



SP Transmission & Distribution Comments on Bath University paper

Comments are set out below by reference to numbered paragraphs in the paper.

1. Any paper on distribution charging cannot consider use of system charges in isolation. Connection charges are a fundamental component of the whole charging regime, particularly when it comes to decisions of where to site new loads. The failure of Bath University to consider this is a fundamental flaw in their work.
9. This paragraph refers to alternative approaches to the DRM model based on 'economic principles'. It would be helpful if Bath University could set out in detail what it considered these principles to be so that this assertion could be tested.
10. The assumptions used in the paper that customers will site where use of system charges are lowest is probably a necessary simplification. However, it is unlikely to be true in practice. Location decisions are based on a range of factors, of which electricity distribution charges may or may not be significant. Even if distribution charges were the sole reason for these decisions, the Bath University analysis effectively ignores connection charges, which are probably the most significant factor.
11. Again the assumptions in respect of location of generators may be necessary to do the analysis but are unlikely to be true in practice. Wind resource availability and planning consent are likely to be by far the major considerations for locational decisions relating to renewable generation.
14. The approach of using substation and switchgear costs in the modelling of the network is a major improvement on the approach used by NGET.
21. System security is a complex area, but it is recognised that if these simplified approaches to be used to determine forward looking investment costs then such assumptions on system security factors are also required.
23. This section demonstrates the underlying problem with the Bath University analysis as it misrepresents the current approach used by DNOs. DNOs mainly have non-locational DUoS charges because the locational element is included in the connection charge. The whole basis of the Bath University analysis and its conclusions is therefore based on an incorrect interpretation of the



DRM methodology. Locational DUoS charges may be important in influencing how existing users modify their usage but decisions on where to site a new load or generator are far more likely to be influenced by connection charges or wider considerations.

In order to demonstrate the concept, it is a valid approach to only consider the investment costs at system peak, however, any methodology must also accommodate peaks at different times during the day.

26. The numbers in the table in respect of the £/kW supplement are difficult to follow. From the figures given paragraph 15, it would be expected that the supplement to match allowed income would be around 21% (£8.6/£7.1), however these appear to be significantly higher in the table (77%). It would be useful if Bath University could explain how these figures were determined and, if they are not correct, what is the impact on the analysis.

The approach of using a simple £/kW supplement to recover allowed revenues requires further consideration, particularly for the methods proposed by Bath University, where this could represent 80%-90% of the total charge. The current approaches used by DNOs try to fairly attribute all costs to users. This crude cost allocation approach using an arbitrary kW cost driver would result in a major rebalancing of charges with larger users paying more and smaller users paying less.

32. The suggested approach of using different expansion constants for different circuits is an improvement on the NGET method but its practicality need to be assessed.
33. The assumption statement that all GSP should be treated as slack nodes, since there are no distribution network costs for adding load or generation at these locations, is not true. Whilst there may be no direct distribution costs, transmission costs will be charged to DNOs and recovered from users. This impact must be included in the analysis.
40. We agree that methodologies which try to take account of network utilisation are more appropriate for distribution networks and warrant further investigation.
41. The core of the Bath University approach is that the long run incremental cost is represented by the difference between two Present Values following the addition of an incremental load of 1MW to a node. The baseline time to reinforce the network is

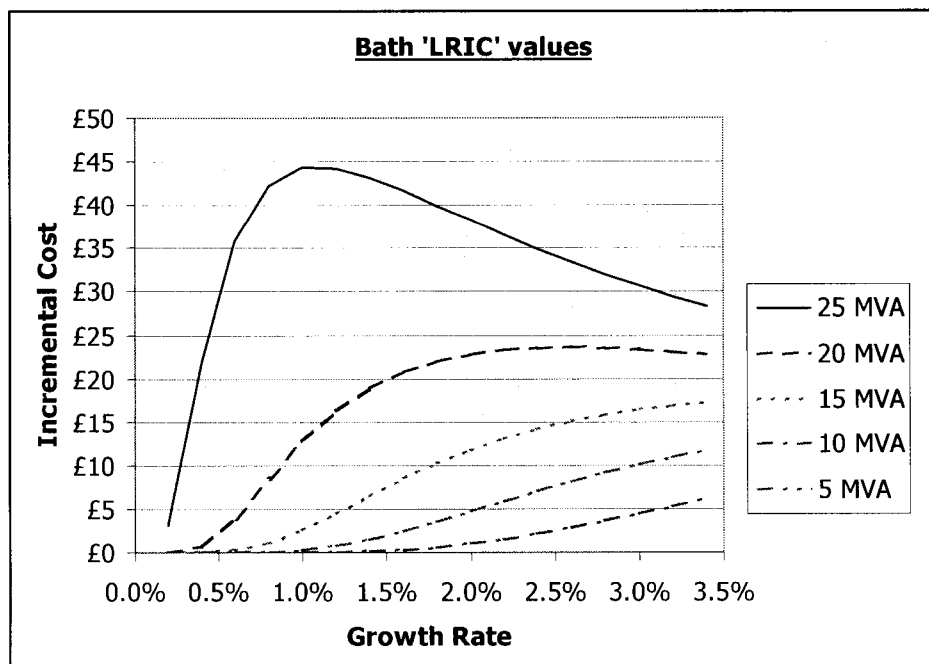


derived from current loading, the network capacity and an assumed load growth rate. We do not believe that this calculation represents anything significant in practice and, in particular, how this represents forward looking costs.

Consider a typical network component, a 132/33kV transformer with a capacity of 60MVA and a cost of £500k. The current demand is 20MVA and the load growth is 1% per annum. If the cost of capital is 6.9% then the Bath University methodology would produce an Incremental Cost of £13/kVA. The calculation is shown below:-

Capacity	60 MVA
Firm Capacity	30 MVA
Demand	20 MVA
Load Growth	1.0% p.a.
Cost	£500 k
Cost of Capital	6.9%
Years to reinforce	40.7 years
Present Value 1	£33 k
Add Increment Demand	1 MVA
Years to reinforce	35.8 years
Present Value 2	£46 k
Incremental Cost	£13 /kVA

If this calculation is repeated for different initial demands and assumptions of load growth then this produces the following results.





This analysis indicates that the Bath University method, despite its complexity, is totally dependent on the assumptions of load growth, which are likely to be guessed. Approaches which are entirely reliant on arbitrary assumptions cannot be considered to be cost-reflective, nor do they meet the charging principles set out by the Implementation Steering Group.

46 This highlights the fact that the favoured approach by Bath University recovers less than 20% of the required DUoS charges with little to no consideration of the methodologies to cover the remaining 80%. This appears to represent a significant flaw and to run counter to the objective of cost reflective charges.

49 To reinforce comments made earlier, this ignores the effects of connection charges.

53 It is a valid assumption that load growth of EXISTING customers will react to price according to their price elasticities.

54 This is the major flaw in the analysis as DRM is always assumed to operate in conjunction with locational connection charges. The analysis must be revisited to reflect this.

55 These assumptions are valid but the comments about other factors also influence where users connect also apply.

60 There is an obvious typographical error in the 'diluted' price elasticities for Commercial. Confirmation is required to clarify that this typographical error has not been carried into the analysis and the conclusions.

The quoted dilution factors also appear to be based on the scaled charges and not the economic charges which represent only 40% of the EHV charges for ICRP and 20 % for LRIC. The quoted diluted price elasticities should be multiplied by 0.4 for ICRP and 0.2 for LRIC. The analysis needs to reflect this.

62. This paragraph identifies the importance of connection charging policy and other matters in respect of decisions of where users connect which have been completely ignored. It also appears to treat elasticity as applying equally to location decisions and to use of the network in situ.

67 Whilst the assumptions made regarding the location of generation are understood and required for modelling purposes, it must still be recognised that they are likely to be invalid.



- 75 The model's prediction that large EHV customers will locate at node 9 solely as a result of low charges due to nearby windfarms appears a little far fetched.
- 84 The assumption that an industrial load will locate into a rural area, merely because of electricity distribution charges is questionable.
85. The assumption in paragraph 63 was that 80% of distributed generation would be from windfarms. However, the modelling predicts that all this generation will be located in an urban area!! This illustrates the point made earlier that a more sophisticated approach to modelling the impact of different charging arrangements needs to be adopted.
- 88 Again, the Bath University model assumes that the windfarms will locate in urban areas which is simplistic and flawed.
- 89 - 103. The section on Network Investment is where the flawed assumptions and simplistic modelling are used to justify the benefits of the LRIC approach. The whole benefit case of the LRIC approach is based on the assumption that windfarms will locate in urban areas. There is no evidence that this is the case. Other errors in the Bath University analysis, such as the price elasticities used and the fact that connection charging has been ignored, mean that the calculations on the impact on network investment are likely to be invalid.
- 104 - 106 The conclusions are based on flawed analysis of the benefits of the proposed approaches. We believe that Bath University should considered revisiting its paper to include the impact of connection charging, the availability of wind resources, planning and other factors affecting locational decisions.