THE ASSOCIATION FOR THE BRITISH ELECTROTECHNICAL INDUSTRY

Smart grid evaluation framework consultation

BEAMA response 16th Dec 2011

The responses represented in this paper are the collated views of members of the BEAMA smart grid Task Force. These views are expressed as one opinion where there is unanimity, but where there are differing views these are highlighted.

Section 2: Smart grid evaluation framework?

Q1: Do you agree with our definition of smart grids?
The definition covers the majority of issues well, but it is suggested that more emphasis could be given to the role of network operators.
Q2: Have we captured the main complexities associated with assessing the costs and benefits of smart grids?
The main complexities covered are virtually all technical – these are very important but there are important other issues that need to be considered: • We are pleased to see at least some mention of possible "deals" with which to engage the consumer (in Annex C from section 5.2.1 onwards). But this topic is so essential that it deserves at least its own section, and throughout the document a more consumer-centric approach could address some of the serious consumer issues prompted by a smart grid. • Although state estimation is listed as a conventional investment strategy, are you confident you have covered enough bases to ensure there will be sufficient measurement points? • Different business models in the future will need to be to developed and facilitated as a result of the development and deployment of Smart Grid techniques. • A number of future uncertainties are not considered, such as the uncertainty of future smart grid technology advances and the need for continuous replacement of older technologies; the uncertainty around the development of new technologies that are not yet known; or the uncertainty surrounding the performance of smart grid technologies that are not yet mature.
Q3: Do you agree with our approach to dealing with these complexities, in the overall evaluation framework, in particular: **(i) We propose to take a two-stage decision tree approach, rather than relying on a conventional cost-benefit analysis framework alone. Does this constitute an appropriate approach, given the need to measure differences in the "option value" that different smart grid investment strategies provide?** **(ii) Do you agree that the year 2023 constitutes an appropriate decision point in our analysis?**
The proposed two-stage approach is felt to be appropriate. However the timing of decisions needs to be more closely linked to the decisions on smart metering, a key

element of a smart grid, and the timing of the first price control after these decisions; currently planned for 2023 –it is suggested that the decision point should be set at 2020.

Section 3: Value drivers and scenarios

Q4: Do the technologies set out in Table 2 constitute a sensible list of value drivers?

The list of value drivers is a comprehensive list, but there are a number of other drivers that need to be added. In addition there is some concern that the use of the term 'value drivers' is unclear and inconsistent in the document, thus reducing the use of the summary table.

- Technology for co-ordinating demand, i.e. Home Energy Management (HEM). This is important because it can a) bring-about absolute reduction in consumption, and also b) make the home more adaptable to supply variation.
- Distributed Intelligence at the distribution transformer and intelligent street lighting.
- Secondary storage for vehicles (hydrogen or methane) should also be included in the smart grid technologies.
- It is also recommend adding an additional column in Table 2 for the prevalence of these technologies up to the decision point. This is important because some technologies that are not considered to be prevalent by the decision point but will develop later on, may not need to be taken into account in the analysis initially or should be considered as lower priority in the smart grid technologies table.

Q5: Do you agree with our assessment of the technical characteristics of each?

The technical characteristics are considered appropriate.

Q6: Are there any other technologies that could have a significant impact on the value of smart grids?

The response to this Question is considered to be similar to Question 4 and we have similar opinions:

- Facilitating technologies (allowing integration of functions) such as communications and smart agents.
- Home Energy Management: an essential part of the smart grid, in particular as smart appliances and other low carbon technologies (photovoltaic solar, Electric vehicles, Heat pumps, and smart appliances) increase in popularity due to national and international policies and consumer choice.
- Distributed Intelligence at the distribution transformer and intelligent street lighting.
- Secondary storage for vehicles (hydrogen or methane) should also be included in the smart grid technologies

Q7: Our analysis suggests that the most important factors to vary across the scenarios will be:

the pace of electrification of heat and transport;

the increase in distributed generation; and

the increase in intermittent and inflexible generation.

Do you agree? Are there any other variables that we should look to vary across the scenarios and why?

The report analyses the features of three factors, but does not present any analysis on why these three factors were chosen. We would expect inclusion of a comparative analysis of the chosen factors with other factors which have not been chosen. In addition to the three areas identified consideration needs to be made on the following:

- The cost of energy for the consumer or end user
- Generation capacity
- Consumer engagement to facilitate co-operation. This is the most important area missing. The lack of customer acceptance, in any aspect of the smart grid will be a considerable barrier. This is particularly important in times of increasing energy prices.
- The co-ordination of all parts of the grid by appropriate communications is key. The roll of communications planned for the roll out of smart metering need to be considered with other possible technologies from around the world.

Section 4: Smart grid and conventional investment strategies

General comment: We would like to offer the following general comment on investment. One of the complexities highlighted early in the report is the disaggregation of costs and benefits. However, in this section the emphasis appears to be directed towards distribution network investment. It should be emphasised that the unit being considered is “GB plc”, not DNO entities, and that investment can be on- and off-network. We would further recommend that as part of its work the Smart Grid Forum specifically considers the relationship of smart grids to energy value chain business models and how cost and benefits can be reconnected.

Q8: Out of the options presented, which set of assumptions should we make on smart meter functionality?

BEAMA members have differing views on this issue, but all agree that the roll, of the smart metering functionalities is very important, as is the timing of the planned roll out in the UK.

Each of the options offered has some support amongst the BEAMA membership. The following points have been emphasised:

- The Consumer Gateway is key as the connection between the grid and the customer. The design of this technology is likely to be decided by the final specifications developed for the smart meter roll out.
- The roll of the internet in the future is considered to be worth more

investigation, in particular as it is likely develop faster than other technologies over the period of time covered by the report.

- The phraseology employed with respect to 'supplier-led' and 'DNO-led' ToU is not helpful, as it implies a presumptive mindset on deployment and engagement of demand response. We would recommend instead use of the phrases 'energy-related' and 'network-related' respectively.

- 15-minute latency would be preferable for the ultimate smart grid functionalities, but half hour latency is probably sufficient – for now – for energy-related demand response but not for network-related demand response.

- In order to have efficient network-related demand response, there is need for more advanced measures than just enhanced communications to reduce the latency.

Q9: Do you agree with our proposed approach of including smart appliances in the business as usual?

BEAMA believes that smart appliances should be included but with some reservations about the penetration by 2023. If there are to be sufficient appliances, in white goods, heating/ventilation equipment and other equipment key decisions on the Home area network(s) for smart metering need to be made as soon as possible. Without this and other incentives to appliance manufacturers, some initial enthusiasm from the sector will not deliver products in the timescales assumed.

The assumption that smart appliances will only receive signals from smart meters is too simplistic. This could well be the most convenient route, but there may be controllers independent of smart meters making demand response decisions, and control may also occur as part of a home automation environment.

Q10: Do our proposed smart grid strategies capture the main deployment options?

The two smart grid strategies proposed provide the most apparent deployment options, which provide a clear investment strategy to the DNOs. However, a third option should be considered, being a more holistic approach within a sub-region of a network, linked to a local government area. This option would provide more localised options which will have a collaborative and coordinated approach with all stakeholders in that area (generators, TSO, DNO, retailers, transport executive, local government, chambers of commerce etc).

Q11: Have we provided an accurate overview of the main services that smart grid technologies can provide? Do you agree with our proposed assumptions on the characteristics of these technologies?

As covered in earlier questions we believe that there is an appropriate focus on the distribution network, but that a more holistic approach including the costs and benefits across the entire value chain and stakeholders, including end consumers and energy management technologies.

Section 5: Value chain analysis

Q13: Are there any other groups in society that we should consider in the value chain analysis?

BEAMA believes that there are a number of other groups that need to be taken into account:

- Customers are at least mentioned as a stakeholder, although as rather an afterthought (they get only a short paragraph at the end).

- Cities/towns as collections of consumers, commercial and industrial energy users and also local authorities.

- Investors and housing and property developers (as a specific but highly relevant customer group). The latter two groups are highly relevant to the successful development of a low carbon society: in respect of investors for the prompt deployment of low carbon generation, and of developers for an appropriate energy-demand.

Q14: Do you agree with our conclusions regarding the distribution of costs and benefits?

Within the structure of the analysis the distributions are appropriate with the exception of the consumer, and their role in supplying finance for all grid infrastructures.

However the complexities in assessing the costs and benefits as discussed in question 2 make it difficult to carry out accurate and significant analysis

Q15: Do you agree with our proposed approach to assessing the costs and benefits for the transmission network?

The approach does not deal with either the role of the consumers or transmission owners to a sufficient extent. Some members believe that the whole analysis needs to be carried out from the customer benefit angle, but this opinion was by no means unanimous.

Section 6: Proposed model specification

There are a number of concerns with the overall modelling methodology, mainly arising from the use of models of networks. The outcome of the CBA is sensitive to the costs of specific smart grid technologies used in the model, and the selected priority stack. This is a highly subjective process and as previously discussed based on future cost uncertainties. While the methodology discussed (for instance incremental decision making) may well be the approach used by a network operator in making an investment decision, it appears to be a micro-economic analysis which has been genericised and multiplied to a national scale.

We believe it would be far more instructive, and less subject to uncertainty and subjectiveness, to take a macro- economic approach. BAU analysis, undertaken using the proposed network modelling methodology, would form the basecase on which to judge value of smartgrids. However, the analysis could then focus on the policy drivers of smartgrids (carbon targets, security of supply, affordability) rather than the deployment of specific technologies. A generic model on cost reduction would be appropriate at this macro level, using the BAU basis as the starting point.

Q16: How suitable is the proposed network modelling methodology which use representative networks, with headroom used to model when network investments should be made on feeders?

See general comments

Q17: Are the voltage levels (from 132kV down to LV) being considered by the model appropriate, or should the model be limited to focus on any particular voltage levels?
Content
Q18: For each of the voltage levels we are considering, are current methods sufficient to recognise available headroom and the cost of releasing additional headroom in these networks? If not, is the proposed approach considered to be too simple or overly complex?
Within the general comments there is considered too much complexity.
Q19: Is our approach to estimating the clustering of low-carbon technologies appropriate? Is any other evidence available in this area?
No comment
Q20: Are the proposed generation model assumptions (a simple stack of generator types, no technical dispatch constraints, half-hourly demand profiles for summer and winter, and representative wind profiles) suitable?
Broadly content
Q21: Should a simple representation of interconnection be included in the model?
Yes
Q22: Does the model represent demand side response appropriately?
Needs to consider the Consumer perspective and consumer engagement much more, and thus probably how Home Energy Management fits into it all.

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