Thursday, 21 May 2015

Dear Nisha,

As the academic lead for the Customer-Led Network Revolution project I am writing to provide my views on Northern Powergrid's application for the Successful Delivery Reward for that project. The academic input to the project covered a number of areas such as trial design, qualitative and quantitative data analysis, simulation and emulation, and support for the transition into business as usual. More generally, the academic input ensured that the appropriate research methodologies were rigorously adhered to so that the results can be trusted and used with an appropriate level of confidence. As a result, the learning delivered by CLNR will inform DNOs, the wider electricity industry, government and consumers about the benefits and challenges of developing a low carbon electricity system.

Question 1: Do you consider that the SDRCs have been delivered to a quality expected from the Full Submission, in a timely and cost effective manner?
Regarding the quality of the learning derived from the customer trials, the project has been able to analyse separately and in an integrated manner a number of datasets which are unique in the UK:

- Half hourly (or more detailed) electricity consumption from over 13,000 customers across the trials: 11,000 domestic and 2,000 SME, industrial & commercial, and distributed generation.
- Detailed monitoring of electricity use across circuits within the home from over 120 customers for at least 6 months and over 80 customers for 12 months
- Analysis of the electricity consumption of approximately 1,200 customers in response to a range of 'flexibility' propositions (time of use, restricted hours, direct control, within premises balancing and large scale responsive load / responsive generation)
- A survey of approx. 1,250 domestic customers and approx. 150 business customers
- Over 250 face to face interviews with more than 130 customers

The quality of the learning from the project needs to be judged with consideration of:

1. The quantitative analysis with calculated statistical validity concerning energy consumption and customer behaviour; this learning came from integrated analysis of survey responses and demand data (n>1000).
2. The modelling to extrapolate and generalise the physical trials conducted;
3. The in-depth analysis of the social dimensions of low carbon technologies and novel interventions;
4. The qualitative analysis of customer engagement and the processes of developing, offering and trialling the technical and commercial solutions.
5. The numbers of trial participants

It is important to appreciate the range and value of learning generated from these test cells such as:

a) that it has provided real-world data that can be used in simulation and in the laboratory to design planned network trials, de-risk planned network trials and then to extend, extrapolate and generalise the network trials in line with the VEEEG methodology that we have developed and shared;

b) that it has increased our overall understanding of how customer's electricity use is shaped in relation to interventions designed to realise flexibility (which we achieved through analysis across and between test cells); and

c) that it has enabled us to examine both the processes through which the roll-out of low carbon technologies is likely to take place in the future and how/why households are and are not changing their use of electricity in response to interventions to realise flexibility.

Due to the effective management of the project, despite market conditions resulting in the take up low carbon technologies being lower than envisaged, we have managed to cover all the key technology types in quite significant numbers and, whilst the numbers of some may not have been particularly large, we were be able to take the results from the customer facing trials and input them into the VEEEG analysis to extend, extrapolate and enhance the results to model their potential impact on the network. The integrated learning we committed to provide has therefore been delivered.

The overall robustness of the learning to enable DNOs to make decisions on which smart grid solutions to roll out or trial further is at least equivalent to that committed in the bid and the quality is evidenced by the number of papers published in peer reviewed academic journals, including some of those with the highest impact factor in their fields.

The relevance of the learning from the project is due in no small part to the socio-technical approach adopted by the project and the success of this approach has resulted in a range of publications (papers, theses, book chapters) in both engineering and social sciences. Furthermore, the project has gone to great lengths to make the learning available to other DNOs in a form that is designed to assist adoption e.g. the strategies set out in the Optimal Solutions for Smarter Network Businesses report, and the extensive DNO toolkit that includes operational guidance, technical recommendations for purchase, training materials, and lessons learned reports.

Question 2: Do you consider that the project has been well-managed and has implemented best available principles, processes and practices for managing changes and risk?
CLNR was a large and complex interdisciplinary project addressing an area which is rapidly changing and one which contains high levels of uncertainty. The core methodology of the project remained unchanged but the project necessarily evolved from the original proposal document. It was essential for CLNR to be flexible in order to best deal with emerging constraints and to exploit opportunities. That CLNR delivered the SDRC in full, to a high level of quality and within the original budget is in itself evidence that the project was well managed.

Throughout, the project team remained true to the project aims and carried out trials with significant numbers of real customers on real networks, deployed and monitored on both rural and urban networks the full range of planned smart grid technologies (enhanced monitoring, real time thermal rating, battery storage, enhanced voltage control) and developed the overarching optimisation / control system that brings it all together. In addition, we have developed new research and

modelling techniques through the development of the Validation – Extension – Extrapolation – Enhancement - Generalisation (VEEEG) methodology that has enhanced the applicability of the results from the CLNR trials, and other LCNF projects, and demonstrated application to most of the GB distribution network.

The project has delivered learning that quantifies the scale and cost of both network flexibility and customer flexibility and provided a decision support tool and a control system that are able to optimise from a range of solutions to provide the most appropriate solutions for deployment to address a range of constraints and, once deployed, operate the solutions in real-time to provide the optimum response based upon real-time network monitoring / modelling. To achieve the outputs, we have had to overcome a number of externalities and vary our approach. The trial methodology remained fundamentally unchanged and, rather than take the easy option of de-scoping the project, we persevered and achieved the full objectives of the project within the original overall budget.

As a member of the Executive Board for the CLNR project I was involved in the decision making process for managing the changes, issues, risks and opportunities that were escalated to the Board and I also had a view of how those not escalated were managed. My experience was that appropriate processes were followed and, critically, decisions were made with a keen awareness of the need to simultaneously balance time, cost, quality and scope in order to maximise the value of the learning that could be delivered.

In summary I believe that the CLNR project was successful in significantly driving forward learning in all of the target areas set out in the bid and that this learning will deliver value for DNO's and their customers over the coming years.

Yours Sincerely,

Phil Taylor