the results since they require different input data and operate under different assumptions. The key decisions which must be made when building a load flow model are outlined below.

a) Choice of network simulation

The electricity Transmission System can be represented in three different ways within a load flow model:

i) As an '**intact network**' – the complete overall capability of the transmission network, assuming that all lines are in operation and that there are no equipment outages (i.e. no transformers or lines out of service);

ii) As an '**indicative network**' – an approximation of the transmission network in existence at a specific point in time (i.e. a snapshot of the network during a specific Settlement Period), which is based on the intact network but includes all known equipment outages; or

iii) As a '**representative network**' – an approximation of the typical configuration of the transmission network over a longer period (e.g. a financial year), which is based on the intact network but includes the average outages over the period (referred to as 'scaled impedance').

b) Choice of modelling approach

Power flows can be analysed using two different types of load flow model:

i) An alternating current (AC) load flow model, which utilises data that reflects AC electrical flows on the network (i.e. it calculates both the active and reactive power flows in each line, and the magnitude and phase angle of the voltage at each node);[5] or

ii) A direct current (DC) load flow model, which applies a set of simplifying assumptions to the AC flows in order to render them similar to a DC flow (i.e. it calculates only active power flows and the voltage phase angle).

c) Choice of slack bus

A 'slack bus' is a node in a load flow model that acts as a sink for any surplus or deficit in power that arises as a result of inaccuracies within the model or input data. It also acts as a reference node for voltage and phase angle.

2.2.2 P198 Modelling Requirements

P198 proposes that the Load Flow Model should be based on an intact network, which was the approach followed for P75, P82 and P105. It is silent on whether an AC or DC model should be used. The original P75/P82 modelling undertaken by the TLFMG used an AC model; however, on the basis of the modelling results, a DC model was chosen as the final Load Flow Model to be used operationally by the TLFA.

The P75/P82 modelling was undertaken in 2002 – based on the then current England and Wales Transmission System, and on historic data from the 2001/2002 financial year. Due to the introduction of BETTA in 2005 and the period of time which has elapsed since the original modelling, BSCCo recommends that the P198 Modification Group repeats the modelling exercise for P198 in order to include Scottish data and obtain more up-to-date results. This would involve the extension of the Load Flow Model to incorporate Scotland, and the provision of more recent GB-wide input data (Metered Volumes, nodes and network data) by BSCCo and the Transmission Company. In order to reduce the timescales required to repeat the modelling work, BSCCo is considering the possibility of reprocuring the original P75/P82 modelling provider for P198.

[5] Reactive power is a component of alternating current and voltage which does not contribute to the transmission of energy. A phase angle is a measure of the lag of voltage.

BSCCo recommends that the Modification Group considers whether the original P75/P82 modelling assumptions remain appropriate for P198. As part of this review, the Group will need to consider:

- Whether to use an AC model (which was used for the P82 modelling) or a DC model (which was used for the final P82 solution and implementation);
- Which value for the scaling factor gives the best approximation of the variable element of transmission losses (see 2.1.4 above); and
- Any modelling requirements for potential Alternative Modifications.

2.3 Cost-Benefit Analysis

A standard part of a Modification Group's assessment of whether a Modification Proposal would better facilitate the achievement of the Applicable BSC Objectives is an analysis of the costs and benefits of the proposal. However, for P75, P82 and P105, undertaking a cost-benefit analysis of introducing non-zero TLFs fell outside the expertise of BSCCo and the TLFMG – since the perceived benefits of a zonal transmission losses scheme depend on the ability of the scheme to influence short and long-term market behaviour through economic signals. Some members of the TLFMG therefore commissioned an independent cost-benefit analysis of the Modification Proposals from the National Economic Research Associates (NERA) during 2002, in order to better inform their assessment. However, the assumptions used in this analysis were not accepted by all members of the TLFMG, some of whom commissioned their own cost-benefit analysis from Campbell Carr to dispute the NERA findings.[6] In addition, the TLFMG relied on analysis produced by the Transmission Company in 2001 regarding the possible economic signals of a zonal transmission losses scheme. This analysis was produced prior to the raising of P75, P82 and P105, as part of an Ofgem consultation on transmission access and charging arrangements under NETA – and its results can be found in the Ofgem conclusions document published in early 2002 (Reference 6).

No unified TLFMG cost-benefit analysis was therefore produced for P75, P82 and P105. In addition, some Panel Members and consultation respondents raised concerns that no significant analysis had been carried out to demonstrate that a zonal transmission losses scheme would be more cost-reflective than the existing uniform recovery mechanism – and that P75, P82 and P105 would simply result in short-term 'windfall' gains and losses to Parties. In progressing P198, BSCCo therefore recommends that the P198 Modification Group should:

- Develop and agree the assumptions and requirements for undertaking a cost-benefit analysis of P198;
- Instruct BSCCo to procure an independent external consultant to undertake the cost-benefit analysis in line with the methodology developed by the Group; and
- Agree that the cost-benefit analysis results were produced in accordance with the Group's methodology (even if not all members of the Group agree with the specific findings).

In producing the P198 cost-benefit analysis methodology, BSCCo suggests that the Modification Group may wish to consider the applicability of the following additional transmission losses analysis which has been produced since the TLFMG's original England and Wales assessment of P75, P82 and P105:

a) The Oxford Economic Research Associates' cost-benefit analysis of introducing a GB-wide zonal transmission losses scheme under BETTA (Reference 7) – published in June 2003, and commissioned by the Department of Trade and Industry (DTI) in order to inform its decision on whether to include P82 within the GB Code for BETTA; and

[6] Copies of the NERA and Campbell Carr analysis can be found in the joint P75/P82 Assessment Report.

b) The report by ILEX Energy Consulting on the impact of extending P82 to Scotland (Reference 8) – published in March 2003, and commissioned by the Scottish Executive as part of its response to the DTI consultation on GB transmission losses.

BSCCo recommends that the P198 Modification Group should establish the most appropriate methodology to be used. However, BSCCo recommends that the chosen methodology should include as a minimum:

- An assessment of the impact of P198 on different classes of Parties (e.g. renewables and small players);
- An assessment of the potential impact of P198 on the costs to Parties of carbons emissions; and
- Any risks which might be associated with a zonal losses scheme.

2.4 Detailed Solution Requirements

BSCCo recommends that, in developing the detailed solution requirements for P198, the Modification Group considers both the previous P82 solution requirements as set out in the Business Requirements Solution (BRS, Reference 9) and the functionality to deliver those requirements which was implemented prior to the P82 judicial review ruling. BSCCo recommends that the Group considers the appropriateness of reusing elements of the P82 solution and functionality, including the identification of any savings in costs and implementation timescales (for BSCCo and Parties) which could result from this approach.

More information regarding the original P82 requirements can be found in Appendix 2.

2.5 Implementation Approach

The Proposer suggests an Implementation Date for P198 of 1 April 2007. This is in line with previous Modification Proposals P75, P82 and P105, where the TLFMG considered that a 1 April implementation was essential in order to coincide with Parties' contractual rounds. Although P198 does not propose a phased implementation, various phasing schemes were considered by the TLFMG during its consideration of the previous transmission losses proposals. P75 and P82 Alternative Modifications proposed that non-zero TLFs should be phased in linearly over 4 years (from 25% in year 1 to 100% in year 4), whilst P109 contained a 'hedging scheme' to mitigate the initial effects of TLFs over 15 years. BSCCo therefore recommends that the P198 Modification Group:

- Considers whether a 1 April implementation remains the most appropriate approach;
- Conducts impact assessments to determine the feasibility of a 1 April 2007 Implementation Date; and
- Considers the respective merits of phased and non-phased implementation (potentially as part of the cost-benefit analysis exercise) – noting that a phased implementation approach would need to be progressed as an Alternative Modification.

3 RATIONALE FOR BSCCO'S RECOMMENDATIONS TO THE PANEL

3.1 Recommended Next Phase

BSCCo believes that further consideration of the areas raised in this IWA is required before the Panel would be able to establish whether P198 better facilitates the achievement of the Applicable BSC Objectives. As the areas for consideration are sufficiently defined, BSCCo recommends that P198 proceed to the Assessment Procedure. BSCCo recommends that the areas raised by this IWA should form the basis of the Modification Group's Terms of Reference, along with any additional areas proposed by the Panel.

BSCCo recommends that the P198 Modification Group should be formed from the original membership of the TLFMG as far as possible, since this group undertook the assessment of previous transmission losses proposals P75, P82, P105 and P109.[7] However, it is recognised that the TLFMG last met in early 2003 and that many of its members may therefore no longer be available. BSCCo therefore recommends that the P198 Modification Group should be supplemented as necessary with any members of the current Standing Modification Groups[8] who have expertise in the area of transmission losses.

Due to the potential impact of P198 on the location of generation and demand (and therefore on the GB Transmission System), BSCCo recommends that a representative of the System Operator-Transmission Owner Code Committee should be invited to be a member of the P198 Modification Group in accordance with Section F2.4.5A of the Code. This would ensure that the assessment of P198 includes input from the Scottish Transmission Owners in addition to the Transmission Company.

3.2 Recommended Timetable and Activities

It is estimated that progression of P198 through the Assessment Procedure will require:

- 6 Modification Group meetings;
- Provision of modelling input data by BSCCo and the Transmission Company – estimated time 2 weeks;
- Provision of a modelling exercise by an external consultant (estimated time 3 weeks, estimated cost £50,000);
- 1 impact assessment by BSC Agents;
- 1 impact assessment by Parties, Party Agents and Core Industry Document Owners;
- 1 impact assessment by BSCCo;
- 1 Transmission Company analysis;
- Provision of a cost-benefit analysis by an external consultant (estimated time 3 weeks, estimated cost £30,000);
- Provision of any required information by the Transmission Company to support the cost-benefit analysis; and
- 1 industry consultation.

The full proposed timetable and estimated costs for the progression of P198 are shown in Appendix 4.

The original progression of P82 required a 6-month Assessment Procedure. Although the ability to reuse elements of the P82 work means that this assessment timescale can be reduced for P198, BSCCo believes that it would not be possible to compress the P198 assessment into the standard 3-month timetable for the following reasons:

i) The necessity of undertaking modelling work to include Scottish data and to provide more up-to-date results;

ii) The desirability of procuring external expertise for the cost-benefit analysis; and

iii) The dependencies between the Assessment Procedure activities, which mean that progression timescales cannot be reduced by undertaking them in parallel (for example, the results of the modelling and impact assessments will form part of the cost-benefit analysis, which in turn will form part of the industry consultation).

[7] Details of the TLFMG's membership can be found in the P75/P82 Assessment Report.
[8] Governance Standing Modification Group, Pricing Standing Modification Group, Settlement Standing Modification Group and Volume Allocation Standing Modification Group.

BSCCo believes that it would be possible for the Modification Group to complete its assessment of the Proposed Modification in four months, and therefore recommends that P198 be submitted to a 4-month Assessment Procedure such that an Assessment Report is presented to the Panel at its meeting on 11 May 2006. A full interim report would be presented to the Panel at its March meeting, with verbal updates to be provided in February and April. However, it should be noted that the recommended timetable is based on BSCCo's current estimates of the minimum timescales required to undertake modelling and cost-benefit analysis for the Proposed Modification. If it is subsequently identified that these timescales are not sufficient (for example, due to the need to assess potential Alternative Modifications), the Modification Group may be required to seek Panel's agreement to extend the Assessment Procedure.

Section F2.2.9 of the Code states that the normal maximum Assessment Procedure set by the Panel should be three months, 'unless the particular circumstances of the Modification Proposal (taking due account of its complexity, importance and urgency) justify an extension of such timetable' and provided that the Authority has not issued a contrary direction. BSCCo therefore invites the Panel and the Authority to endorse a 4-month Assessment Procedure for the reasons set out above.

Section F2.6.8 of the Code states that:

'Prior to the taking of any steps in an Assessment Procedure which would result in the incurring of significant costs (as determined by the Panel in each case in the relevant terms of reference) for BSCCo, the Modification Group shall seek the views of the Panel as to whether to proceed with such steps and, in giving its views, the Panel may consult with the Authority in respect thereof'.

Since the provision of external modelling and cost-benefit analysis are recommended by BSCCo for inclusion in the P198 Modification Group's Terms of Reference, BSCCo invites the Panel to endorse the estimated required expenditure as part of the Terms of Reference. This would enable the Modification Group to commence work in these areas as soon as possible during the Assessment Procedure.

4 TERMS USED IN THIS DOCUMENT

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

Acronym/Term	Definition
'Alpha' (α) factor	The scaling factor applied to total transmission losses such that 45% are allocated to delivering Trading Units and 55% are allocated to offtaking Trading Units.
Ex-ante	Based on forecast data.
Ex-post	Based on actual data.
Fixed losses	The element of transmission losses which is independent of the distance travelled by electricity.
Load Flow Model	An electrical model of the Transmission System, used to generate Transmission Loss Factor values.
Node	Used in a Load Flow Model to represent points where energy flows on or off the Transmission System.
Slack bus	A node in a Load Flow Model to which any surplus generation or demand is allocated.
Total transmission losses	The sum of fixed losses and variable losses in any given period.
Transmission losses	The energy lost from the Transmission System in transporting electricity (calculated as the difference between total generation and total demand).
Transmission Loss Adjustment (TLMO)	The parameter for recovering the costs of the proportion of transmission losses which are not recovered through the Transmission Loss Factor, and which is applied on a uniform basis.

Acronym/Term	Definition
Transmission Loss Factor (TLF)	The parameter for allocating some or all transmission losses on a non-uniform basis, and which is currently set to zero.
Transmission Loss Factor Agent	The entity responsible for calculating Transmission Loss Factor values.
Transmission Loss Multiplier (TLM)	The factor used to scale BM Unit Metered Volumes in Settlement in order to recover the costs of total transmission losses from Parties.
Variable losses	The element of transmission losses which occurs through heat, and which increases with the distance travelled by electricity.

5 DOCUMENT CONTROL

5.1 Authorities

Version	Date	Author	Reviewer	Reason for Review
0.1	04/01/06	Kathryn Coffin	Sarah Jones	For technical review
0.2	05/01/06	Kathryn Coffin	Chris Rowell	For quality review
1.0	06/01/06	Change Delivery		For Panel decision

5.2 References

Ref.	Document Title	Owner	Issue Date	Version
1	Joint Assessment Report for Modification Proposals P75 'Introduction of Zonal Transmission Losses' and P82 'Introduction of Zonal Transmission Losses on an Average Basis' ELEXON - Modification Proposal 082	BSCCo	08/11/02	1.0
2	Modification Report for Modification Proposal P82 'Introduction of Zonal Transmission Losses on an Average Basis' ELEXON - Modification Proposal 082	BSCCo	16/12/02	1.0
3	Modification Report for Modification Proposal P75 'Introduction of Zonal Transmission Losses' ELEXON - Modification Proposal 075	BSCCo	16/12/02	1.0
4	Modification Report for Modification Proposal P105 'Introduction of Zonal Transmission Losses on a Marginal Basis Without Phased Implementation' ELEXON - Modification Proposal 105	BSCCo	16/12/02	1.0
5	Modification Report for Modification Proposal P109 'A Hedging Scheme for Changes to TLF in Section T of the Code' ELEXON - Modification Proposal 109	BSCCo	18/03/03	1.0
6	'Transmission Access and Losses under NETA: Revised Proposals' http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/1396_19transaccess.pdf	Ofgem	February 2002	N/A
7	'A Report to the DTI: The Impact of Average Zonal Transmission Losses Applied Throughout Great Britain' www.oxera.com/main.aspx?id=233	OXERA Consulting Ltd	June 2003	N/A
8	'A Report to the Scottish Executive: Assessing the Introduction of Zonal Charging for Transmission Losses in Great Britain' www.ilexenergy.com/?t=6_3Archive2003#ZonalCharging	ILEX Energy Consulting	March 2003	2.0

Ref.	Document Title	Owner	Issue Date	Version
9	Business Requirements Solution for Modification Proposal P82 'Introduction of Zonal Transmission Losses on an Average Basis' ELEXON - November 03 Release	BSCCo	15/05/03	1.0

5.3 Intellectual Property Rights, Copyright and Disclaimer

APPENDIX 1: MODIFICATION PROPOSAL

Modification Proposal – BSCP40/06	**MP No: 198** *(mandatory by BSCCo)*

Title of Modification Proposal *(mandatory by originator)***:**

Introduction of a Zonal Transmission Losses scheme

Submission Date *(mandatory by originator)***:** 16th December 2005

Description of Proposed Modification *(mandatory by originator)*

It is proposed that a zonal transmission losses scheme is introduced to the GB BSC. This scheme would be based on the principles established under modification P82. A single Transmission Loss Factor (TLF) (the "applicable TLF") would be derived *ex ante* for application to generation and demand BMUs within a zone (the "applicable zone") for a relevant period (the "applicable period"). The proposed scheme would retain the current process for allocating transmission losses to generation and demand (45% of transmission losses to production accounts and 55% to consumption accounts).

Nodal marginal TLFs would be derived for each BMU from a representative collection of historic power system conditions using an intact network simulation (the "load flow model") during a previous period that provided a representation of the applicable period (the "reference year"). The transmission company would provide appropriate data for the network simulation. BSCCo would provide a load flow specification for the load flow model. The calculation of the annual TLFs would be under the governance of the BSC. A TLF Agent or a service provider would undertake the load flow modelling. The modelling process and load flow model will be subject to independent review by the Panel and BSCCo. The BSC Panel would endorse the TLFs prior to their application.

The applicable period for the zonal marginal TLFs under this proposal would be the BSC year (from April to March). Zonal marginal TLFs would be derived from nodal figures by volume-weighted averaging and time-weighted averaging for applicable zones. The applicable zones would be the geographical area in which a GSP Group lies, determined by the Panel (applying such criteria as it shall decide in its discretion). The zonal TLFs would be adjusted by an appropriate scaling factor (the "applicable scaling factor", which was set at 0.5 under P82). The value of this scaling factor would be fixed under the governance of the BSC at a level that, to a first approximation, (a) allocated the heating element of the transmission system losses on an average basis, with little under or over recovery (heating variable losses), and (b) resulted in other transmission losses being allocated on a uniform basis (fixed losses) through the parameters TLM0. Any inaccuracy in (a) would be compensated for in (b). Separate Zonal TLFs will be calculated for both generation and demand.

The zonal TLFs would be published on the Elexon website at least one month prior to the applicable period. BSCCo will map BMUs to the applicable zones. This mapping would be published at least one month prior to the application of TLFs, made available to BSC parties in electronic format and be revised from time to time. The volume of transmission losses in each Settlement Period for the applicable period would be allocated amongst individual BMUs in settlement by applying the relevant zonal TLFs, TLMO+j and TLMO-j.

Modification Proposal – BSCP40/06	MP No: 198 *(mandatory by BSCCo)*

In order to provide an opportunity for parties to prepare for the introduction of a zonal losses scheme, we propose an implementation date of April 2007. The scheme should be cost effective, not introduce unnecessary or untoward risks on parties and be simple to audit.

Description of Issue or Defect that Modification Proposal Seeks to Address *(mandatory by originator)*

Under the current BSC arrangements all transmission system losses are allocated to BSC parties in proportion to metered energy, whether production or consumption on a uniform allocation basis (45% to production accounts, 55% to consumption accounts). Therefore, the cost of heating (variable) transmission losses is allocated amongst BSC Parties regardless of the extent to which they give rise to them. This means that customers in the north of GB and generators in the south of England have to pay some of the costs of transmitting electricity to locations miles away from the source of generation.

The proposed scheme will enable the variable costs of transmission losses to be allocated on a cost-reflective basis and reflected on parties that cause them. The modification would remove the current cross subsidies and associated discrimination that is inherent in the uniform allocation of transmission losses.

The current allocation of transmission losses fails to provide potential connectees to the transmission system with appropriate signals regarding the implications of siting in different parts of the country. This may give rise to inefficient decisions regarding the development of new power stations or connection of new industrial loads. This results in the inefficient use of energy and unnecessary carbon emissions. A zonal transmission losses scheme would enable long-term locational signals for losses to be introduced into the GB electricity market.

It is anticipated that to the extent that the zonal charging of losses influences the use of existing generation and the location of future investment, it will reduce the total amount of electricity transmitted and therefore increase the efficient use of energy.

Earlier studies of a similar proposal have indicated that such a scheme could reduce carbon emissions in the short term by between 2000 tonnes p/a and 6000 tonnes p/a. These savings could increase to between 48,000 tonnes p/a and 127,000 tonnes p/a in the longer term.

Impact on Code *(optional by originator)*

Impact on Core Industry Documents or System Operator-Transmission Owner Code *(optional by originator)*

Impact on BSC Systems and Other Relevant Systems and Processes Used by Parties (*optional by originator)*

Modification Proposal – BSCP40/06	**MP No: 198** *(mandatory by BSCCo)*

Impact on other Configurable Items (*optional by originator)*

Justification for Proposed Modification with Reference to Applicable BSC Objectives *(mandatory by originator)*

The proposal will better facilitate BSC Objective A relating to the efficient discharge by the licensee (NGC) of the obligations imposed upon it by its licence. A zonal transmission losses scheme will remove market distortions and the discrimination that exist in the present arrangements.

The proposal will better facilitate BSC Objective B by enhancing the efficient, economic and co-ordinated operation by the licensee (NGC) of the licensees transmission system. Adoption of a zonal transmission losses scheme will remove cross subsidies which the present uniform charging for transmission losses create. A zonal transmission losses scheme will therefore enhance efficiency through more cost reflective charging which could be expected to influence both short term plant despatch and long term business decisions influencing investment in both generation and demand.

This proposal will also contribute to better achieving the BSC objective C relating to the promotion of effective competition in the generation and supply of electricity, and (so far as consistent therewith) and the promotion of such competition in the sale and purchase of electricity. In particular:

- The proposal will introduce a cost reflective allocation of transmission losses according to the degree to which BMUs in an applicable zone give rise to losses;
- The proposal removes the current cross subsidies between customers (north to south) and generators (south to north) that occur through the uniform allocation of transmission losses;
- The allocation of losses to zones will enable the costs to be reflected on generation and demand in a manner that does not unduly penalise individual BMUs;
- A scheme based on the ex ante calculation of zonal loss factors will enable users of the transmission system to estimate the impact and appropriately reflect the costs;
- A zonal scheme would provide better information to users of the transmission system regarding the implications of siting generation and new load in different parts of the country; and
- In the longer term zonal allocation of transmission losses would encourage appropriate investment in generation or new load in areas which currently have limited capacity relative either to generation or demand. This will ultimately bring down the overall costs of losses with benefits for customers and the environment.

Modification Proposal – BSCP40/06	**MP No: 198** *(mandatory by BSCCo)*

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Attachments: No *(delete as appropriate) (mandatory by originator)*

If Yes, Title and No. of Pages of Each Attachment:

APPENDIX 2: INITIAL ASSESSMENT OF IMPACTS OF MODIFICATION PROPOSAL

An initial assessment of the impact of P198 has been undertaken by BSCCo in respect of all BSC systems, documentation and processes. The precise impacts of P198, and the implementation timescales which they would require (including the extent to which previous P82 functionality could be reused), will be established during the P198 Assessment Procedure once the Modification Group has developed the detailed solution requirements for the Proposed Modification and any Alternative Modification. It is anticipated that less implementation effort and lead time will be required the more closely the P198 solution is based on P82.

The estimated impacts below are based on the assumption that the solution for deriving and publishing TLFs under the Proposed Modification will be largely identical to that set out in the P82 BRS.

a) Impact on BSC Systems and Processes

BSC System / Process	Potential Impact of Proposed Modification
BM Unit Registration	The Central Registration Agent (CRA) would be required to amend its BM Unit Registration process so that a non-zero TLF value (obtained from the TLFA) is registered for each BM Unit and reported in relevant data flows.
Central Data Collection	The Central Data Collection Agent (CDCA) would be required to provide the TLFA with Metered Volume data for the sample Settlement Periods used in the Load Flow Model.
Data Publication on the Balancing Mechanism Reporting Service (BMRS)	The Balancing Mechanism Reporting Agent (BMRA) would be required to receive BM Unit-specific TLF values from the CRA and use these in BMRS reporting.
Settlement Administration	The Settlement Administration Agent (SAA) would be required to receive BM Unit-specific TLF values from the CRA and apply these in Settlement calculations.
Derivation of Zonal TLFs	A new BSC process, with supporting systems, would need to be introduced for the TLFA to derive TLFs through the application of a Load Flow Model in accordance with a Network Mapping Statement.

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

- Ad-hoc registration of TLFs for new BM Units;
- Retrospective recalculation of TLF values following a Trading Dispute or identification of a manifest error; and
- Estimation of data where the input data required by the Load Flow Model is incomplete.

b) Impact on BSC Agent Contractual Arrangements

P198 would have no impact on the contractual arrangements for any existing BSC Agents. However, a procurement exercise would need to be undertaken, and appropriate contractual arrangements created, for the new TLF agent/service provider.

c) Impact on BSC Parties and Party Agents

It is anticipated that Parties may wish to verify the allocation of their BM Units to TLF zones. Parties that have developed their own systems to monitor the Settlement calculations may also need to amend these to take account of the existence of non-zero TLF values.

It is not anticipated that P198 would impact any Party Agents.

d) Impact on BSC Panel

It is estimated that P198 would have the following impact on the Panel:

- The Panel would be responsible for approving the Load Flow Model, the Load Flow Model Specification (potentially as part of a wider BSC Agent Service Description) and the Network Mapping Statement for use by the TLFA;
- The Panel may be responsible for establishing the definitive list of TLF zones for use in the Network Mapping Statement and Load Flow Model (potentially including the resolution of any appeal over the mapping of BM Units to zones);
- The Panel may 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 may be responsible for establishing, for use in the Load Flow Model, the number of sample Settlement Periods to be used in each load period; and
- The Panel would be responsible for ensuring that the TLFA Load Flow Model complies with the Load Flow Model Specification at all times – including retrospectively, where the calculation or use of TLFs is the subject of a Trading Dispute. Potentially, the Panel could be assisted in this role by an independent Load Flow Model Reviewer.

e) Impact on Transmission Company

It is estimated that P198 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 provision of a list of all nodes on the Transmission System, and assistance in resolving any appeal over the allocation of BM Units to TLF 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. Potentially the required network data could be obtained from National Grid's Seven Year Statement.

f) Impact on BSCCo

Area of Impact	Potential Impact of Proposed Modification
BSC Website	BSCCo may be required to publish TLF data on the BSC Website (e.g. lists of the TLF zones, the BM Units allocated to each zone, and BM Unit-specific TLFs). Any existing website references to TLF=0 would also need to be amended.
Trading Operations Monitoring and Analysis System (TOMAS)	Amendments to BSCCo's TOMAS system may be necessary if BSCCo is required to load non-zero TLF values from CRA data flows.
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 are likely to include processes for requesting node information from the Transmission Company for new BM Unit registrations, assigning new BM Units to TLF zones, and (if necessary) acting as an interface between the TLFA and the CDCA, CRA and SAA.
BSC Panel/Panel Committee Support	BSCCo would be required to assist the Panel in the determination of TLF zones for incorporation in the Network Mapping Statement. If a process is introduced for Parties to be able to appeal the mappings set out in the statement, BSCCo would be required to support the Panel in the determination of any such appeal (potentially including the development of appeal guidelines). It is anticipated that 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). However, the progression of such a Trading Dispute may require additional steps for the TDC to obtain a report from an independent 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. Due to the need to be able to update the statement on an ad-hoc basis to reflect changes in the registration of BM Units, Volume Allocation Units and GSPs, it may be appropriate to introduce a specific change process for this document.
Procurement and Contract Management	BSCCo would be required to procure the TLFA and manage the resulting contract (including monitoring service level compliance). If a requirement is introduced for the Load Flow Model to be periodically verified by an independent expert, BSCCo would also be required to procure and manage this Load Flow Model Reviewer.

g) Impact on Code

Code Section	Potential Impact of Proposed Modification
Section E 'BSC Agents'	If the TLFA is established as a new BSC Agent, this will need to be added to the list of existing BSC Agents in Section E.
Section H 'General'	If the Load Flow Model Specification is established as a Code Subsidiary Document, this will need to be added to the list of existing 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 zonal TLFs and their use in Settlement calculations.
Section V 'Reporting'	Section V would require amendment to detail the publication of TLF data on the BMRS and the BSC Website.
Section X 'Definitions and Interpretation'	Section X would require amendment to detail any new or altered Code-defined terms required for P198.

h) Impact on Code Subsidiary Documents

Document	Potential Impact of Proposed Modification
BSCP01 'Overview of the Trading Arrangements'	Amendments would be required to reflect the derivation of non-zero TLFs and their use in Settlement calculations.
BSCP15 'BM Unit Registration'	Amendments would be required to include the process for allocating non-zero TLF values to BM Units.
BSCP38 'Authorisations'	Amendments may be required if an authorisation process is introduced for Parties to request certain TLF data from BSCCo.
BSCP41 'Report Requests and Authorisations'	As above.
BSCP42 'Business Continuity'	Amendments would be required to detail the processes to be followed in the event of a failure of TLFA systems or processes, potentially including the deposit of a copy of the Load Flow Model in escrow.
CVA Data Catalogue	Amendments would be required to reflect any new or altered reporting requirements as a result of P198.
Reporting Catalogue	As above.
Communications Requirement Document	Amendments would be required to reflect the rules for communicating with the TLFA.
BSC Agent Service Descriptions	The BMRA, CDCA, CRA and SAA Service Descriptions would need to be amended to reflect the new obligations on these Agents in respect of zonal TLFs. If the TLFA is established as a new BSC Agent, a TLFA Service Description will also need to be developed (potentially incorporating the Load Flow Model Specification).

Document	Potential Impact of Proposed Modification
Load Flow Model Specification	The specification for the TLFA Load Flow Model may need to be established as a new Code Subsidiary Document.

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

No impact anticipated.

j) Impact on Other Configurable Items

Other configurable items relating to the operation of the BSC Systems (e.g. Interface Definition and Design, User Requirements Specifications, Design Specifications, System Specifications, Manual System Specifications and Operating System Manuals) may require amendments to reflect the changes outlined in a) above.

k) Impact on BSCCo Memorandum and Articles of Association

No impact anticipated.

l) Impact on Governance and Regulatory Framework

The Proposer suggests that one of the long-term benefits of P198 would be a reduction in carbon emissions. Whilst the P198 Modification Group could consider the costs of carbon emissions to Parties, any environmental impacts of P198 fall outside the vires of the Applicable BSC Objectives. However, such environmental considerations form part of the wider factors which the Authority could take into account under its statutory duties when making its decision on P198.

APPENDIX 3: SUMMARY OF PREVIOUS MODIFICATION PROPOSALS

The key aspects of the solutions to previous Modification Proposals P75, P82 and P105 are outlined below, and are shown against the proposed P198 solution for comparison.

TBD = To Be Determined

Aspect of Solution	P75 Proposed	P75 Alternative	P82 Proposed	P82 Alternative	P105	P198
Scope of Zonal TLF Calculation	Fully Marginal (Includes Fixed & Variable Losses)	Fully Marginal (Includes Fixed & Variable Losses)	Scaled Marginal (Includes Variable Losses Only)	Scaled Marginal (Includes Variable Losses Only)	Fully Marginal (Includes Fixed & Variable Losses)	Scaled Marginal (Includes Variable Losses Only)
Scaling Factor	-	-	0.5	0.5	-	**TBD**
Applicable Period for Zonal TLFs	Settlement Day	Calendar Month	BSC Year	BSC Year	Calendar Month	BSC Year
Nature of TLF Calculation	Ex-Post	Ex-Ante	Ex-Ante	Ex-Ante	Ex-Ante	Ex-Ante
Applicable Zones for Production BM Units	TNUoS Zone	TNUoS Zone	GSP Group	GSP Group	TNUoS Zone	GSP Group
Applicable Zones for Consumption BM Units	GSP Group	GSP Group	GSP Group	GSP Group	GSP Group	GSP Group
Process for Conversion of Nodal TLFs into Zonal TLFs	Volume-Weighted Averaging	Volume-Weighted Averaging	Volume-Weighted Averaging	Volume-Weighted Averaging	Volume-Weighted Averaging	Volume-Weighted Averaging
Process for Conversion of Half-Hourly TLFs to Applicable Period	Time-Weighted Averaging	Time-Weighted Averaging	Time-Weighted Averaging	Time-Weighted Averaging	Time-Weighted Averaging	Time-Weighted Averaging
Type of Load Flow Model Chosen for Final Solution	DC	DC	DC	DC	DC	**TBD**
Type of Network Chosen for Final Solution	Intact	Intact	Intact	Intact	Intact	Intact
Phased Implementation?	No	Yes	No	Yes	No	No
Phasing Period	-	4 Years	-	4 Years	-	-

APPENDIX 4: COSTS AND TIMETABLE FOR PROGRESSION

ESTIMATED COSTS OF PROGRESSING MODIFICATION PROPOSAL[9]

Meeting Cost	£7,000
Legal/Expert Cost	£83,500
Impact Assessment Cost	£5,000
ELEXON Resource	80 Man days £20,500

A gantt chart showing the proposed Assessment Procedure timetable is provided on the following page.

[9] 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

ID	Task Name	Duration	Start	Finish
1	**Panel Meeting - IWA**	1 day	Thu 12/01/06	Thu 12/01/06
2	*MG Meeting 1 (agree Proposed Modification & potential Alternative Modification modelling requirements)*	1 day	Wed 18/01/06	Wed 18/01/06
3	Input data obtained by National Grid & BSCCo	10 days	Thu 19/01/06	Wed 01/02/06
4	Draft modelling spec	4 days	Thu 19/01/06	Tue 24/01/06
5	*MG Meeting 2 (agree Proposed Modification solution & potential Alternative Modification(s))*	1 day	Wed 25/01/06	Wed 25/01/06
6	Procure modelling provider	8 days	Thu 26/01/06	Mon 06/02/06
7	Draft impact assessment requirements spec	5 days	Thu 26/01/06	Wed 01/02/06
8	MG review by correspondence	3 days	Thu 02/02/06	Mon 06/02/06
9	Modelling undertaken	16 days	Tue 07/02/06	Tue 28/02/06
10	Impact assessments & Transmission Co analysis undertak	16 days	Tue 07/02/06	Tue 28/02/06
11	*MG Meeting 3 (agree cost-benefit analysis requirements and provider)*	1 day	Wed 08/02/06	Wed 08/02/06
12	**Panel Meeting - verbal update**	1 day	Thu 09/02/06	Thu 09/02/06
13	Draft cost-benefit analysis spec	6 days	Thu 09/02/06	Thu 16/02/06
14	MG review by correspondence	3 days	Fri 17/02/06	Tue 21/02/06
15	*MG Meeting 4 (agree modelling delivers requirements, consider impact assessment responses, & agree provisional implementation approach)*	1 day	Wed 01/03/06	Wed 01/03/06
16	Cost-benefit analysis undertaken	10 days	Thu 02/03/06	Wed 15/03/06
17	**Panel Meeting - Interim Report (including modelling results)**	1 day	Thu 09/03/06	Thu 09/03/06
18	MG consideration of cost-benefit analysis	3 days	Thu 16/03/06	Mon 20/03/06
19	*MG Meeting 5 (agree cost-benefit analysis delivers requirements, agree provisional assessment against ABOs & consultation Qs)*	1 day	Tue 21/03/06	Tue 21/03/06
20	Draft consultation document	5 days	Wed 22/03/06	Tue 28/03/06
21	MG review by correspondence	3 days	Wed 29/03/06	Fri 31/03/06
22	Industry consultation undertaken	12 days	Mon 03/04/06	Tue 18/04/06
23	Draft Proposed Modification legal text	12 days	Mon 03/04/06	Tue 18/04/06
24	**Panel Meeting - verbal update**	1 day	Thu 13/04/06	Thu 13/04/06
25	*MG Meeting 6 (agree final assessment against ABOs, Proposed Mod legal text & Implementation Date)*	1 day	Thu 20/04/06	Thu 20/04/06
26	Draft Assessment Report	5 days	Fri 21/04/06	Thu 27/04/06
27	Draft Alternative Modification legal text (if applicable)	5 days	Fri 21/04/06	Thu 27/04/06
28	MG review by correspondence	4 days	Fri 28/04/06	Wed 03/05/06
29	**Panel Meeting - Assessment Report**	1 day	Thu 11/05/06	Thu 11/05/06