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Monday, February 24th, 2003

Mr Lars Even Rognlien
Distribution Policy Manager
Regulation & Financial Affairs
Office of Gas and Electricity Markets
9 Millbank
LONDON
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Dear Mr. Rognlien,

Electricity distribution losses: A consultation document; January 2003, 03/03

Thank you for the opportunity to comment on this consultation document, which provides a very comprehensive consideration of the issue of electricity losses in distribution systems and its broader context.

Power Technologies International (PTI) is part of Stone & Webster Consultants and a member of the Shaw Group Inc. For decades it has provided a wide range of power system software and related consultancy to the Energy Industry in the UK and worldwide. Recently we were retained by ELEXON, Balancing and Settlement Code Company, to advise them on the issue of allocation of electricity transmission losses.

PTI would like to offer some comments related to **(1)** cost of electricity losses and optimal capacity of distribution network elements, and **(2)** focusing the regulatory efforts with the aim of reducing electricity distribution losses.

1 Cost of electricity losses and optimal capacity of distribution network elements

This comment updates some research findings quoted in the Ofgem's consultation document. The consultation document makes reference to:

> "Effect of losses in design of distribution circuits", S. Ćurčić, G. Strbac and X.P. Zhang, IEE Proc. Gener. Transm. Distrib., Vol 148, No. 4, July 2001.

The calculation of optimal capacity utilisation of circuits in this paper was made on the basis of a trade-off between cost of energy lost and cost of capital expenditure. For the cost of electricity losses a historic ½ h PSP (Pool Selling Price) annual profile was used. Among other factors the optimal circuit utilisation depends on the shape of circuit's ½ h annual loading profile as well as on its coincidence with annual ½ h energy price profile. Ofgem's consultation paper indicates an estimated cost of lost electricity, based on the loss-weighted average, as 2.96 – 3.62 p/kWh. A shortened version of calculations made in the above paper has been repeated with flat ½ h annual energy price profile of 2.96 and 3.62 p/kWh. The results are broadly consistent with the results reported in the paper. With cost of losses 2.96 p/kWh the optimal utilisation rates are slightly higher and with 3.62 p/kWh they are even lower than those reported in the paper. For different circuit loading profiles there is some

asymmetry in departure of new results from the previous results as the flat cost of losses profile is based on a general loss-weighted average. It should be noted that these calculations are made for a range of individual circuit types at different voltage levels, usual for the UK practice and a few indicative annual loading profiles. Therefore, the results are of a generic character and applicable to real networks.

2 Focusing the regulatory efforts with the aim of reducing electricity distribution losses

This comment attempts to clarify and emphasise the rationale of considering the cost of losses in efforts to establish an optimal distribution network with respect to electricity distribution losses. It also attempts to identify a conflict of incentives in the current regime with a wish to assist solving it in the future regime.

We would like to welcome Ofgem's initiative that the cost of losses should be considered in efforts to reduce the electricity distribution losses since we understand it to be fundamentally correct approach. Consumers ultimately pay for both network elements that produce higher or lower electricity distribution losses and for the lost electricity energy. There is a trade-off between ***(i)*** cost of lower loss or higher loss network elements, and ***(ii)*** cost of energy lost on these network elements. In an exaggerated way (in order to make the point clearer) the relationship between these two types of costs is presented in Figure 1. Optimising the total of these two types of cost is in consumers' interest. It is believed that currently the electricity distribution losses are above optimal with indication that it is the situation (a) in Figure 1. This is the situation where capital expenditure in low loss network elements is avoided at expense of having high electricity distribution losses and consequently cost of losses. Moving to situation (c), with very high cost of network elements, in relative terms, and very low cost of losses would not benefit consumers either. The aim should be to nearly achieve the optimal situation (b).

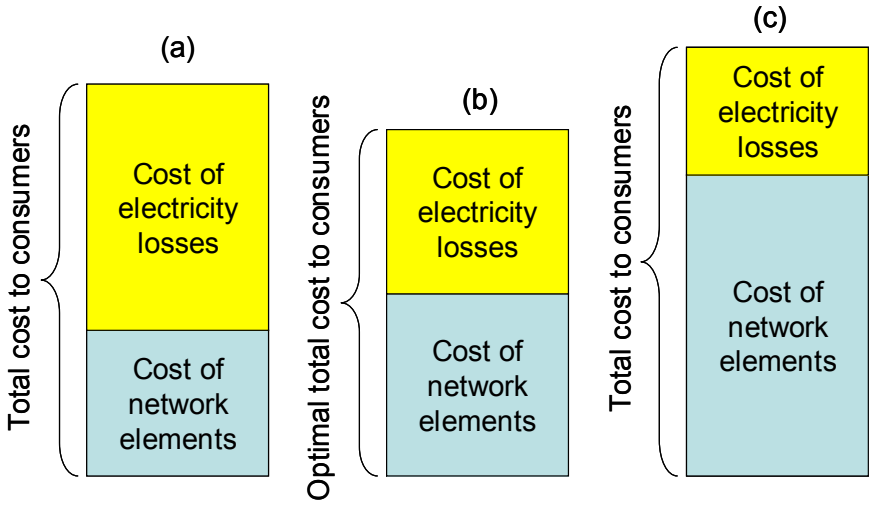

Figure 1: Optimising the total cost to consumers

It should be noted that a move from situation (a) to the optimal situation (b) in Figure 1 would result in consumers paying an increased charge to distribution businesses and paying a decreased bill for electricity energy. However, more importantly, in total they would be paying less and there would be important environmental benefits.

Opportunity to install network elements that will optimise losses normally arise in cases of new network developments and during replacement programmes. That indicates that some time will be needed to see tangible improvements. It is believed that the distribution businesses have no problem to include the cost of such optimal network elements in their RAB (Regulatory Asset Base) and receive adequate returns. Considering only this circumstance, distribution businesses would be neutral and they could be expected to apply such an approach even without any particular incentive. However, it appears that this approach is in a considerable conflict with a strong incentive distribution businesses have to achieve efficiency savings in developing and maintaining their networks. Perhaps the consultation process and Ofgem's work could focus on solving this conflict. Furthermore, considering an effective incentive for distribution businesses to reduce electricity distribution losses without solving this conflict could result in departing from the optimum indicated in Figure 1.

We hope you will find this response helpful. If the PTI can be of any further assistance, please do not hesitate to contact us.

Yours faithfully

Dr. Srdjan Ćurčić
Senior Consultant