The Institution of **Engineering and Technology**
Michael Faraday House
Six Hills Way, Stevenage
Hertfordshire, SG1 2AY
United Kingdom
T +44 (0) 1438 313311
F +44 (0) 1438 765526
www.theiet.org

Ref: (S)922:HF

Smart Metering Implementation Programme – DCC Licensing Team
Department of Energy & Climate Change,
3 Whitehall Place,
London,
SW1A 2AW

25 November 2011

Dear DCC Team,

Smart Metering Implementation Programme:
Policy Design of the Regulatory and Commercial Framework for DCC

Please find attached the response from the Institution of Engineering and Technology to the Consultation regarding the detailed policy design of the regulatory and commercial framework of the Data and Communications Company (DCC) for smart metering in the UK.

This response has been prepared by the IET" s Energy Policy Panel in collaboration with the IET" s Policy Panels on Communications, IT and Transport.

If we can be of further assistance to the Programme please do not hesitate to contact me.

Smart Metering Implementation Programme:

Design of the Regulatory and Commercial Framework of DCC

Response from the Institution of Engineering and Technology (IET)

INTRODUCTION

This submission focusses on the technical questions relating to the overall purpose and requirements of the Data and Communications Company (DCC) for smart metering in the UK. However non-technical aspects of the detailed policy design of the regulatory and commercial framework are outside the IET" s core expertise and therefore not answered.

Unfortunately, the timing of this consultation does not allow for a fully informed response because we are awaiting:

Publication by DECC of their strategy / scenarios necessary to meet the 4th carbon budget
Publication by the Treasury of the revised National Infrastructure Report in late November
Clarity of issues raised in the DECC/Ofgem Smart Grid Forum Workstream 4 " Closing Doors
"

We would be pleased to revisit this response in due course following publication of these reports should DECC consider this useful.

Key messages from the IET in respect of this consultation are as follows:

Smart Metering is part (and ONLY part) of a complex system. Flexibility needs to be included in the DCC for future expansion as part of the **overall systems approach** that will be required as we progress through the period of contractual agreement (e.g. 5 to 15 years).

The Smart Metering Programme has always struggled in articulating its real objectives and benefits. Cost benefit analysis has been applied only to limited objectives around automation of meter reading, and some level of consumption reduction through consumers changing their behaviour. But the real gain will be when a smart grid is deployed in the future, and without a smart grid much of UK energy policy will not be readily deliverable.

Much effort has been devoted by government and industry to specifying smart meters to be able to play a role in a future smart grid. The current debate is really about how much pre-investment in the WAN should be made to protect future smart grid functionality.

The initial smart metering application of the WAN has limited data flows, much less than would likely be required for a future smart grid. We agree that oversizing the WAN now is not necessary, but that providing a **clear future upgrade path** for both data handling capacity and latency is critical. If this is not done, there is a risk that WAN limitations will prevent the integration of the smart metering system into a smart grid and strand the smart meter assets. This would delay the effective implementation of energy policy and make achievement of UK carbon reduction targets more difficult and more costly.

It is perhaps useful to consider the analogy of the early days of motorway construction in the UK. It is like deciding to build the M1 by starting on the Luton to Milton-Keynes section and sizing it on that traffic flow, before the construction is extended to London or Leeds. Certainly there is a good reason not to put in all the facilities associated with the full capacity motorway at the start, such as large service areas, electronic traffic information, etc., but it would be madness not to design the cuttings or the bridges for the ultimate traffic.

This is basically the problem faced by the smart metering programme. It needs to ensure the future flexibility and capacity to cope with electric vehicles, heat pumps, solar PV, etc but shouldn" t be insisting on everyone having all the bolt-ons from " day one" .

CHAPTER 3: DCC LICENCE CONDITIONS

12. Do you agree that any obligation to facilitate competition in the area of distribution should be considered as part of the implementation of any future smart grids related arrangements?

The question relates to Section 9 of the Electricity Act in which the duties of licensees are to facilitate competition in generation and supply (but not distribution). There is speculation that, in the future, smart grids might provide opportunities to facilitate competition in electricity distribution e.g. DNOs competing with each other to provide services such as demand reduction or voltage support, however this is currently unclear.

Under smart grid arrangements there may also be competitive opportunities in the future for Distribution System Operator (DSO) roles and for Energy Supply Company (ESCO) roles. The latter might bring an integrated approach to delivering best value by integrating the use of electricity and gas, heat storage, electricity storage and EV charging. This might be done on a domestic basis or on a community basis. The thinking on smart grids is not yet sufficiently advanced for a definitive position to be put forward, however there would be wisdom in keeping options open here.

The IET agrees that any specific obligations in this area should be reviewed later when thinking on smart grids is further advanced.

16. What are your views on the Smart Energy Code (SEC) Applicable Objectives set out in the consultation?

a) The efficient discharge by DCC of the obligations imposed upon it by its licence;
Agree

b) The efficient, economic and co-ordinated provision of DCC services;
Agree

c) Promoting effective competition in the supply of gas and electricity;
Agree. This is an objective of the codes already existing.

d) Promoting efficiency in the implementation of the administration of the SEC;
Agree

e) An objective related to having due regard to the environment;
Agree

f) An objective related to promoting or facilitating competition in energy efficiency, metering services and other energy related services;

Agree - if the sense of this question is intended to imply facilitating services such as the following:

Provision of energy efficiency advice informed by customer‟ s metered energy use

Other services to encourage demand side solutions: these might include:

- ESCOs (to provide an energy efficient bundle of home energy insulation, heating and lighting).
- Customer devices in the HAN which provide monitoring and data which may be used to improve energy efficiency

g) An objective related to maintaining data privacy and security, and security of the smart metering system.

Agree.

Privacy is a vital issue: the privacy concerns could scupper the project, as happened in the Netherlands. Yet there is a clear conflict between consumers' expectations of privacy and the need for data necessary to meet regulated duties. This conflict needs to be fully analysed and the necessary compromises need to be debated and agreed, transparently, with the relevant industry and NGO representatives.

Security is even more essential, and again the issues have not yet been characterised and analysed in enough depth.

In view of the present absence of full analysis it might be advisable to put a general requirement for privacy and security in the Smart Energy Code (SEC). This would need to be accompanied by a mechanism that will ensure that adequate analysis is undertaken, in a transparent manner, to determine a satisfactory final outcome.

Additional Obligation

We would suggest also that consideration is given to an obligation on all parties to the SEC to facilitate overall **integration** of the smart energy system. The smart energy system will need to be integrated across a range of commercial and organisational boundaries if it is to function effectively.

18. Should there be a Smart Energy Code (SEC) objective related to promoting (or facilitating) efficiency of energy networks?

Yes. The DCC will make decisions against agreed criteria so inclusion of this provision is a key requirement for the development of an interactive smart distribution network.

In addition it is important that the DCC has an obligation to facilitate Smart Grid trials such as Low Carbon Network Fund projects or any successor scheme to this.

19. Do you think the Smart Energy Code (SEC) should have a separate objective of promoting (or facilitating) energy efficiency?

Yes. Promoting and facilitating energy efficiency and carbon reduction is the overriding purpose of smart metering and smart energy generally, and its importance must not be lost In the technical complexities. In particular, to facilitate the most effective use of data for network management, efficiency and market design, there will need to be flexibility as to:

where data is delivered

in what time interval (e.g. to make most appropriate use of that data may require timely delivery) and

who is most able to make best use of that data.

The IET is conscious that there are a number of aspects to this issue and that, in addition to suitable data being made available; an obligation should be put on the DCC to facilitate a practical and timely outcome. We see the DCC as a key player and believe it should have an obligation to do more than simply „ make the data available" .

CHAPTER 6: CORE SERVICES – WAN REQUIREMENTS

80. Please indicate whether the Minimum Core Service Requirements (i.e. message size, frequency, response time and coverage) for each of the message flows in tables 6.1 and 6.2 can be modified to reduce the potential impact on the WAN cost without compromising the corresponding benefits. Please quantify the additional Programme benefit that could be realised by including each of this message flows in the aggregate Minimum Core Service Requirements.

The questions in this section expose the great dilemma of the DECC Smart Metering Implementation Programme which is: is the UK planning for a very expensive but non-secure **automated meter reading (AMR)** system with some ability to deliver energy efficiency through behavioural change, or are we putting in place the **infrastructure** that will provide the building blocks for future low carbon networks? The objectives of the Smart Metering Programme are to achieve both, but in order to achieve implementation Government will need to devise ways to facilitate anticipatory investment.

Infrastructure investment is being considered by the Treasury and in particular by Infrastructure UK. The IET is cautiously optimistic that the revised National Infrastructure Report will go at least some way towards addressing this issue. Thus the timing of the close of this consultation just before the report" s publication makes it problematic to take this into account and we would be pleased to make a revised submission following its publication.

Overall, the main issue for this question is how to manage the risk that reducing the WAN capabilities to reduce costs leads to a technical solution that is not future proof beyond 2019. We recognise this is a difficult problem as it involves dealing with considerable levels of uncertainty as to the timing and nature of a future smart grid. This challenges conventional cost benefit analysis: there is no evidence base against which to quantify future benefits because nobody has either implemented a smart grid or rolled out a competitive interoperable supplier-led smart meter programme before.

We believe that the proposal for WAN capability needs to consider not simply the stand-alone smart metering project but also a much wider future benefit arising from the delivery of a smart grid of which the smart meter is a key part. This benefit is nothing short of **the ability to deliver currently envisaged energy policy in the future**, for example including active demand participation, electric vehicle charging, V2G, and the very significant challenges of network management, especially grid constraints, given these issues.

The IET is concerned that under-investment at this stage in WAN requirements could lead to a technical solution that is not future proof beyond 2019 and would necessitate costly remedial actions and stranded assets in the medium term as the country steps up to meet low carbon objectives.

The impact of removing functionality from the Smart Meter or DCC will become evident in the loss of ability in the future to maximise flexibility of the grid and loss of demand flexibility to minimise constraints. The policy aim must therefore be to determine a **'least regrets'** approach that will maximise flexibility while deferring some cost to when the functionality can deliver the benefits across the whole system. Key to this will be making sure that the proposed **smart grid** functionality that has already been defined **at meter level** is not diluted by the inability of the DCC to implement it over a period of 5 to 15 years. A clear prioritisation should be

considered and milestones identified that can be triggered by demand in uptake of this flexibility by various different commercial parties (not necessarily those that exist today).

A further issue is uncertainty over how far and fast the Smart Grid implementation will need to go. Research into the energy system as a whole does not point conclusively to mass vehicle electrification and heat pumps being the least cost solution for the UK. If for example the UK energy system were to evolve with greater reliance on hydrogen for energy storage and vehicle fuel, this could change the requirement for smart grids substantially. Hence optionality and robustness to a range of scenarios is key.

Reducing the costs of procurement:

It is always useful to be ambitious at the outset of major projects to maximise the benefits, but where the total cost hits and exceeds the available budgets, the most effective way to reduce costs is to re-visit some of the basic cost drivers and take the hard decisions on whether one or more need to be sacrificed.

The main cost drivers for the WAN (network and meter modules) are:

a) Trying to make one smart meter system deal with electricity and gas (and potentially other utilities). However, we understand that this is already in place at the heart of the programme with details close to being resolved.

b) A real time data requirement usually costs more than a non-real time requirement and broadband data specification will usually cost more than narrow band data specification over wireless networks. Meter reading for **billing purposes** need only involve **narrow band** and **non-real time** data. Provision could be made for this to vary over time as real-time applications become available to maximise the efficiency described above.

c) 100% national coverage will drive solutions towards new bespoke (low frequency) networks and these will cost much more than using the existing GSM networks (already in place and paid for) but may leave a few per cent of homes to be addressed by locally tailored solutions.

d) Including a HAN module will cost much more than the provision of a simple standard socket into which a HAN module can be plugged into in the future and only for a sub-set of high end customers.

Another important discipline in containing cost is to identify any aspect of the solution for which there is any Intellectual Property Rights (IPR). The key is to avoid technology for which the IPR is not available to all on FRAND terms. Fair, reasonable, and non-discriminatory terms (FRAND) are a licensing obligation that is often required by standards-setting organisations for members that participate in the standard-setting process.

Future proofing and anticipatory investment

As indicated above there is a fundamental disconnect in requiring **evidence** to support a scenario that has not yet happened. By definition this cannot be done.

Table 6.2 does not go beyond „ requirements as at 2019" , i.e. at the point in time when the rollout completes. **Subsequent continued growth in EVs and heat pumps (and PV) would need to be reflected in future WAN data volume handling requirements.**

The IET agrees with the approach taken by the Energy Networks Association (ENA), whose consistent message to government has been: don" t necessarily procure more WAN capacity
than you need from day one, but ensure that whatever solution offering(s) are selected allow for **continuous data volume expansion** and **continuous latency enhancement**. This should essentially be an NPV cost comparison approach, but also recognising the value of retaining the

option for cost-effective expansion and/or enhancement despite the fact that future volume and performance requirements are uncertain.

It is important for the DECC Smart Metering team to keep abreast of the DECC 4th carbon budget scenarios (to 2027) for EVs, heat pumps and PV which are not yet publicly available.

The nature of the data flows

We would also point out that the data flows identified are unlikely to be evenly distributed over the 24-hour period. If there is a loss of a major generation asset (or interconnector) during a peak period in winter, one might expect to see simultaneous requests to reduce EV charging, heat pump use and immersion heaters over the whole network.

Note also that there is a requirement to cope in the event of **abnormal conditions**: data flow could range from zero in the case of a communications failure to high network congestion in the event of a widespread communications system malfunction or mass re-start after a system fault. If adequate WAN capacity and resilience is not provided it is likely that system-critical services (e.g. demand control for system balancing) will not be developed for fear of service inadequacy, and the cost-benefits of smart systems in this area of application will be lost. There is a need to establish a WAN and DCC system that engenders **confidence for investment** by commercial service providers.

81. Please quantify the additional benefit, if any, that could be realised by using the 'User Target' rather than the 'Minimum Core Service Requirement' in table 6.1. as basis for the procurement of DCC communication services.

This is a classic case of where the benefits are hard to quantify, not least because DECC have yet to release their strategy / energy scenarios for achieving the 4th carbon budget.

The ENA/SEDG report[1] on value of responsive demand is of relevance here.

82. Please provide views on whether the Service Requirements described in Table 6.3 represent the Minimum Core Service Requirements. Please also indicate whether in your view there are any additional Minimum Core Service Requirements not identified in the above table, and for any such requirement please quantify the additional benefits, if any, that could be realised.

It is problematic to answer this question without understanding the upstream and downstream impact of the proposed solution. There will be shortcomings based on the Minimum Core Requirements of where functionality can reside. For example control of appliances connected via the HAN may require intelligence in the home rather than at the DCC, or a hybrid of the two, based on where data for decision making resides and under whose control. Future implementation may require the Minimum Core Requirement to expand (or contract) and provision should be made to allow this to be reviewed at the appropriate times.

END

[1] Benefits of Advanced Smart Metering for Demand Response Based Control of Distribution Networks Summary Report (ENA/SEDG/Imperial College)