COST BENEFIT ANALSYSIS OF P75: RESPONSE TO CAMPBELL-CARR

A Report for a Consortium of UK Generators

Prepared by NERA

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1. INTRODUCTION

Powergen has sent the TLFMG a note[1] by Campbell Carr (CC) assessing NERA's report on the cost benefit analysis of P75. This report contains our response.[2]

The CC report is divided into three sections: one section discussing why the approach is incorrect in principle; one section discussing NERA's assumptions for particular parameters; and some detailed comments on the NERA report.

We have updated our CBA in the light of responses to the TLFMG consultation and also to take into account some of CC's comments. However, CC often commented on our analysis without providing any alternative estimate, which left us unable to make any change.

Furthermore, the CC report contains some errors and misconceptions. In one important case (see 4.4.2), CC underestimates a cost of P75 by a factor of 10 and therefore reaches an erroneous conclusion.

This response therefore summarises how we have accommodated CC's comments, where appropriate, and where CC has made errors. Overall, we did not find that allowing for CC's comments had a major impact on the cost-benefit analysis.

1 The note is dated 28 September 2002, which we presume is an error. A more likely date is 28 October 2002.

2 This report has been sponsored by AES Drax, AEP, British Energy, Humber Power Ltd, Teesside Power Ltd and Scottish Power.

2. POINTS OF PRINCIPLE

2.1. Role of Cost Benefit Analysis

CC makes the following statement:

- *"**BSC objectives already take account of the efficiencies that the cost benefit analysis seeks to quantify. To rely on these elements in a cost-benefit analysis of the Modifications is therefore not appropriate. The BSC Objectives validly imply cost-benefit analysis in terms of central systems but consumer benefit is otherwise delivered through competition in generation and supply. Implicit in this is that risk resides with such parties who will not pass on gains and losses to consumers except through the route of competition.**"*

In this paragraph, the first sentence contradicts the second sentence. If the BSC objectives take account of efficiencies, it must be "appropriate" to include them in a cost benefit analysis. Moreover, cost benefit analysis is a practical way to assess the competitive impact of any proposed modification.

The interpretation of the BSC objectives in this context was set down at the start of the TLFMG's deliberations as a set of appraisal criteria, including an interpretation of the role of competition. Those appraisal criteria stated that competition is a mode of organisation which should only be used when it fosters greater efficiency. Consequently, cost benefit analysis indicates whether or not a measure is pro-competitive, by checking whether or not it fosters greater efficiency. These points were repeated in the TLFMG's consultation document.

CC offers no other definition of competition, or "greater" competition, except for the following rather vague statement:

- ***In the case of transmission losses, consumer benefits are taken into account in terms of the allocation of costs more accurately to remove cross subsidies. In turn that would give more efficient outcomes as parties develop their approaches to competition.***

The second sentence also uses efficiency as the indication of a successful improvement in the state of competition. However, it seems to ***presume*** that the proposed modification (presumably P75) will encourage more efficiency. The purpose of cost benefit analysis is to test such prejudices.

2.2. Scope of Cost Benefit Analysis

CC also makes the following claim:

- *"**[I]n terms of the BSC, it is efficiency in network operation and BSC administration that are relevant rather than the more general economic efficiency of UK plc on which the NERA analysis is based.**"*

NERA's analysis contains only those elements that were flagged in the appraisal criteria and the consultation document. These elements refer to the impact of P75 on efficiency in network operation (and the associated reduction in transmission losses), to changes in BSC administration, and to the costs imposed on BSC Parties (as a consideration in the pursuit of efficient competition). We have not investigated costs or benefits by any wider definition, and certainly not at the level of "UK plc".

2.3. Dynamics of Cost Benefit Analysis

CC states that cost benefit analysis fails to take into account that:

- *"**The promotion of competition will give rise to innovation that will in turn develop further efficiency.**"*

CC offers no indication as to what these effects might be or how to quantify them, so the statement remains nothing more than an article of faith – meaning that it has no objective basis.[3] The purpose of the BSC Objectives and governance procedures is to ensure that key decisions are driven by some more than unsupported prejudice. Nevertheless, where CC has indicated that additional factors should be borne in mind (such as demand growth), we have tried to do so.

3 Economic theory is not in consensus that more competition leads to more innovation – as Schumpeter pointed out, monopolists may have greater incentives to innovate, as they capture the full benefits of innovation.

3. ASSUMPTIONS

3.1. Discount Rate

CC argues that 10% or higher reflects cost of investment in electricity industry.

The BSC Objectives say nothing about using the discount rate of the electricity industry, but refer only to general concepts of "efficiency", which is a characteristic of society as a whole. The 6% "social discount rate" used by government is intended to capture society's valuation of future benefits. (Incidentally, the effect of using a higher discount rate is to reduce the value of any future net benefits, whilst leaving the initial costs unchanged.)

3.2. Demand Growth

CC argues that NERA has omitted to allow for demand growth.

This observation is correct. In our revised version, we have tried to include the effects of demand growth on related items. However, once one allows for one long-term time trend, it becomes necessary to consider others, such as the long-term growth of efficiency.

We have adjusted our results for NGC's SYS 2002 forecast of growth in "energy requirements", which include transmission and distribution losses, thus our adjustment accounts for any growth in demand and in losses. In practice, demand growth at 1.6% per annum has a very small effect on the results. Allowing for long-term efficiency growth in the electricity sector, which is also 1%-2% per annum, almost exactly offsets this effect.

3.3. Rate of Losses

CC says that losses are currently about 1.5% but that according to NGC's SYS they would be 1.9% by 2008/09.

It is hard to know exactly how to treat NGC's SYS estimates, since they have proven to over-estimate losses in the past. Moreover, NGC's figures apply only to peak conditions and may overstate the effect on total losses over the year. As described above our adjustment for demand growth reflects any change in losses.

3.4. Avoidable Cost of Generation

CC argues that the average efficiency of CCGTs in the UK is 49% and that efficiency degrades over the years; because of this NERA's 50% efficiency assumption is too high.

One must be careful to distinguish between the efficiency of plant that might be closed (which will reflect current average levels) and the efficiency of plant built in the future (which would adopt the most efficient modes of operation). We have tested the impact of using a 49% efficiency to calculate the avoidable cost of generation and found the effect on our overall results to be negligible (due to time constraints we have not changed the 50% figure used in the report).

On a related point, Arthur Malcolm of NGC suggested that our figure for short-run avoidable costs reflects only the cost of CCGT generation and that the inclusion of other plant types might raise the estimate of avoidable costs. We examined the costs of coal-fired generation, but found that its avoidable costs currently lie slightly below those of a CCGT. Our use of CCGT costs is therefore slightly biased in favour of P75.

3.5. New Entrant Price More Appropriate for Valuing Losses

CC argues that using the avoidable cost of generation to value losses "***is only appropriate in terms of net social benefit and is not appropriate to NGC's or generators' efficient price signals***."

Here, CC seems to be confused. The purpose of cost benefit analysis is indeed to estimate the net social benefit (for the limited range of costs and benefits under consideration), so using the avoidable cost of generation is appropriate. We assume that the transmission losses signals facing NGC or generators (or, indeed, consumers) reflect the full market price of power, but cost benefit analysis measures ***effects***, not ***incentives***.

3.6. Cost of Systems

CC argues that data on the costs of systems comes from one source, that software developers suggest that they are high, and that systems for losses may be part other software developments and thus the cost of losses systems would be marginal

Unfortunately, CC does not provide any alternative figure on which we might base our analysis. The only relevant submission to the TLFMG's consultation document came from Teesside Power Ltd and we have updated our estimate accordingly. We combined TPL's figure with the (lower bound) figure from London Electricity to give an average cost per BSC participant. We then multiplied this average cost by the number of independent BSC Parties submitting a response to the TLFMG consultation document.

CC also argues that an ex ante losses scheme would have lower costs than an ex-post one, but neither CC nor anyone else has provided any relevant estimates. We are awaiting consistent cost estimates from Logica for P75 (ex post) and P82 (annual ex ante), so see whether the ratio might provide a useful indicator of potential cost savings.

4. DETAILED COMMENTS

4.1. Despatch costs

CC makes a number of statements about our estimate of the potential reduction in despatch costs which merit comment:

- ***Our estimate of avoidable cost is based on CCGT fuel cost but should be based on coal*** (This would reduce the potential benefits - see discussion at 3.4 above;
- ***losses should be priced at the full price of electricity*** (see discussion at 3.5 above);
- *"**NERA may be on safer ground reducing losses to the rate of average rather than marginal**"* (We presume this means that CC agrees with this aspect of our methodology.)
- ***TLM adjuster only considers generation TLMs, which may be inappropriate, as the NGC's figure of £3m may include demand losses as well.*** (As far as we can tell NGC did not consider demand side gains from re-despatch. We considered demand effects separately.)

4.2. Demand Elasticity by Location

CC argues that demand elasticity in the South is lower than in the North, as the North has a higher proportion of industrial demand then the South. As a result, the impact of the reduction in demand may be overstated.

Unfortunately, CC provides no evidence on the size of the possible disparity, so we could not amend our estimate. We experimented with different figures and found that the effects on the overall appraisal were trivial. We have therefore left the method unchanged, as its main purpose is completeness (ie, to account for the change in load) rather than to add materially to net benefits.

4.3. Generation Relocation

CC argues that figures ignore demand growth and that savings should apply immediately not after 5 years. CC also says that, according to NGC's forecast, 2GW of additional plant are required to meet demand.

We have allowed for demand growth and other long-term trends (see 3.2 above). We cannot, however, see any reason to presume that the full scale of benefits would be immediate. Our assessment assumes that some short-term benefits are immediate and that some longer term benefits take time to arrive. It seems particularly unlikely that the effect on plant construction will be felt immediately, since so little plant is being constructed at present. Moreover, even if 2GW were to be constructed, it is unlikely that the whole volume would be built in the South if P75 goes ahead, but in the North otherwise.

CC also argues that "non-network costs" are not relevant. These costs are relevant to the calculation, since it is impossible to define "efficient operation of the transmission network" without considering new generators are locating efficiently or not, taking into account all associated costs. In fact, we could not estimate such costs, but merely noted that they would reduce the net benefit of plant relocation.

4.4. Windfall Gains

4.4.1. Risk premium

CC argues that NERA's 1% increase in cost of capital is not reasonable as some generators will lose with P75 and others will gain and thus NERA's calculation does "not take into account differences between generators".

In this statement, CC seems to misinterpret the rationale of NERA's risk adjustment. NERA's cost of capital increase is only applied to ***new*** generation. The risk adjustment measures the effect of windfall gains and losses created by P75 on investors' perception of risk, not of only of losses. If investors think they risk a similar reallocation of wealth in the future (linked to any change in the BSC including, but not limited to, a revisions of the losses methodology), they will demand higher returns regardless of where they locate new plant.

4.4.2. Risk mitigation

CC suggests that the risk from imbalances due to the ex-post nature of P75 can be hedged by increasing spill, but commits an error in calculating the effect. CC must have made an error in calculating the size of the effect, as we cannot see why 0.5% spill should raise costs by 0.5p/MWh, when 2% spill raises costs by 20p/MWh. If we understand the methodology, the latter figure is correct, but the former figure should be 5p/MWh.

CC suggests that the lower figure is more reasonable, but does not say why. Even so, 5p/MWh applied every MWh of total annual generation (300 TWh) would entail costs of £16 million ***per annum***, considerably more than the per annum cost of risk included in our assessment.

Incidentally, our estimate of a 1% rise in the cost of capital increase derives from a response to OFGEM's consultation on losses and access in 2001, well before P75 was proposed. The assessment provided at that time by Enron's European traders is not likely to have considered the additional risk resulting from the ex-post nature of P75, and so may understate the increase in the cost of capital.

4.4.3. IT costs associated with risk

CC argues that spillage as a hedging technique will also cap "***the costs of new systems required to forecast losses because historic outturns will be sufficient to estimate losses without expensive new systems with a little bit of extra spill to cover the risk. Therefore, the use of LE's estimate of costs seems excessive***". However, LE mentions changes to "a raft of participant systems". It therefore clear that LE was not only estimating the cost of new systems to forecast losses.