



Zonal Transmission Losses

Response to Ofgem's assessment of proposals to modify the Balancing and Settlement Code

29 March 2007

1. Introduction

The current method employed in the Balancing and Settlement Code (BSC) to apportion the cost of variable transmission losses (losses) is not cost reflective. The uniform calculation of Transmission Loss Factors (TLFs) fails to take account of the extent to which electricity generators and consumers in different areas of the country are responsible for power lost over the transmission network. This results in a beneficial cross subsidy for companies who operate generating plant far from the major retail markets and for customers in centres of demand, such as London, whose consumption requires power to travel long distances. As such, the current allocation is uncompetitive and prevents companies from accurately reflecting the true cost of losses in their tariffs.

Furthermore, companies whose generation portfolios are such that they benefit from this cross subsidy could be said to have artificially lower costs and a corresponding unfair pricing advantage. Conversely, other companies and new market entrants are potentially inhibited from lowering their costs and tailoring their businesses to price more competitively.

A more cost reflective method of allocating the cost of losses has been heralded for years, since back to the beginning of privatisation of the UK electricity industry. The recent round of proposed Modifications to the BSC has provided the industry with another opportunity to thoroughly consider an appropriate solution. After months of comprehensive assessment it is clear that Proposed Modification P203, if implemented, would correct the long standing cross subsidy in a way that would be as accurate as practicably possible.

The long history of the issue, in industry terms, is notable. When it is also considered that it will not be possible to implement a solution before late in 2008, any notion that companies would be subject to windfall financial gains or losses is clearly misleading. As is any notion that a decision to implement one of the proposals would be an exceptional regulatory risk.

Instead, analysis of trends over the last few years confirms that the actual level of losses is steadily increasing, meaning that the transmission system is increasingly inefficient and that the lingering cross subsidy is increasingly uncompetitive. Proposed Modification P203 provides the opportunity to reverse these trends.

Ofgem's assessment of the proposals is impartial and accurate. When the benefits identified in the consultation document are reviewed, in the context of analysis in this submission showing that the volume of losses is increasing, it is clear that the 'do nothing' option is no longer justifiable nor sustainable.

This submission responds to the impact assessment questions in the same order as presented in Ofgem's consultation document.

2. Chapter 2: Direct impacts

2.1. Response to Ofgem's summary of the direct impacts of the modification proposals

Losses are a business cost. The crux of the issue is simple: "Someone has to pay for the electricity that is generated but is not subsequently sold to customers."¹ Each of the Proposed Modifications evaluated here aims to apportion the cost of that missing power in a way that is fairer than allocating losses uniformly to industry parties. Each promotes a method that would allow costs to reflect the extent to which generation and demand in different areas of the country either causes or, with the exception of P204, mitigates the level of losses.

To persist with the current method, with a redundant TLF sitting in the BSC, would be to maintain and foster inefficiencies in the generation and supply of electricity in the UK. The analysis from OXERA demonstrates that considerable efficiency savings, of up to 545 GWh a year², could be achieved quickly: through less wasteful short term generation dispatch decisions, through a general generation shift from north to south and through fuel switching. The analysis also puts a price on this preventable waste of up to £17.8m a year.³

The decision is therefore how best to claim the highest possible efficiency savings at the lowest cost. It is notable that, excluding the most expensive options (P200 and its Alternative), the proposals have similar implementation costs, within a range of £24,000, and similar operational costs, within a range of only £10,000.⁴ This leads the cost/benefit judgement to focus on which proposal provides the most accurate mechanism for improving the efficiency of electricity transmission. As such, Proposed Modification P203 is the only proposal that neither softens the mechanism with additional scaling nor discounts significant seasonal effects.

In sharp contrast to the achievement of the maximum cost/benefit is the proposal that supports phasing (P198 Alternative) and those which inaccurately present uncompetitive 'grandfathering' rights as hedging (P200 and its Alternative). These proposals recognise that a defect in the current arrangements exists but then propose maintaining it for years to come.

OXERA's figures are conservative because they do not sufficiently recognise that losses seem likely to increase steadily if the 'do nothing' option is accepted. It should be also remembered that the potential for efficiency savings is not limited to generators. Accurately reflecting the cost of losses caused by customers whose energy use requires power to travel long distances, would encourage greater steps to be taken towards energy efficiency and environmentally responsible consumption.

2.2. Additional direct impacts that should be considered

Given that losses amount to a substantial cost for both generation and retail electricity businesses, assessment of the Proposals should consider the comparative level of this cost over recent time. Early in 2007, E.ON UK reported to ELEXON that 2006 had seen a substantial increase in the level of losses, particularly over the second half of the year.

¹ Consultation document, 1.3

² Consultation document, table 2.3a

³ Consultation document, table 2.3b

⁴ Consultation document, table 2.5

Our view that there has been a progressive increase in losses has since been researched and validated by ELEXON. This indicates that recently, in the absence of a cost reflective TLF calculation, by degrees less and less of the power generated in the UK has actually been consumed. Much of it has instead been lost as heat through the transmission system, with negative consequences for economic efficiency. It also signifies comparatively higher CO₂ emissions and an increasingly wasteful use of natural resources.

2.3. Additional analysis of direct impacts

Additional analysis of the extent of increasing physical losses is publicly available in the Trading Operations Report of January 2007⁵, a regular paper produced by ELEXON for the BSC Panel, the Imbalance Settlement Group (ISG) and BSC Parties.

The report confirms one of E.ON UK's specific observations that offtaking Transmission Loss Multipliers (TLMs), the values in the BSC applied to metered volumes which include TLFs in their calculation, have increased significantly throughout 2005 and 2006, with the steepest rate of increase seen in the second half of 2006. This indicates that the transmission of power across the UK is increasingly inefficient.

Specifically, the ELEXON analysis shows that while demand remained relatively constant, between December 2004 and December 2006 transmission losses increased by circa 15%. Enquiries made to the System Operator then confirmed that, as a result of transmission system improvements completed in the summer of 2006, system constraints of flows from Scotland to England have been eased. The direct consequence has been an increase in the net energy flow into England through Harker and Stella West, with a related consequence of a decrease in energy flows coming through the interconnector from France.

E.ON UK maintains that connected generators should be free to generate as their business models dictate. However for competition to be fair, the cost of transmission losses should be higher where businesses choose to generate a long way from the major centres of demand, as their commercial decisions cause more power to be lost over the transmission system. The cost of this wasted power is currently disproportionately paid by businesses whose operation actually acts to mitigate overall losses, for example by generating in the south of England.

3. **Chapter 3: Indirect impacts**

3.1. Response to Ofgem's summary of the indirect impacts of the modification proposals

An uncompetitive cross subsidy persists within the UK electricity market, as the trading arrangements currently fail to take account of the extent to which electricity generators and consumers in different areas of the country are responsible for losses. This cross subsidy is beneficial for companies who operate generating plant far from the major retail markets and for customers in centres of demand whose consumption requires power to travel long distances.

The most accurate method to correct this cross subsidy would be to calculate TLFs by settlement period on an ex-post basis. Unfortunately this was acknowledged by the Modification Groups to be both technically very difficult and likely to be prohibitively expensive. Furthermore, group members' unanimous opinion was that companies should receive information on the allocation of losses in advance, in order to factor losses into their costs ahead of the year's contract rounds.⁶

⁵ ELEXON Paper No: 123/02, Section 1, pp 5-6, available on the website www.elexon.co.uk

⁶ P198 Draft Modification Report for BSC Panel, 4.1.2

In contrast the least accurate methods would be to implement either phasing or preferential charging arrangements for existing generators (P198 Alternative and P200 and its Alternative respectively). These proposals recognise that the cross subsidy exists but then propose maintaining it for years to come.

Of the methods being assessed, Proposed Modification P203 achieves the correction of the cross subsidy in the most accurate way that is practicable. The solution is practicable in that four seasonal calculations can be utilised, rather than a single annual calculation (P198), for little additional cost and businesses will be informed of the year's losses allocation before the contract rounds. The consultation document correctly points out that the solution is the most accurate, as the sharpness of TLFs will not be diminished by additional scaling: "...restricting the calculation of TLFs in the manner proposed under P204 would appear to detract from (or at least not improve) the accuracy of the TLFs."⁷

As for the potential impact on the perception of risk, the argument that losses present an exceptional change to the regulatory framework is totally implausible. Firstly, it would assume that the privatised UK energy industries have not managed significant changes before now, when for example the introduction of long term entry capacity auctions in the gas market or the British Energy Trading and Transmission Arrangements (BETTA) were far more ambitious in scale. Secondly, it assumes that the issue of losses has arisen unexpectedly and is not well understood. For this argument to stand, it has to discount references in the initial privatisation prospectus; that the issue was listed in Schedule 12 to the Policy and Settlement Agreement as a feature to be implemented by July 1996; that the New Electricity Trading Arrangements (NETA) and BETTA systems are already codified to implement zonal losses; that previous Modification Proposals have been raised in the BSC and subsequently approved; and that nearly three years will have passed between the submission of Proposed Modification P198 and the eventual implementation of an approved proposal. Thirdly, it needs to assume that the rigorous BSC modification process administered by ELEXON either does not exist or is not sufficiently thorough.

A further key consideration is the application of a fixed scaling factor of 0.5. The consultation document expresses concern that this figure is an approximation.⁸ However the validity of the factor was probed extensively by the P198 Modification Group and resolutely supported by the load flow modelling analysts at Siemens Power Transmission and Distribution, who observed that the "...results empirically confirmed that the scaling factor of 0.5 is the correct choice for the method applied."⁹

3.2. Additional indirect impacts that should be considered

Since the summer of 2006 it has been particularly concerning that the competitive gap between those parties that largely benefit from the cross subsidy and those that are generally disadvantaged by it, has widened. The level of losses is rising, due to increasing flows from Scotland to England, increasing the impact of TLMs applied to metered volumes.

Furthermore, the latest TLM values, from the start of 2007, appear to indicate that this trend is continuing and that the commercial impact of the allocation of losses has not levelled off after increasing significantly throughout 2005 and 2006. It would therefore seem unsustainable to let an uncompetitive feature of the market persist when the accurate and practicable solution in Proposed Modification P203 could be implemented to address the problem.

⁷ Consultation document, 3.8

⁸ Consultation document, 3.8

⁹ Dr. Srdjan Ćurčić, Siemens PTI, MP198 Load Flow Modelling Service, 2nd Draft Report Presentation, 10 May 2006, Slide 90. (P198 Modification Documents are available on the website www.elexon.co.uk)

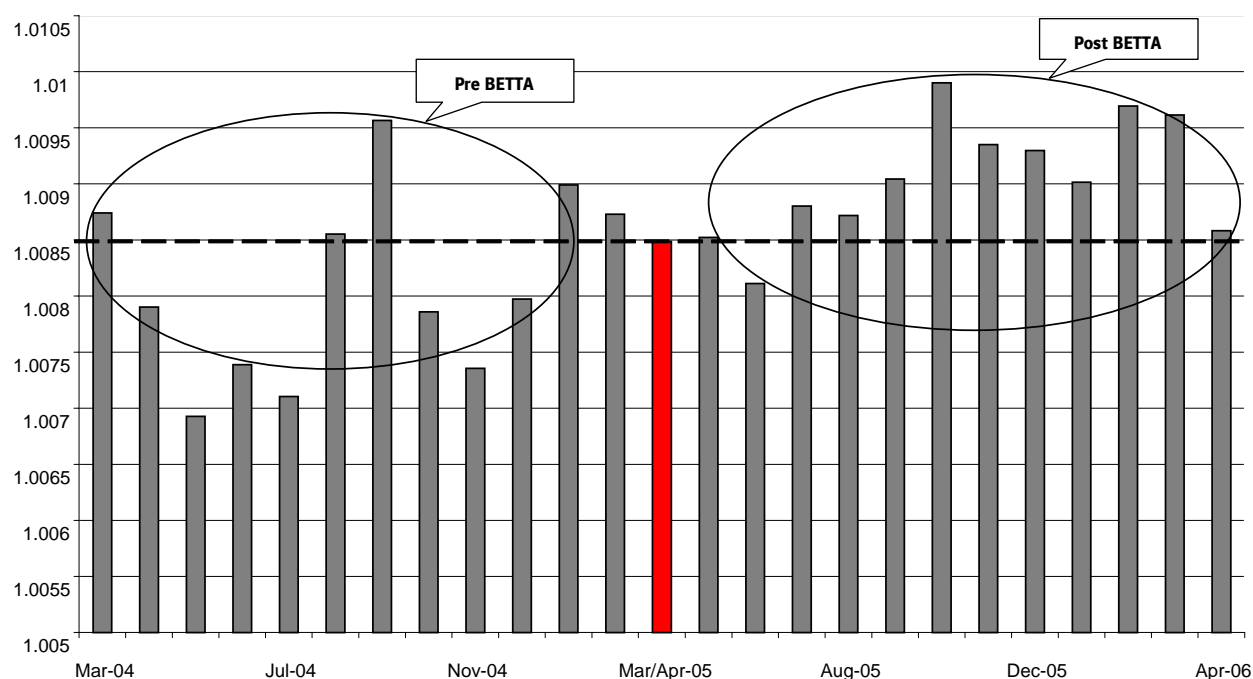
3.3. Additional analysis of indirect impacts

As losses have increased the values of delivering TLMs applied to generation volumes have steadily lowered and the values of offtaking TLMs applied to consumption volumes have risen.

For example, the mean average delivering TLM for the six months to the end of June 2004 was 0.993594. By the six months to the end of December 2006 the average had dropped to 0.991842; and then the average for the following two months, taking us up to March 2007, dropped again to 0.991155. The difference between the highest and lowest allocations is 0.2439%, which applied to a generation portfolio of millions of MWh amounts to a considerable cost.

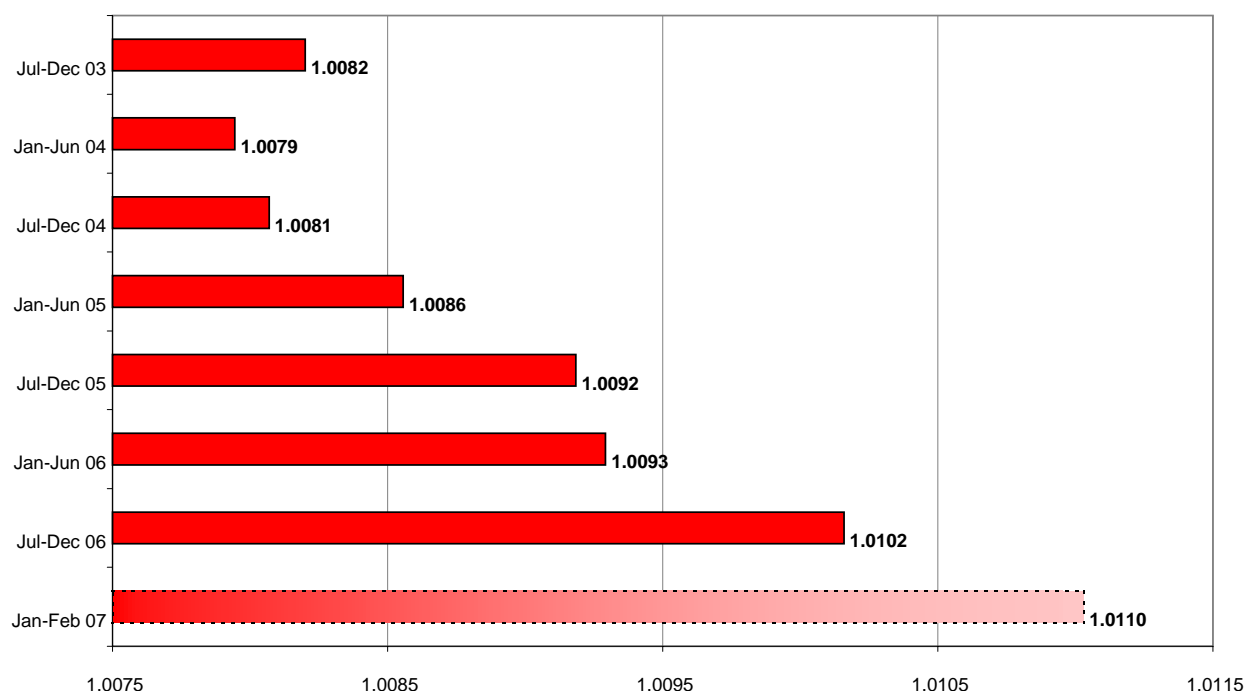
However the impact of increasing offtaking TLMs is more substantial. In order to consider these increasing values, two periods of time should be evaluated: firstly around the implementation of BETTA in April 2005, for which an increase in losses could have been expected; and secondly the six month period from the summer of 2006, when the industry had not anticipated a significant change.

Figure 3.3.1. Impact of BETTA on offtaking TLMs



The chart shows that TLMs, and therefore the industry cross subsidy associated with the uniform allocation of losses, increased markedly after the implementation of BETTA. By comparing against the mean average of offtaking TLMs for the months either side of the implementation date of 1 April 2005, it is clear that a step change occurred. Where the sum of the variance of the TLM average in the year before BETTA is substantially negative, the sum of the variance for the following year is substantially positive. While this could have been anticipated by the industry it may have been logical to expect that losses would plateau at the new higher level. Instead the trend has continued.

Figure 3.3.2. 6 monthly mean average offtaking TLMs



The chart presents the offtaking TLM data in a manageable format by simply dividing each year in two. Therefore the impact of BETTA is incorporated into the average offtaking TLM value of 1.0086 for the period January to June 2005 inclusive and 1.0092 for the period July to December 2005. The step change in the second half of 2006, reported by E.ON UK and investigated by ELEXON, was clearly substantial: taking the average value to 1.0102.

Although not a comparable time period, and therefore shaded, it is concerning that the average offtaking TLM value has continued to increase, standing at 1.0110 for the first two months of 2007. The cost effect resulting from the difference between the lowest and highest values on the chart amounts to a rise of 0.31%; a very significant increase across a typical retail portfolio, in a competitive market where margins can be slim.

As referred to in 2.3 above, ELEXON demonstrated that the level of losses increased by circa 15% over 2005 and 2006. Without the implementation of a more cost reflective method of allocating losses, there is no way to remedy the impact of TLMs on metered volumes. E.ON UK maintains that Proposed Modification P203 provides the most accurate feasible method to correct the current unwelcome trend. It has the potential to halt and reverse the trend by encouraging more efficient short term generation decisions and would also accurately reflect the cost of losses in retail tariffs, encouraging consumers in major centres of demand, such as London, to use energy more efficiently. This could reduce costs: if overall losses reduce, so do the associated costs for all generators and customers.

4. Chapter 4: Environmental impacts

4.1. Response to Ofgem's summary of the environmental impacts of the modification proposals

The implementation of one of the proposals assessed here would have an effect on businesses' locational investment decisions at the margin. However in the long term, OXERA's view that the long term effect is uncertain is appropriate.¹⁰ Similarly, Ofgem rightly concludes that losses "...would be likely to have a lower impact than the signals from other factors such as TNUoS charges which are of much greater magnitude."¹¹ The conclusion is therefore that none of the proposals would have a detrimental impact on the development of more renewable generation.

Convincing evidence to support this conclusion is size of the, principally Scottish, GB transmission queue. If prudent, all of the projects waiting for connection should have incorporated the cost of losses into their business models. That the queue stretches out to 2016 suggests that factors such as wind speeds and land availability outweigh the effect of losses.

In contrast, and in order to reach a balanced conclusion, it should be remembered that renewable generation projects are planned right across the UK, with many, including projects of unprecedented size such as London Array, in the south of England. If the marginal locational impact of losses did tip the balance for a prospective renewable project, then substitution to a less congested area of the transmission network would be an additional benefit.

More generally, it should be remembered that more efficient generation decisions and a greater effort towards energy efficiency and responsible consumption, engendered by the accurate reflection of costs, has the potential to stop and correct the trend of increasing losses, producing a reduction in carbon emissions.

5. Chapter 5: Process and way forward

5.1. Our view of the process and timetable for progressing the modification proposals

E.ON UK is disappointed that such a long standing issue will take over a year from now to implement, accepting the view of ELEXON that the lead time will be a year and the view of the Modification Groups that implementation should complement contract rounds. With these restrictions in mind, Ofgem's suggested process will allow for the implementation of an approved proposal at the next available opportunity.

Ofgem's particular thoroughness, for example by adding a 'minded-to' stage to the process, is understandable given the contentious nature of the issue.

6. Summary

This submission seeks to highlight several important considerations in the assessment of proposals to introduce a cost reflective method of paying for power lost over the transmission network.

Firstly, the UK electricity transmission system appears to be getting increasingly inefficient, with less generated power actually reaching customers today than over recent years.

¹⁰ Consultation document, 4.16

¹¹ Consultation document, 4.20

Secondly, Modification Proposal P203 provides a method to correct this inefficient trend. It has the potential to halt and reverse the trend by encouraging more efficient short term generation decisions and possibly by affecting long term generation project development decisions at the margin. It would also accurately reflect the cost of losses in retail tariffs, encouraging consumers in major centres of demand, such as London, to use energy more efficiently. After initial implementation this would reduce costs: if overall losses reduce, so do the associated costs for all generators and customers.

Thirdly, although connected generators should be free to generate as their business models dictate, those that choose to generate a long way from the major centres of demand should be charged a proportionate rate that reflects the corresponding increase in losses. The cost of wasted power is currently disproportionately paid by businesses whose operation actually acts to mitigate overall losses, for example by generating in the south of England.

Finally, and fundamentally, there is not a justifiable reason to maintain the long standing and growing cross subsidy inherent in having a redundant TLF in the BSC. This cross subsidy artificially lowers costs for some parties and prevents competitive companies from reflecting the true cost of losses in their tariffs. Proposed Modification P203 provides a method to remove the cross subsidy that is as accurate as practicably possible.

7. Contact details and further information

To discuss any aspect of this submission in more detail please contact:

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