Seasonal Zonal Transmission Losses

Response to Ofgem's impact assessment of proposal P229 to modify the Balancing and Settlement Code

04 July 2011

1. Introduction

"Someone has to pay for the electricity that is generated but is not subsequently sold to customers."[1] However, the method currently employed in the Balancing and Settlement Code (BSC) to apportion the cost of those variable transmission losses (losses) is not cost reflective, producing a cross-subsidy that is anticompetitive and distorts the market. The present uniform calculation of Transmission Loss Factors (TLFs) does not account for the extent to which electricity generators and consumers in different areas of the country are responsible for power lost over the transmission network. Simply, "at present parties are not paying charges that reflect their contribution to losses."[2] This results in a beneficial cross subsidy for companies who operate generating plant far from the major retail markets, and consumers in demand centres whose consumption requires power to travel long distances. Conversely, customers whose usage gives rise to fewer losses pay for those incurred for others to be supplied, while companies whose generation results in fewer losses, incur proportionately higher losses costs than their portfolio gives rise to, limiting their ability to price competitively. Uniform attribution of such losses by preventing companies from accurately reflecting their true cost in tariffs is fundamentally anticompetitive as companies whose generation portfolios are such that they benefit from this cross subsidy can be said to have artificially lower costs, so an unfair pricing advantage.

Correcting this situation by adopting a more cost reflective method of allocating losses has been suggested since privatisation of the UK electricity industry, with the desirability of locational signals being recognised by the Pool Executive Committee and OFFER prior to NETA and the raising of various BSC modification proposals aiming to solve the problem. In 1995, the issues were summarised by the Director General of Electricity Supplies (DGES) writing to the Pool Chairman:

"On numerous occasions since 1990, I have had to repeat my view that charges for transmission losses need to be made cost reflective.
It is important that decisions on the despatch of existing generation, the location of new generation, and on capital expenditure on the transmission system are properly informed. If they are not, costs and losses will be unnecessarily high, energy efficiency will be reduced, prices to customers will be increased and additional transmission lines will need to be built, with adverse environmental impacts."[3]

Ofgem have continued to acknowledge the variety of negative consequences of the current cross subsidies, such as inefficient generation and investment and higher costs, in responses to previous

[1] Ofgem, Impact Assessment on RWE proposal P229 - seasonal zonal transmission losses scheme (Consultation document), 2.4; Ofgem, Zonal transmission losses - assessment of proposals to modify the Balancing and Settlement Code, (2007 Consultation document) 1.3
[2] Ofgem, Zonal transmission losses - the Authority's 'minded-to' decisions 6.33
[3] Skyplex Consulting Ltd, Zonal Transmission Losses in the GB Electricity Market: A Review of Statements by Ofgem and Others, Appendix 1 xxi

proposals[4]. Sixteen years on from the DGES's statement, this latest proposal to modify the BSC has provided the industry with another opportunity to thoroughly evaluate an appropriate solution for today's market, now including offshore transmission. After over two years of comprehensive assessment by industry, consultants, academics and Ofgem, in addition to all the analysis previously undertaken, it is clear that if implemented, P229 would correct the long standing cross subsidy in a way as accurately as practicably possible.

As the flaws in the current methodology have been acknowledged for twenty years and considerable effort invested by all parties to explore alternative calculations, it is highly desirable for the P229 decision to resolve this situation. It is particularly unfortunate that previous decisions on losses have been closed on procedural grounds (from 2002-04 for modification proposals P75, P82 and P105, as well as 2005-07 for P198, P200, P203 and P204).

Resolving this situation is also now more pertinent than ever. Firstly, as this issue has been 'open' for so long it creates uncertainty in the market. The prospect that an anticompetitive arrangement may at some point be corrected is welcome, but regulatory uncertainty is not helpful and particularly undesirable at a time when urgent investment in generation assets as well as reinforcement of networks is needed to replace retiring plants and meet renewable generation targets while keeping the lights on. Treatment of transmission losses is only a small factor in locational decisions, but another question mark for developers and generators trying to assess the economics of new or existing plant, if not addressed by a positive decision to implement P229.

Secondly and more fundamentally, the urgency of minimising our environmental impact, through measures such as reducing emissions, is now not just more widely realised but also physically greater than when previous modifications were raised. A continuation of the present methodology that does not reflect the true cost of transmission losses thus failing to incentivise reductions, would be insupportable when the UK's goal is to move as rapidly as reasonable to a 'low-carbon economy'. Minimising losses, incentivising the most cost-effective generation through P229 Proposed, would both reduce emissions and overall costs to the consumer in line with Government and European energy policy. Giving average CO_2 emission savings of 1.4 Mtonnes per annum (£21m), potentially up to 3Mt pa[5], implementing P229 Proposed would be a step towards achieving the UK's carbon budget as set following advice from the independent Committee on Climate Change. We note that accounting for the further environmental and financial benefits of reductions in emissions of other pollutants, the NPV of P229 Proposed over ten years is forecast by LE/Ventyx to increase from £47.9m[6] to potentially £276.9m[7] (including demand-side benefits, and similar figures when calculated with lower and higher WACC estimates). While Redpoint's 'Lot 2' analysis (that excluded demand-side benefits), suggested a smaller benefit of £161.1m when including NOx and SOx, versus LE/Ventyx's £275.2m, their forecast excluding NOx and SOx benefits supports the other consultants', with a slightly higher cost benefit of £47.7m versus £46.1m expected.[8] It has also been noted that 'the treatment of NOx benefits appears conservative in the sense that the government guidelines

[4] Ofgem, Zonal transmission losses - the Authority's 'minded-to' decisions 1.3
[5] Consultation document 4.55, 4.58
[6] London Economics/Ventyx, Cost Benefit Analysis of Modification P229: Changing to Zonal-Seasonal Transmission Loss Factors, Report Version 1.0 (Cost Benefit Analysis), 5.2/Table 5-2/8
[7] Cost Benefit Analysis 5.2/Table 5-3/8
[8] Redpoint, P229 Cost Benefit Analysis: Additional scenarios ('Lot 2') 3.2 Table 14

suggest that N2O (the main NOx gas) should be valued as a greenhouse gas with a pollutant value 310 times that of CO2'.[9]
Furthermore, while there is variability in the NOx and SOx forecasts due to their sensitivity to input specifications, it should also be noted that those estimates including NOx and SOx do not include the social cost of these emissions[10]. The environmental and social improvement in air quality as well as the financial value in enabling these reductions through implementing P229 should not be underestimated. Irrespective of the value of NOx and SOx reductions though, in line with previous analysis the consultants all concluded that implementing seasonal zonal transmission loss factors via P229 would have a considerable positive net benefit.

Furthermore, with such strong benefits identified, we would not anticipate this issue being 'closed' if the present proposal is not approved. We fear that any decision not to implement P229 would only see further proposals being brought forward, requiring more resources until the issue is resolved, with costs ultimately being borne by customers.

The industry has coped with many more significant changes to trading arrangements in the past while zonal losses has remained a potential development, from inclusion in the Pooling and Settlement Agreement as a feature to be implemented by mid 1996[11], to that of a TLF currently set to zero being incorporated in the BSC calculation ready for this development. When it is considered that these suggested changes have been anticipated for so long, and as even now a solution would not be implemented before October 2012, any notion that correcting the existing cross-subsidy would be a regulatory risk was rightly dismissed by The Brattle Group[12]. Competitive businesses will have taken this possible development into account for many years; no companies should be relying on such cross-subsidies.

It is notable that implementation of the Alternative instead of Proposed P229 would not incur lower costs. (We would also reiterate our response to CPC00654 in that we do not anticipate any significant implementation costs to change our systems whatsoever). The cost/benefit judgement is thus quite clear when the indicated benefit from the Alternative is a reduction in losses by only 57 GWh, versus 211 GWh average saving per annum[13] and an overall benefit of £12.5m without NOx and SOx savings, £76.0m with NOx and SOx savings[14,] as opposed to the overall benefit of £47.9m without, £276.9m with, that implementation of P229 Proposed is forecast to achieve[15]. As we stated in response to the previous round of losses proposals in 2007, but even more so now in 2011; when the benefits identified in the consultation are reviewed, it is clear that the 'do nothing' option is no longer justifiable, nor sustainable. Implementing the Alternative would be better than leaving the current cross-subsidies in place, but would have a far weaker positive impact than the Proposed P229.

[9] Brattle Group Ltd, A Review of LE/Ventyx's Cost-Benefit Analysis of Modification P229 ('Lot 1') 7 (b)
[10] Cost Benefit Analysis 3.5.3
[11] Pooling & Settlement Agreement, Schedule 12 Transitional Arrangements p432
[12] Brattle Group Ltd, A Review of LE/Ventyx's Cost-Benefit Analysis of Modification P229 Lot 3 Additional Analysis ('Lot 3') 8
[13] London Economics/Ventyx Cost Benefit Analysis Report Annex: Additional Modelling using Alternative Beta Values Annex 2 Table A2.1
[14] London Economics/Ventyx Cost Benefit Analysis Report Annex: Additional Modelling using Alternative Beta Values A 1.3.2
[15] Cost Benefit Analysis 5.2

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

2. CHAPTER: Four

Question 1: Do respondents consider that we have appropriately identified and where possible quantified the impacts of P229 Proposed and P229 Alternative?

Yes. Ofgem's assessment of the Proposed and Alternative P229 proposals seems impartial and accurate. As Brattle Group's 'Lot 1' analysis confirmed, the demand growth and prices utilised by LE/Ventyx for coal and carbon lie within Ofgem's Project Discovery scenarios thus we are satisfied that they are appropriate. We note that the gas prices used in 2009 were on the low side, but that the conclusion that can be drawn from this is that the as the high gas scenario modelled by LE/Ventyx resulted in considerably higher net benefits, their reference case may notably underestimate the likely benefits of P229[16]. As previous analysis has suggested, the impact assessment has confirmed that the greatest impact from this modification would be on the relative marginal costs of different generators, thus influencing changes in despatch. The sensitivity analysis undertaken by LE/Ventyx, reviewed by The Brattle Group and built upon in for instance the further wind scenarios modelled by Redpoint is thorough in quantifying the potential impacts of P229 under a variety of commodity price and development scenarios. The findings that the 15GW Offshore Wind and RES-E scenarios both still result in a strong positive benefits under P229 (£36.6m and £41.3m respectively excluding NOx and SOx compared with LE/Ventyx's reference of £46.1m and Redpoint's own of £47.7m)[17], i.e. that the benefits are stable under all these capacity development pathways, are welcome, and address concerns raised that the original LE/Ventyx analysis was of a scenario that would undershoot our renewable generation targets.

As previous proposals have attempted, P229 aims to apportion the cost of transmission losses in a fairer way than allocating them uniformly to industry parties. P229 promotes zonal charging that would allow costs to reflect the extent to which generation and demand in different areas of the country either cause or mitigate the level of losses. This would effectively bring TLF methodology in line with LLF, which accounts for the losses considered to be caused, or relieved, on a Distribution System by a flow at that Boundary Point. It would also help to achieve greater loss savings from calculating TLFs on a seasonal rather than annual basis, the benefits of which have also been highlighted in analysis for previous proposals[18]. Utilising four seasonal calculations and informing companies of the year's losses allocation before the contract rounds provides the optimum solution for users.

P229 Alternative as a scaled version of the Proposed would be a step in the right direction but "clearly the P229 Alternative approach yields much lower benefits than the P229 Original approach. This is only to be expected as the scaling adopted under the Alternative proposal results in loss factors that do not reflect 'actual' losses".[19] While recognising that a defect exists, the Alternative

[16] 'Lot 1' 5.2
[17] 'Lot 2' 6.2
[18] 2007 Consultation document 2.14; Ofgem, Zonal transmission losses - the Authority's 'minded-to' decisions 4.10
[19] 'Lot 1' 6.1

does not propose to correct it in a way that would incentivise a reduction in overall system losses. It would indeed minimise redistribution, but only through implementing a less efficient solution that would have a far weaker impact on transmission losses, emissions and costs (hence the reference case estimate of a Net Present Benefit over 70% lower than the Proposed).[20] There is no need for a scaled Alternative version of P229: if existing arrangements are to be corrected this should be done properly via implementing the Original Proposal so that future costs are proportionate to each Party's impact on total losses. Complaints that implementation would lead to increased costs for certain parties are unsurprising given the unfair commercial advantage that some companies presently enjoy; but this is not a reason to pass up the opportunity to reduce transmission losses, associated wasted generation and emissions to the greatest possible extent from the options on the table. This is what P229 Proposed would achieve.

Both the Proposed and Alternative would however at least have a positive financial and environmental impact, although under a low gas scenario this would be in doubt were the Alternative implemented, and the general reduction in losses and costs is much lower under the Alternative. (Noting however that a low gas scenario may now be less likely than it seemed in 2009). To persist with the current method though, would maintain and foster inefficiencies in the generation and supply of electricity. It would be hard to understand any failure to take this opportunity to make savings in transmission losses, emission reductions and multi £m costs to the consumer.

The analysis demonstrates that under P229 Proposed considerable efficiency savings, ranging from around 121 GWh to 308GWh a year and averaging 211GWh per year could be achieved under the Reference case, with total ten-year losses savings ranging from 168GWh in the nuclear scenario to 220GWh in a high gas price scenario. Only the low gas price scenario appears likely to see fewer losses savings (but these still forecast to range from 24-103GWh per year, 80GWh on average)[21]. The analysis also puts a price on this preventable waste of about £9.1m a year[22]. With clarification that total benefits excluding NOx and SOx are predicted to range from £4.3m to £97.8m NPV, (if including NOx and SOx, from a negative (-£16.7m) only under the high gas price scenario to +£73.5m to +£267.8m under the other five scenarios,[23] it is easier to be confident of the likely benefits of implementing P229 whatever future price tracks and the GB generation mix may look like. This would be achieved chiefly through less wasteful short-term generation despatch decisions, fuel switching and a general generation shift from north to south, though it is evident that P229 would not have a significant impact on siting decisions[24].

If the marginal locational impact of losses did tip the balance for a prospective renewable project, it could be argued that substitution to a less congested area of the transmission network would be an additional benefit. However fundamentally P229 is not expected to have a significant impact on siting decisions for conventional or renewable generation, at most 'making locations that are already attractive more attractive and vice versa'[25]. Prior to the adoption of Connect and Manage, the existence of a queue of projects waiting to connect in the north of Scotland indicates that a

[20] Consultation document p6
[21] Cost Benefit Analysis 5.5, 6.2.5, 6.4.4, 6.5.4, 6.6.6; low gas 6.3.4; London Economics/Ventyx Cost Benefit Analysis Report Annex: Additional Modelling using Alternative Beta Values Table ES-1
[22] Consultation document, p6
[23] Consultation document, 4.7 Table 4.1
[24] Consultation document, p6
[25] 'Lot 1' 6.3

potential change to the calculation of transmission losses was indeed no deterrent to locating generation in the north. Financially, as previously noted by Oxera and Ofgem[26], it is clear that current zonal TNUoS charges of greater magnitude are much more likely to drive locational decisions than losses[27]. (Though as also highlighted in 'Lot 3' reports and by LE/Ventyx, even zonal TNUoS has relatively small impact on siting decisions)[28]. Moreover, as we highlighted in our response to Ofgem's Project TransmiT Call for Evidence[29], the higher revenue achieved by a small increase in Load Factor can offset even a significant difference in TNUoS rates. As far as distributional impacts and potential transfers are concerned, it should also be noted that while the removal of the current cross-subsidy is expected to result in the greatest reductions in revenue for generators in South Scotland and the North West, Supply transfers offset this by over 75% and 50% for these zones respectively, with reference case benefits to Suppliers in Scotland for a single year modelled at £18m, that should be passed on consumers[30]. Brattle have also highlighted their belief that in the cost-benefit analysis LE/Ventyx 'exaggerate the distributional effects since they are based on prices derived from generator offers using TLFs rather than TLMs'.[31]

It is clear from the analysis that concerns previously raised that P229 might have a negative impact upon renewables development are unjustified. As the 'Lot 3' analysis confirmed, renewable generation is 'likely to remain profitable under the P229 proposals'.[32] The cost-benefit analysis could not be clearer: LE/Ventyx are confident that 'P229 is not predicted to have any discernable impact on renewables, and especially the capacity/energy of renewables going forward'.[33] They found many reasons to support this conclusion. In addition to such influences as technical challenges, connection opportunities and planning permission it cannot be assumed that any particular region is necessarily 'better' for renewables. Conditions in any location can be highly site-specific and idiosyncratic. Indeed, while wind and wave strengths may be generally greater in the north and west, large-scale offshore wind development is currently planned off Lincolnshire and in the south-east. As above, the load factor that a specific site can achieve will be a far more influential factor in wind siting decisions than TNUoS, which is again far more influential than zonal losses would be. Ultimately, non-economic factors such as site availability and load factor, plus policy impacts from the design of the Renewables Obligation and its apparent Feed-in Tariff with Contract for Difference replacement are of much greater influence than transmission losses are or would be. LE/Ventyx's sensitivity analysis also demonstrated that in their aggressive wind development scenario, the NPV of P229 Proposed without SOx and NOx would actually be £6m higher than the reference scenario, at £54m instead of £48m,[34] while Redpoint also showed stable benefits across the reference and increased wind development scenarios modelled.[35] For existing plant it must also be remembered that having very low marginal costs, renewable generation such as wind would still be incentivised to generate whether P229 was in place or not: renewable despatch is not likely to be affected. (Rather as Brattle have noted, following the adoption of Connect and Manage, zonal losses may

[26] 2007 Consultation document, 3.21, 4.20
[27] Cost Benefit Analysis 7.4.7/Table 7-12
[28] Consultation document, 5.18
[29] http://www.ofgem.gov.uk/Networks/Trans/PT/Documents1/E.ON_UK.pdf, Figure 2
[30] Cost Benefit Analysis 5.7/Table 5-6
[31] 'Lot 1' 6.2
[32] Consultation document, 4.39
[33] Cost Benefit Analysis 7.4.1
[34] Cost Benefit Analysis 6.5.2/Table 6-30
[35] 'Lot 2' 6.2

actually lead to non-renewable plant in the north being constrained off more frequently – thus reducing the cost of congestion).[36]

Significant assessment of transmission losses has now been undertaken for the various losses proposals since 2002 and it is quite clear that there is a compelling economic and environmental case for replacing the current market-distorting, anticompetitive allocation of variable losses with the more cost reflective attribution that P229 would provide.

Question 2: Do respondents consider that there are additional impacts which we should take into account in the decision making process and, if so, what are these?

It could be considered that the benefits calculated are conservative because they do not recognise that losses may increase if the 'do nothing' option is accepted. Elexon's analysis shows that average weekly transmission losses have shown an upward trend through 2011 so far[37].

LE/Ventyx noted that they did not model other emissions such as mercury, soot, ash and particulates, reductions in which can minimise for example acid rain and negative impacts on human health, but the beneficial reductions in CO_2, NOx and SOx emissions that implementation of P229 should achieve are clear enough. By extending the assessment performed by the Modification Workgroup and consultants Siemens and LE/Ventyx, plus confirming the expectation of no direct impacts on health and safety from P229, we believe the assessment is thorough and comprehensive. In relation to health however, Brattle's 'Lot 3' analysis did highlight LE/Ventyx's forecasts of significant NOx and SOx reductions under P229 and that the significant reductions in these pollutants that contribute towards asthma attacks, suffered by 5 million people in the UK should have a positive impact on welfare for many GB consumers.[38] Thus the Ofgem consultation statement that 'We are not aware of any health and safety implications related to the P229 Proposed or P229 Alternative'[39] underplays what could be a notable benefit from implementing P229.

3. CHAPTER: Five

Question 1: Do respondents consider that we have appropriately identified the potential interactions of the P229 proposals with TransmiT and the EMR?

Yes. P229 has clear known impacts totally separate from any short-term measures that might be introduced through TransmiT or longer-term through Electricity Market Reform. Both Project TransmiT and the EMR are aiming to ensure that electricity trading arrangements are fit for purpose to meet the challenges that E.ON has previously highlighted: enabling a timely move to a low-carbon energy sector while keeping costs down but continuing to meet Security and Quality of Supply Standards.

[36] Consultation document, 5.18; Brattle Group, BSC Modification 229: Potential interactions with options for changes to transmission charging ('Lot 4'), 6
[37] May 2011 Trading Operations Report Chart 3.37
[38] 'Lot 3' 3.2
[39] Consultation document 4.63

P229 would implement a solution for a specific issue as a preliminary step towards achieving this goal, and there is no indication that any of the possible short-term options under TransmiT would 'undo' P229. We note that as Brattle's 'Lot 4' report confirmed, any move to flat TNUoS charges or commoditised TNUoS would have minimal impact on the costs and benefits of P229, indeed that flat TNUos would not change the benefits; 'commoditised', more likely to slightly increase the benefits from P229.[40]

Longer-term, as identified, neither the finer points of the four elements of EMR measures identified by DECC, nor timescales for their implementation have yet been decided in sufficient detail to fully determine their interactions with the P229 proposals. However, Brattle's analysis confirms that it seems likely that any contradictory long-term impact resulting from TransmiT or EMR would at most serve only to 'undo' P229.[41] As demonstrated by both LE/Ventyx and Redpoint[42], the most significant benefits from P229 Proposed or Alternative are likely to be achieved from the third year of implementation. However it is clear that as implementation has a very short payback period, in practice most likely to be 'less than one year'[43], it is clear that benefits would be achieved by implementing P229 in 2012 even if elements of TransmiT or EMR reduced its impacts in the longer term[44].

As far as any other interactions are concerned, the consultants have acknowledged that as interconnectors account for a relatively small amount of GB demand, any more detailed modelling is unlikely to have had a significant impact on the results[45]. As far as links with Europe are concerned, any developments towards European 'market coupling' are also some way off such that implementing P229 would have positive benefits to the GB market before any changes to further align our Codes with Europe, whether or not that led to any changes in the treatment of losses.

Question 2: Do respondents consider that we have appropriately indentified the likely impacts of these interactions?

Yes. As per our answer to Chapter 5's Question 1, high-level emerging options under Project TransmiT are still being developed and the detail of the four elements of EMR is yet to be decided. However it appears that Brattle's 'Lot 4' exploration of potential interactions has investigated the likely impacts as thoroughly as possible at this time. We note that they also envisage that the adoption of Connect and Manage since LT/Ventyx's analysis was completed should increase the benefits of implementing zonal losses[46].

4. 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. The major environmental and cost saving benefits that P229 would bring are more important than ever before, hence we hope to see a decision to implement P229 as soon as possible.

[40] 'Lot 4' 5
[41] Consultation document 5.21
[42] Consultation document, 5.14 Table 5.1
[43] 'Lot 4' 3/22
[44] Consultation document, p6 & 5.16
[45] 'Lot 1' 4.3.6
[46] 'Lot 4', 1.1/13

Modification Proposal P229 provides a method to correct an anticompetitive element of BSC calculations that will encourage more efficient short term generation decisions, and possibly affect long term generation project development decisions at the margin. It would also accurately reflect the cost of losses in retail tariffs, encouraging not only generators to consider losses but also consumers in major centres of demand to use energy more efficiently. This would reduce costs significantly: if overall losses reduce, so do associated costs for all generators and customers. 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 total 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. 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 P229 provides a method to rectify this longstanding cross subsidy. As the consultants assessing P229 have summarised:

- LE/Ventyx: 'We conclude that the net benefits of P229 are predicted to be positive and significant on a net present value basis'[47]

- Brattle Group, 'Lot 1': 'given the low level of implementation and operating costs associated with the Modification, it is difficult to see how the net present value of introducing P229 could be anything other than positive'[48]

- Redpoint, 'Lot 2': 'Our modelling indicates positive benefits from the P229 zonal losses modification under all the scenarios that we have studied'[49]

5. Contact details and further information

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[47] Cost Benefit Analysis 8
[48] 'Lot 1' 8
[49] 'Lot 2', 6.6