

PAPER FOR LOSSES WORKING GROUP

**INCENTIVISING THE DNOs TO REDUCE ELECTRICAL LOSSES FROM THE
DISTRIBUTION NETWORKS – A DUTIES BASED APPROACH**

**NOTE FROM JOHN FRANCE
REGULATION DIRECTOR, NORTHERN POWERGRID**

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INTRODUCTION

1. This paper considers an alternative approach to the problem of incentivising the DNOs to reduce electrical losses from their distribution networks.
2. Since privatisation there has been a losses incentive that is based on measuring the difference between the number of units that enter a DNO's network and the number of units that leave the network. The details of the mechanism have changed over the various price control reviews but have always been based on rewarding or penalising the DNO for the difference between these two numbers.
3. In the recent past it has become clear that there are intractable measurement problems about one of these two numbers, i.e. the number of units exiting the DNO's network.
4. However, even if it were possible to measure that number in a consistent manner and with reasonable accuracy in future, it is doubtful whether an incentive that is based on rewarding or penalising the difference between units entering and exiting the network is appropriate for the future.
5. In this note I shall explain why I think the simple approach of an incentive based on the difference between units entering and exiting the network is inappropriate. I shall then go on to explore an alternative approach that I call a 'duties based approach' because it rests on the introduction of a new duty into the DNO licence.

THE INCENTIVE PROBLEM

6. The analysis that follows is not affected by whether or not an accurate and consistent method of measuring units exiting the system can be found. Even if this issue went away, there is a fundamental problem with the nature of the incentive.
7. Real electrical losses from the networks are the result of the combination of the behaviour of the DNO itself and the behaviour of those who are connected to the DNO's network.

8. The DNO's own behaviour can influence the level of losses from the network through the way that the network is designed and operated. At the margin, new investments can introduce lower loss equipment. The DNO may also operate its network in a way that reduces (or increases) electrical losses. However, in the absence of changing demands being placed on the network by end users, and given the scale of the network, it appears reasonable to suppose that such changes to investment and operational practice will have only a small impact relative to the total level of losses on the network.
9. An incentive based on calculating the difference between units entering and units exiting the network could still work if the measurements were accurate and the factors that drove that difference were indeed factors under the control of the DNO.
10. The first of these two factors, the ability to accurately and consistently measure the level of losses on the distribution network, is not currently present, as the recent past has demonstrated. However, the introduction of smart meters during the RIIO-ED1 period may improve this position.
11. The second factor referred to above is the behaviour of those who are connected to the DNO's network. The way that connectees use, or generate, electricity, and the times at which they do so has an effect on the level of electrical losses. Measured electrical losses (but not real electrical losses) also increase as a result of theft from the network. At the losses working group meeting on 4th May 2012, a number of DNO representatives stated that electrical losses would increase significantly in the future due to changes in the way connectees use the network. This paper takes as a starting assumption that this is the case, and that the consequent change in losses would far exceed the impact on losses any DNO could have through changes to the physical configuration or operation of its network.
12. It is sometimes said that it is wrong to reward or penalise a DNO for the behaviour of others. There is an intuitive appeal to this statement: after all why should a DNO be handsomely rewarded just because those who we connected to its network have changed their behaviour?

13. I do not quite agree with this objection in its unqualified form, but in the end I get to the same position.
14. In principle there would be nothing wrong with an incentive that rewarded or penalised a DNO for the combination of its own actions and for the actions of others, provided that the DNO is able to ensure that the economic signal that is inherent in that incentive can be sent effectively to the third parties whose behaviour is contributing to the outcome.
15. The inability to distinguish by measurement the contribution to actual losses that is made by the DNO's own behaviour, as opposed to the contribution that has been made by the behaviour of those connected to the DNO's network, would not be fatal to the idea of an incentive that rewards or penalises the DNO for the combined effect of these two behaviours provided that the DNO is able to incorporate in its prices the signal that will encourage connectees to minimise losses. In practice the only lever that the DNO has that could influence the behaviour of connectees is the DNO's ability to incorporate the economic signal in its pricing structure.
16. In principle, it would be possible to incentivise the DNO without needing to isolate the consequences of its own behaviour, but the pre-condition to this being a sensible approach is that the DNO must then be able to introduce these signals into its charges.
17. Before the purists leap to the conclusion that this should be done because losses are a bad thing that are contributing to CO₂ emissions, we must pause to consider the fact that the introduction of low carbon technologies is going to increase the electrical losses from the network. That is not a bad thing; in CO₂ terms it is a price worth paying, because the reduction in CO₂ emissions resulting from the introduction of the technology is more beneficial than the increase in electrical losses that is its concomitant (although it is of course true that, for any given capacity low carbon generation capacity, there is still a

benefit from having lower losses since more high carbon generation can then be displaced).

18. Incorporating a losses signal in the charges of DNOs is therefore problematic in policy terms, unless the policy maker wished there to be a locational signal that helped encourage only the 'lowest loss' green generation to go ahead. However, this would have to be borne in mind as part of a policy mix and, assuming the status quo is correctly calibrated, more direct support for low carbon generation may be required to avoid discouraging generation that should actually be installed. It would otherwise be silly to penalise the very technologies that can contribute to reduced emissions just so that the DNOs can be placed under an incentive that is based on the difference between two very large numbers, only a part of which has anything to do with the behaviour of the distributors themselves.
19. The practicalities of introducing a pricing signal into a DNO's charges that incentivises loss minimising behaviour on the part of connectees would no doubt be considerable in any case.
20. To try to do that but at the same time to distinguish between technologies to turn the signal off where the connectee was considered to be virtuous would add a layer of complexity that would make the approach still more unappealing.
21. However, the logic is inescapable. If it is not thought possible (or desirable) to incorporate such a signal in the charges of DNOs, it follows that it would be absurd to reward or penalise the DNO for the behaviour of others.

22. For these reasons a duties based approach may commend itself to policy makers.

THE DUTIES BASED APPROACH

23. The duties based approach proceeds from the assumption that the DNO can influence the level of electrical losses from the distribution network only at the margin. In particular, it focuses on the DNO's decisions on the equipment to use and the way it is configured as new assets are introduced, whether in replacement of existing assets because they have (or may in due course) failed or because new capacity is necessary at particular points on the network.
24. The duties based approach is simple in its design and straightforward in its application. It has no problems of measurement and therefore avoids all the issues that Ofgem has had to address in its recent decision and consultations on the current settlements-based incentive.
25. In place of the existing special condition there would be a new condition (probably a standard condition as it would not be part of the price controls).
26. The new condition would impose a new overarching duty on the licensee to design and operate its network so as to ensure that losses from the network are as low as is reasonably practicable.
27. In support of this new duty, there could be a requirement placed on the licensee to prepare a statement of the manner in which it will discharge the overarching duty having regard to factors such as:

- the licensee’s policy with respect to the electrical characteristics of new assets to be introduced to the network;
 - the licensee’s policy with respect to decisions on which existing assets may be replaced and over what timescale;
 - the licensee’s policy with respect to the way that the distribution network is operated (under normal operating conditions);
 - the assumptions made by the licensee in investment appraisals where potential solutions are evaluated. This would include the value placed on electrical losses by the licensee in such appraisals.
28. The statement referred to in the previous paragraph should be submitted to Ofgem for approval and the licensee should be placed under a duty to review it from time to time, taking account of the views of stakeholders.
29. Since the Authority would have the power to approve the statement, Ofgem would have control over some of the decisive components (e.g. the value to be placed on a saved unit).
30. This may be too light touch for some. The approach could be supplemented by a regime of selected audits at price control reviews. Ofgem could appoint a reviewer to establish whether the licensee had properly applied the approved policy in the schemes that were selected for audit. It would then be a relatively simple matter to link an adverse finding from such an audit with the review of outputs that will take place at the price control review under the RIIO frameworks. Indeed, for the sake of clarity, Ofgem may wish to specify the action that would follow if a DNO failed with respect to this particular output.

NEXT STEPS

31. If this approach commends itself to Ofgem, I would be happy to draft an appropriate licence condition that (I hope) will demonstrate how straightforward it would be to implement such an approach.