

UK ENERGY WHITE PAPER: MEETING THE CHALLENGE?

By Ed Colby

After lengthy periods of consultation with the myriad interested parties in the UK energy sector, the British government released a long awaited White Paper in May this year, outlining its strategy for dealing with energy supplies in the long term. Amongst a wide ranging and controversial raft of policies, the paper gave new prominence to managing the demand side and proposed a two stream process for introducing consumption data to consumers: standalone 'consumer displays' and the longer term introduction of smart metering.

White papers are strategy documents and therefore details of implementation are thin on the ground, but the market is already responding. So will the White Paper accelerate the introduction of smart metering or has the mandate to provide consumer displays undermined the market potential?

STRATEGIES FOR ENERGY SAVING

In the UK, domestic energy consumption represents an estimated 24 percent of the total annual carbon emissions. The government is hoping that direct information on consumption data will achieve reductions in carbon emissions of 0.4 MtC by the year 2010.

To achieve this, the White Paper proposes "requiring energy suppliers to provide free electricity displays and expecting smart electricity and gas meters to be installed within every home over the next decade, all of which will help give households the information they need to save energy."

This will be achieved by requiring every replacement meter in the UK to come with a real time display, by allowing consumers to directly request a 'real time energy display' from energy retailers, and by strongly supporting the introduction of smart meters within the next decade.

MARKET RESPONSE

The UK industry has given the proposal a mixed reception: certainly the Energy Retail Association (ERA) is not impressed. Their response to the White Paper makes it clear that while the industry supports the introduction of interactive smart meters, they believe: "electricity display devices ... are a gimmick measure as they do not address the real challenge at hand – they only work for electricity (not gas) and they give time-delayed information (rather than real time). There is also a very real concern over the dangers if they are installed

incorrectly and we want to make it clear that the industry will not be liable for this decision."

Prior to the White Paper, work done by the ERA on the minimum requirements for smart meters set basic standards for displays based on existing non-smart meters and minimum requirements for meter interoperability with a consumer display unit. However, in practise the choice of communications technique and additional functionality has been left open. In effect suppliers wish to keep their options open and considering the complexity of the challenge this is not surprising.

Meanwhile, there is no agreement on functionality and communications standards for a simple consumer display unit. The White Paper suggests a minimum level of information – that it must show real time information about electricity consumption – and of accuracy – 95% – but is silent about important details such as the requirements for communications, installation and maintenance, data storage and future proofing. Without any standard, it is hard to see how existing devices could be integrated into future generations of smart meters.

CONSUMER DISPLAY DEVICES – A POSSIBLE STANDARD?

Against this background, we think it's timely to propose a tentative standard for interoperable consumer display units, for debate with meter and display manufacturers, energy suppliers and consumers. A summary of this can be seen in Figure 1. A well thought out standard will help ease the transition to smart metering for those houses that acquire consumer display units, and give a benchmark for the performance of new smart metering products, at least in their consumer facing functions. However, any such standard will need to be lightweight, to avoid it becoming bogged down in debate between vested interests and to allow some degree of competition between suppliers to the market

It is our view that the most important attributes of a consumer display unit (CDU) are the attractive display of reliable, easy to understand information. Consequently, much of the cost in the unit will be concentrated in the display, processor and memory. With adequate memory residing in the CDU, the meter will be required to update small packets of information frequently, which reduces difficulty in coordinating the data at two locations. The ERA SSRM project already suggests an XML data format, which means the size of each data packet being moved will be small, and allows the use of a variety of communications technologies. Data being moved will include the load, the cumulative energy used, the time of use and cost of the energy, if available.

Physical attributes	Open
CDU display	Open
Memory	Sufficient memory to store 12 months of half hourly data
Data interface requirements	XML
Communications	One way communications based on ZigBee or Bluetooth standard
Protocol requirements	Open standard
Installation and maintenance	Consumer installed

Figure 1 – Basic attributes for a consumer display unit standard

Many solutions have been suggested for the communications link between the CDU and the meter, but this tends to confuse the issue and add to the risk of redundancy. The proliferation of solutions seems to have been driven by recognition that no one technology can cover all the possible property types and meter locations. However, if CDUs are to be low cost items, they need a low cost solution of the sort already widely used in consumer products, with no ongoing running costs. The two most widely available short range solutions of this sort would be Bluetooth and ZigBee standards, which have the added advantage of being robust against communications outages. These solutions would, however, place limitations on where the CDU can be located and require consumers to take some care in installing their CDU.

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In suggesting these constraints, it is assumed that individual manufacturers will want to offer a wide range of data presentations, including bar charts, pie charts, graphs, cost information, comparison of usage over various periods and against national averages, and potentially broken down by appliance. Some of this presentation may well require further research to make it possible, and could form the base of proprietary knowledge to give manufacturers market advantage.

THE ARRIVAL OF SMART METERS – SCENARIOS FOR MARKET ENTRY

This standard is required urgently: the White Paper proposals suggest that from 2008 a minimum of 1.6 million consumer display units will be installed each year as old meters are swapped out and meters fitted to newly built houses. Even if a standard for interoperable consumer display devices were to be achieved by the end of 2008, design and manufacturing lead times suggest that there will be a legacy of devices which are incapable of taking data straight from a smart meter.

Some challenging implications emerge from the installation of unstandardised CDUs:

- Costs to energy suppliers of around £72 million per annum for equipment alone. These will presumably be passed back to consumers
- Time and cost of replacing incompatible displays with smart meter displays may slow implementation of smart metering
- A legacy of displays without important elements of functionality, for example no link to pricing information
- The market for displays to be sold as complementary to smart meters is being reduced, since consumers may not wish to replace fairly new display units unless energy suppliers bear the cost.



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ABOUT THE COMPANY: Sentec is a leading research organisation specialising in the utilities industry. Its physics and engineering skills are used in many industry sectors and over the last five years, the company has developed an outstanding track record in creating and developing the new technologies that underpin modern utility metering.

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Even without the potential problem of legacy CDUs there are many challenges associated with the government's stated aim of full smart metering within the next ten years. The estimated costs of 'smarting' electricity meters are significant: between £40 - £75 per meter capital costs plus £25 - £30 installation costs. Adding consumer displays would raise the price by another £20 - £30. A variety of new technologies will assist in bringing these costs down in the longer term, but only if sufficient market volumes exist.

Without additional intervention in the market, the natural tendency will be for suppliers to segment their customers and to introduce meters where they will appear most profitable, rather than wholesale introduction.

A recent major study from Gill Owen and Judith Ward at Warwick Business School ('Smart meters in Great Britain: the next steps?') makes the situation clear:

"A major question remains as to whether the government's energy white paper expectation for smart meters for all domestic customers within ten years can be achieved without additional interventions in the meter market ... Uncertainty about what, if anything, the government may or may not mandate, is presently inhibiting even modest smart meter investment."

They raise three policy options to allow the government to achieve their smart metering goals:

1. A supplier led approach – the government would provide a mandated timescale and framework, and allow suppliers to make their own arrangements to meet these standards
2. Systematic roll out of meter and communications network – the government would provide a mandated timescale and framework and regulate franchises to provide smart meters in each region
3. Systematic roll out of communications network only – the government would provide a mandated timescale and framework and regulate a franchise to provide the communications option only, while allowing suppliers to make their own arrangements for procurement and installation of smart meters.

While the authors do not favour any one approach, it is clearly their judgement that intervention of some sort will be necessary to give the market the impetus it needs to achieve the challenging goals of the White Paper.

The Energy White Paper marks a high tide in the interest in smart metering in the UK, as energy retailers start to recognise the potential business benefits and government champions their use for demand side reduction. The goal of full smart metering in ten years demands further government intervention in the market, although it remains to be seen if the government has undermined its goal by promoting the early introduction of consumer display units. In any event, as the industry struggles to remove barriers to the introduction of smart meters and standardise its requirements, the next six months should prove to be key to the future of smart metering in the UK. Watch this space. **MI**