To:
Nienke Hendriks
Senior Price Control Review Manager
Ofgem
9 Millbank
London
SW1P 3GE
Nienke.Hendriks@ofgem.gov.uk

Response to the DPCR Update document in relation to Cambridge Economics Policy Associates (CEPA) report on benchmarking.

This response is from:
Dr. Victor Podinovski[1]
Susila Munisamy[2]
Prof. Robert Dyson[3]
Dr. Catherine Mitchell[4]

Warwick Business School supports the use of DEA for benchmarking the DNOs and the use of total costs and quality of service measures in the assessment of efficiency that was proposed in the Cambridge Economics Policy Associates (CEPA) report. The use of total costs and quality measures provides a more balanced and comprehensive evaluation of performance.

DEA has become a popular benchmarking methodology and has been proposed or is in use by electricity regulators in other countries. DEA is a very convenient method to analyse performance due to the minimal assumptions underlying it, the ease of handling multiple inputs and outputs, its ability to accommodate small data sets (as in the case of the UK DNOs) and its usefulness in the measurement of productivity. Since the UK has a small number of DNOs (i.e. 14), DEA is the appropriate technique to analyse their performance.

CEPA also argued that regression analysis would also be of use for assessing the validity of the DEA analysis. However, the use of regression analysis is not suitable in small sample sizes as the statistics may become unreliable. This is because, if one or two companies in a small sample size have particular characteristic in common and are also unusually inefficient, the regression analysis will indicate that this characteristic is a cost driver because it is statistically correlated with high costs. As a result, regression that estimates the relationship between cost and cost driver can produce misleading results in small samples. Stochastic Frontier Analysis is still more

[1] Dr. Victor Podinovski, Operational Research and Systems Group, Warwick Business School, University of Warwick, Coventry, CV4 7AL, UK. E-mail: Victor.Podinovski@wbs.ac.uk
[2] Susila Munisamy, Associate Fellow, Centre for Regulation under Management, Warwick Business School, University of Warwick, Coventry, CV4 7AL, UK. Department of Applied Statistics, Faculty of Economics, University Malaya, Kuala Lumpur, 50600, Malaysia. Email: Susila.Munisamy_Doraisamy@wbs.ac.uk
[3] Prof. Robert Dyson, Associate Dean, Warwick Business School. Pro-Vice-Chancellor, University of Warwick, Coventry, CV4 7AL, UK. Email: Robert.Dyson@wbs.ac.uk
[4] Dr. Catherine Mitchell, Centre for Management Under Regulation, Warwick Business School, University of Warwick, Coventry, CV4 7AL, UK. Email: Catherine.Mitchell@wbs.ac.uk

vulnerable to the effect of small sample size (as acknowledged in CEPA's report), since the decomposition of variation in the sample into random (i.e. statistical noise) and efficiency related components requires a large number of data points to be statistically significant.

As set out above, we do support the use of DEA but in general we do not consider CEPA's DEA analysis to be particularly rigorous or sophisticated. WBS/CMUR can extend the work that has been done by CEPA in terms of benchmarking the DNOs using DEA in such a way that we feel the analysis would be more sophisticated and reliable so that we would be able to identify how and where DNOs can improve their efficiency and assess of the scope of future efficiency savings that can be achieved by the DNOs.

In CEPA's DEA analysis the index measure of quality (minutes lost/ customers) incorporated in the model may be problematic as it is not compatible with the volume measure of other inputs and outputs used. Also, this quality measure is negatively valued (undesirable) and thus need to be minimized. We can suggest plausible quality measures and the appropriate treatment of them in the DEA model in order to provide meaningful interpretations of results. As distributed generation is increasing gaining importance, we could also include a measure of the DNOs performance in this area. This is keeping in view that benchmarking would inevitably shape the efforts and directs considerable resources of the DNOs towards the variables included in the model.

Susila Munisamy has also developed extended DEA models[5] that takes into account the technological realities of the production process of the DNOs under evaluation by incorporating the trade-offs that exist in the production process. The conventional DEA models have the freedom to assign weights that are inconsistent with the trade-offs that exists in the production process. This is curtailed through the use of weight restrictions that are based on production trade-offs. Trade-off exists between operating and capital costs, between indicators (e.g. cost and quality) and between functions. When trade-offs occur, the reduction in one factor, can lead to increase to another, hence reducing the overall reduction. This will impact on the efficiency scores. Taking into account production trade-offs between factors will provide a more valid estimate of efficiency. In addition, by taking into account the trade-offs between operating and capital costs we can also attain total costs modelling. In the regulatory context, ignoring trade-offs can lead to unrealistic cost reduction targets set by the regulator and may result in companies being unable to finance themselves. This could have a lasting impact on the structure of the industry and services it provides to the key stakeholders – the customers. Thus, in order to obtain results that are relevant for policy making, it is essential to use models that correctly reflect the technological realities of the production process.

With the availability of panel data, we can also perform a total factor productivity analysis using an extended DEA-based Malmquist index of productivity This extended index not only eliminates the problem of slacks (i.e. the problem of input surplus and output shortfalls) of the conventional Malmquist index but also accounts

[5] The improved models were developed in her PhD thesis entitled 'Benchmarking the Performance of UK Electricity Distribution Network Operators: A study of Quality, Efficiency and Productivity Using Data Envelopment Analysis'

for trade-offs that exist in the production process to provide a more valid or 'real' measure of productivity. This extended Malmquist index can be explicitly decomposed into its root components of efficiency change and technological change.

In conclusion, we have a number of concerns about this consultation. While acceptable, we consider that a more rigorous and sophisticated analysis could be undertaken which would be of more help to Ofgem.