Registered Office:
Newington House
237 Southwark Bridge Road
London SE1 6NP

Registered in England and Wales No: 3870728

Company:
UK Power Networks
(Operations) Limited

Rhianne Ogilvie
Ofgem
9 Millbank
London
SW1P 3GE

9 April 2015

Dear Rhianne

Assessing the energy efficiency potential of Great Britain's energy infrastructure

Thank you for the opportunity to respond to the above consultation. This letter should be treated as a consolidated response on behalf of UK Power Networks' three distribution licence holding companies: Eastern Power Networks plc, London Power Networks plc, and South Eastern Power Networks plc. It is not confidential and can be published via the Ofgem website.

We believe that, in terms of electrical infrastructure efficiency, the report has taken an unnecessarily narrow perspective, limited to measures for reducing network losses. As a consequence, the report fails to convey the wider aspects of electrical infrastructure energy efficiency covered by Regulation 6 such as load management, interoperability, connection to energy generating installations, and access possibilities for micro energy.

Our answers to the consultation questions are provided in the appendix to this letter and we hope that you will find our comments helpful. If any part of our response requires further explanation or clarification, please do not hesitate to contact me.

Yours sincerely

Keith Hutton
Head of Regulation
UK Power Networks

Copy: Paul Measday, Regulatory Returns & Compliance Manager, UK Power Networks

Return Address:
Newington House
237 Southwark Bridge Road
London
SE1 6NP

Appendix

Assessing the energy efficiency potential of Great Britain's energy infrastructure

Question 1: How well do you think this report assesses the energy potential of the gas and electricity infrastructure in GB? Please explain your answer with reference to the Regulation 6 text.

The report notes that the requirement on the Gas and Electricity Markets Authority under Regulation 6 is to deliver to the Secretary of State an assessment of the energy efficiency potentials of the gas and electricity infrastructure of Great Britain in particular regarding transmission, distribution, load management and interoperability, and connection to energy generating installations, including access possibilities for micro energy generators, and a list identifying concrete measures and investments for the introduction of cost- effective energy efficiency improvements in the network infrastructure, with a timetable for their introduction. The report also notes that one way to improve energy efficiency for the electricity sector is to reduce losses. Whilst that is true, this appears to be the sole focus of the report for the electricity sector. Measures to manage load, to ensure interoperability, and to improve network access to generation installations are not addressed (other than to a very limited extent and only in the context of reducing losses).

We therefore question why these further aspects of 'network efficiency' have not been more fully addressed in the report. Load management (through DSR/DSM and flexible tariffs), interoperability (for example of smart grid technologies and smart meters, and between transmission and distribution network data systems) and enabling timely and economic access to networks for distributed generation (again through smart technologies and commercial innovation) will be increasingly important in addressing Britain's trilemma of delivering secure, affordable and environmentally sustainable electricity. Some (but not all[1]) of these measures will beneficially reduce the extent to which electrical losses (in absolute terms) will rise due to the additional electrical energy delivered by networks as a result of policies associated with the electrification of heat and transport. However, the major contribution to energy efficiency (in particular reducing the carbon footprint of the electricity system) will be in terms of the avoided costs of network reinforcement to provide capacity and security of supply that would otherwise be necessary to enable network access to energy-efficient (and particularly low carbon-emission) forms of generation, transport and heat which will make an important contribution to Britain meeting the EU 2020 target of reducing primary energy consumption by 20%.

In terms of electrical losses, UK Power Networks published, as an annex to our RIIO-ED1 business plan, what has been acknowledged by Ofgem to be a comprehensive losses management strategy. The document covers a total of 14 areas where improvements associated with technical losses can be made. The strategy was derived with a focus on minimising the cost impact to consumers. To further inform our strategy, UK Power Networks, in collaboration with Western Power Distribution, commissioned a study by Imperial College and Sohn Associates to explore the scope for cost-effective measures to reduce technical losses (and also for potential secondary uses of waste heat associated with losses). Whilst the report confirmed the validity of the measures included in our strategy, it also demonstrated that further extending the scope of some of those measures would be justified in CBA terms. For example, the report demonstrated that installing LV cables with even larger cross-section conductors than our strategy proposed, and operating transformers at much lower peak utilisation levels (effectively lower Load Indices), would further reduce losses sufficiently to deliver a positive npv over the life of the assets. Nevertheless, such additional measures would result in increased costs to consumers in the shorter term (i.e. due to the investment necessary which, in part, would be recovered from consumers as 'fast' money).

[1] For example, Real Time Thermal Rating of lines and transformers and the use of DSR to allow higher peak utilisation factors and hence accommodate load growth will result in higher electrical losses than a conventional network reinforcement solution.

UK Power Networks recognised that, in the current economic and political climate, increasing costs to consumers beyond that necessary to accommodate demand growth and deliver the outputs which consumers value, could be considered inappropriate. The aim of UK Power Networks' losses management strategy is therefore to protect consumers from price increases by maximising opportunities for reducing losses through measures which can be undertaken in conjunction with our overall network management activities and proposed network interventions, and which, therefore, involve little, if any, incremental cost.

In that regard, it should be noted that the anticipated savings outlined in our losses management strategy were against a counterfactual of the losses that would be incurred over ED1 in the absence of that strategy, and were based on the levels of investment proposed in our originally submitted business plan. Whilst we are now reviewing the impact of the final determinations on our losses strategy, it is anticipated that the majority of the savings outlined by the strategy can still be realised despite the volume reductions incorporated in UK Power Networks' RIIO ED1 settlement.

Whilst the Energy Efficiency Directive Report contains areas of improvement that can be made in relation to electricity distribution network losses, our view is that the document does not consider the full scope of measures available to Britain's network operators. In addition many of the measures focus on areas that are already mandatory such as the use of energy efficient transformers compliant with ECO2015 specifications. In terms of scope, the ambitions of the document are lower than those of UK Power Networks' losses management strategy, and since such measures are also available to other distribution network operators, it would have been better to have included an estimate of the benefits that could be delivered if all British network operators had incorporated similar measures in their losses strategies.

As we comment at the beginning of our response, in assessing the energy efficiency of Britain's energy infrastructure, Regulation 6 directly references connections for energy generating installations and considers access possibilities for micro generators. Notwithstanding the wider energy efficiencies (and carbon savings) resulting from providing economic connections to DG and access to micro-generation, losses improvement measures such as optimised network voltages, balanced network loads and power factor improvement all help to increase network access opportunities for generators. UK Power Networks recognise the benefits of DG and our innovative Flexible Plug and Play project demonstrated how affordable and quick access could be enabled on networks that previously were considered to be at their saturation limits. Connection of DG local to demand can help reduce the upstream distribution and transmission losses associated with supplying that demand, provided that the generation export and local demand profiles are closely matched. With intermittent wind and solar PV generation (the latter of which will not contribute to overnight or winter evening demand) this will not always be the case. Moreover, if local production exceeds demand, then losses will be incurred as a result of reverse power flows through the distribution (and potentially transmission) networks. Notwithstanding possible increases in losses, the gradual displacement of transmission connected fossil fuel generation resulting from affordable and timely connections of low carbon generation to distribution networks can be regarded as a valuable contribution to the energy efficiency potential of Britain's electricity infrastructure.

Finally, we have concerns that the report states potential savings in losses at a level of granularity (in some cases to 6 significant figures) that is not representative of the currently achievable level of accuracy assessment, nor is it representative of the uncertainty inherent in the assessments of benefits being reported. Losses (and the associated benefits assessments) are highly dependent on assumptions about overall demand, loading profiles, DG export profiles, and balancing of load across phases (which will vary in real time however well 'balanced' is the energy delivered by each phase). Reporting broad estimates of potential losses savings to this level of granularity is therefore inappropriate and potentially misleading in terms of the level of confidence it is possible to have, given the many variables that affect network losses. We have made this comment as part of the working group discussions and strongly recommend that Ofgem addresses this in their final report. Acknowledging the uncertainty of the outcome of individual losses reducing measures by

providing an estimate of the range that an efficient level of losses would sit within might allow the industry and Ofgem to jointly develop a more considered view of the range of potential losses reducing measures available.

Question 2: Do you think there is anything else that should be included in the assessment? Can you provide evidence of the benefits it would provide to consumers?

As we comment under Question 1, we believe that, in terms of electrical infrastructure efficiency, the report has taken an unnecessarily narrow perspective, limited to measures for reducing network losses. As a consequence, the report fails to convey the wider aspects of electrical infrastructure energy efficiency covered by Regulation 6 such as load management, interoperability, connection to energy generating installations, and access possibilities for micro energy. These measures have the potential to improve the overall energy efficiency of electrical infrastructure in terms of accommodating low carbon generation and new technologies such as electric vehicle charging and heat pumps – all of which will reduce the carbon footprint of electrical energy.

In that context we would propose that extensive reference be made to potential energy efficiencies that have been explored through numerous IFI, LCNF, NIA and NIC projects. Whilst quantification of benefits might be difficult in some cases, such projects will have provided indicative measures of efficiency, including reduced carbon emissions, whilst providing a platform of smart technologies and commercial innovation that will help Britain reduce primary energy consumption through decarbonisation of generation, and electrification of heat and transport.

In terms of the reported overall scope for losses reduction across distribution networks, the tables in the report indicate annual savings rising (at 2022/2023) to 235.757GWh for distribution. Based on DUKES data, in 2013, transmission losses accounted for 6.4TWh and distribution losses accounted for 19.6TWh (theft or meter fraud accounted for a further 1.0TWh). Overall, losses as a proportion of electricity demand in 2013 fell by 0.5 percentage points from 7.7 per cent in 2012 to 7.2% in 2013. Two points to note from these statistics are:

- Losses fell by 0.5 percentage points in 2013 despite no significant change in overall demand (compared with 2012);
- The potential for annual distribution losses savings identified by the report of 0.24TWh at 2023 represents a 1.23% reduction in distribution losses compared with 2013 levels. Based on the level of distribution losses at 2013, this would represent a saving of around 0.07 percentage points; i.e. one order of magnitude less than the percentage point reduction observed in 2013.

It follows that (even with the benefit of smart meters by 2023) differentiating between actual distribution losses savings (arising from loss reducing measures) of the order outlined in the report and typical annual variations in losses is unlikely to be feasible.

Further understanding of the opportunities and scope for improving the efficiency of electricity infrastructure will require on-going research development and deployment of smart technologies and innovative commercial arrangements with generators and end-users. The continuation of Incentives such as NIA and NIC funding will be important to allow transmission and distribution network operators to fully (and jointly) explore these opportunities.