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**RESPONSE TO
A CONSULTATION ON
SMART METERING FOR
ELECTRICITY AND GAS**

AUGUST 2009

Consulting • Technology • Outsourcing



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1. EXECUTIVE SUMMARY

This consultation submission by Accenture UK Ltd is in response to the invitation of Department of Energy and Climate Change's Consultation on Smart Metering for Electricity and Gas. Accenture is grateful for this opportunity to present our response to DECC's Consultation paper and we would be happy to answer any further questions arising from this document.

Accenture agrees that the Central Communications model (CCM) is the best solution for providing a new market function to manage the infrastructure and data carriage around Smart Metering.

This summary highlights how we believe the *business benefits* of the chosen roll-out, rather than the choice of technology, should drive the deployment rationale, as adopting Smart Metering is a great opportunity to reduce costs and improve customer value across all the utility players.

The CCM model will bring the following benefits to UK Plc:

1. **Simplify and broaden the market** – Smart Metering offers the UK the opportunity to transform the Utilities market, removing unnecessary complexity, facilitating low-carbon product offerings, reducing costs and driving through business benefits for all parts of the value chain;
2. **Stepping stone to a Smarter Grid** – Smart Metering provides the first step towards the Smart Grid, by providing an intelligence to the Grid that allows distributors and suppliers to observe and control the nation's power networks to a greater extent, consumers to install microgeneration in their home and the network to support more widespread use of renewable energy sources;
3. **Customer experience** – Smart Metering could be used as a tool to transform the nation's energy habits, enabling consumers to use energy more cost-effectively, enjoy easier supplier switching, reduce bills and carbon emissions, and receive an improved service from their energy provider.

2. ACCENTURE'S POINT OF VIEW

The UK market is encumbered by an overly complicated market structure, which will be further stressed by the mandated roll out of Smart Meters required to enable the reduction of domestic carbon emissions by 2020, and to facilitate support for renewable through a smarter grid. Figure 1 illustrates the complexity of the current electricity market, using a customer transfer process as an example – 25 flows between 7 industry players:

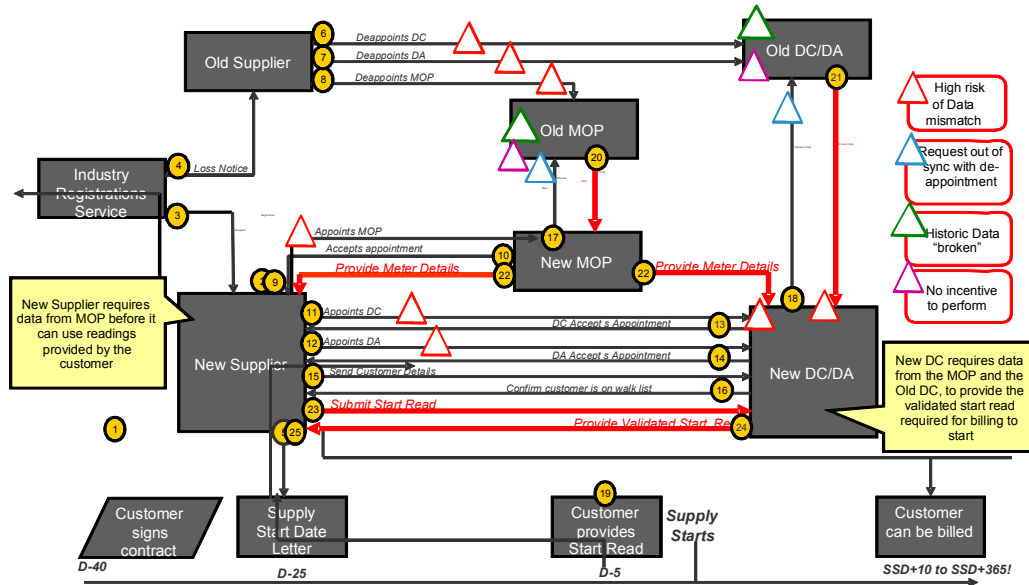


Figure 1

Furthermore, the UK has a separate market model for electricity and for gas, creating dual processes, rules and entities (see figure 2 below). The introduction of Smart Meters into this landscape further complicates the process and raises questions regarding the relevance of the current communication flows and value chains.

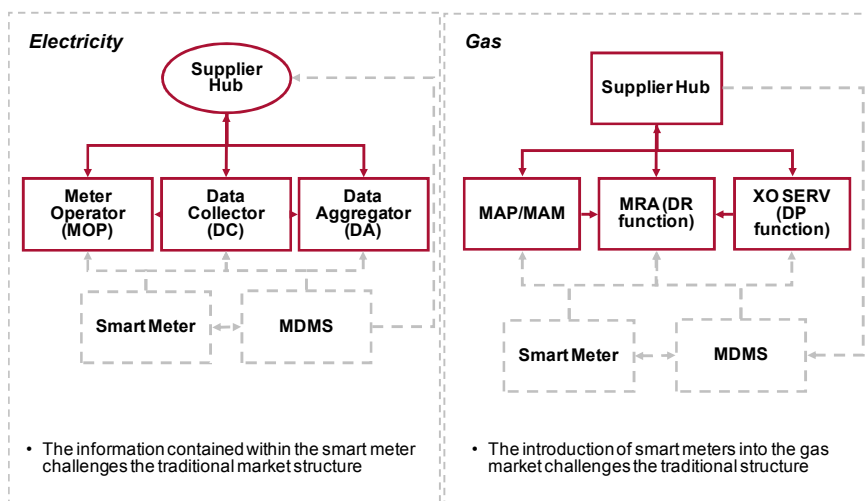


Figure 2

In order to deliver the maximum benefits that Smart Meters can offer, the UK must now resolve the questions around their impact on an already complex market. Simplification of the market structure and processes will ensure a market is created to meet the demands for energy efficiency as well as the requirements of energy retail competition.

Accenture believes that Smart Metering, and the CCM, will enable the market to be redesigned to drive through carbon savings and market efficiency. Accenture's view of this potential market around Smart Meters and Grids is demonstrated in figure 3. The vertical axis marks an upwards progression towards a low-carbon economy, where business, supported by technology, is increasingly reducing carbon output and therefore meeting Government environmental targets. The horizontal axis measures the complexity of the utility market, in terms of processes and interactions (for example between gas and electricity markets), where moving towards the right is a simplified, more efficient market operation. The five scenarios are detailed below.

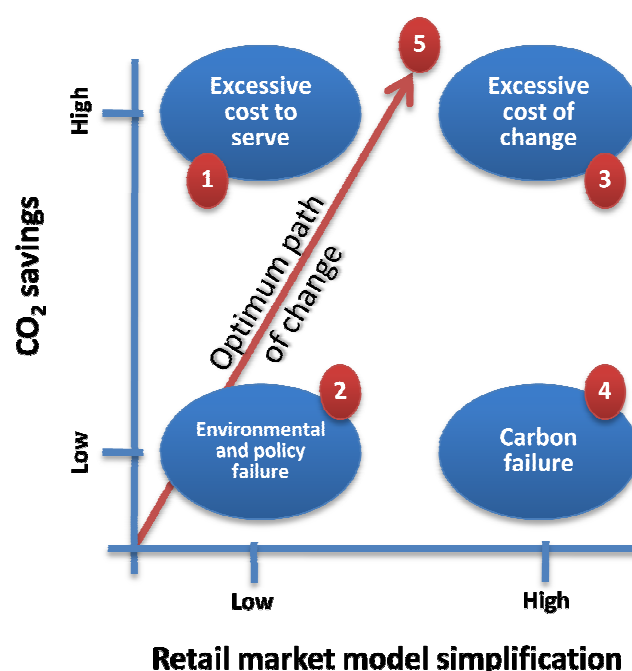


Figure 3

1. **Excessive cost to serve:** low market simplification but high spending on decarbonising the economy will lead to an excessive cost to serve, effectively locking the market down to the few highly specialized players who understand the complexities. While potentially meeting Government environmental targets it will result in an eventual stalemate as market complexities prevent further growth.
2. **Environmental and policy failure:** should the market fail to simplify it will also fail to decarbonise and UK Plc will not meet its environmental targets. Indeed, the failure to modernise the Utilities market will hamper the support capable of being delivered to Smart technologies in the future, including Smart Grids.
3. **Excessive cost of change:** in this scenario, the market simplifies *and* develops the technology and policy to meet carbon targets, but at the price of being unnecessarily expensive and overtly streamlined or advanced for present-day requirements. While such simplification may ultimately be required, this should come about through a phased development – too rapid a push will bring confusion, reduce the speed of any Smart Meter roll out and complicate processes that are not yet defined.

4. **Carbon failure:** driving through efficiency and simplification in the Utilities markets will streamline processes and interactions. However, without introducing carbon-lowering measures, one of the great benefits of Smart technologies will be missed, and the country may not meet its climate change targets.
5. **Optimum path of change:** Accenture believes that the optimum path of change will be a measured dual process of market process simplification and technology ramp-up. Key points to guide this process are:
 - Strong business case behind each functionality to ensure costs remain in check and benefits are rigorously tracked – important to understand the ‘why’ and value of each change being implemented
 - Transparent governance model identifying roles and responsibilities of each player
 - Clear understanding of processes

Accenture believes that the CCM is integral to the realization of the benefits identified from Smart Metering.

Central Communications Model

Accenture believes the CCM supports the simplification of the market and the ability to drive reduction in carbon emissions. Key requirements are:

A central data store

- Avoid dependencies between market participants for transfer of data
- Inclusion of sufficient data to enable a smooth operating of the market, including the central registration of both gas and electricity meters
- Sufficient read history to support rigorous settlement and understanding of customer usage

Process simplification

- All processes to be dual-fuel
- Increased use of real-time processes in line with data availability and benefit delivery
- Increased accuracy of data to drive improved customer service

Interoperability

- The ability for any supplier to serve any customer and communicate with their meter, regardless of whether they installed that meter or not

How the characteristics of the CCM will be implemented is still in question as industry players share competing visions – while some opt for rich functionality, others opt for limited functionality. Given the vast range of industry players and differing opinions, it is likely that agreement may only be reached on limited functionality. This could prove damaging to the successful roll-out of Smart Meters and the realization of benefits, as it could lead to scenario 2 described on the previous page. It is therefore imperative that stakeholders align and agree a rich functionality underlying the communications model, and Accenture believes the Government should play a key role in coordinating this.

Based on the UK market requirements, Accenture believes the following functionalities are needed:

Market requirement	Central communications functionality
Central data store	<ul style="list-style-type: none"> Central data store for key industry data items, such as customer address, tariff settings, meter types and final readings to enable synchronisation by suppliers' back office metering systems and to allow the smooth operation of industry processes Secure communications channel providing guaranteed connectivity to all meters (against an SLA), and an obligation to inform suppliers of any ongoing meter communications failures
Process simplification	<ul style="list-style-type: none"> Manage a centralised Meter Point Administration service Support dual-fuel industry messages Manage a refined set of industry processes such that no market participant is dependent on another for information Provide an agreed read upon Change of Supply or Change of Tenancy
Interoperability	<ul style="list-style-type: none"> Manage all meter firmware updates and communications protocols Translate market participants requests to meter-specific message formats and manage meter communications Manage access control permissions for all market participants

Smart Meter functionality – Building in Smart Grid Readiness

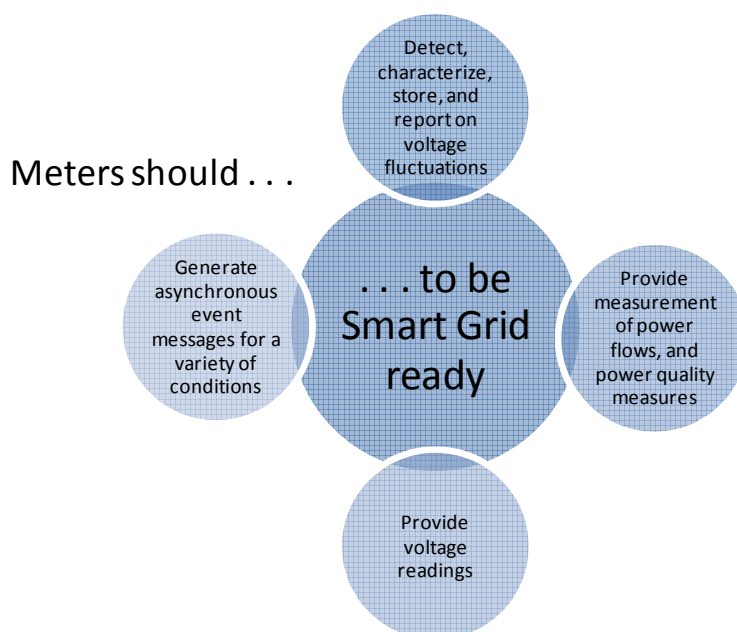
When considering the specification of a Smart Metering solution, particularly around the communications network and the meter specification, it is imperative that thought is also given to the future deployment of a Smart Grid, and how the decisions made around Smart Metering could affect or limit future Smart Grid developments.

Accenture believes there are two approaches to deploying a Smart-Grid-ready infrastructure:

1. **Infrastructure supports Smart Metering and Smart Grids** – the central communications infrastructure is built to support both Smart Meters and Smart Grid and required components, especially in terms of bandwidth, latency, and burst response; the requirements of Smart Grids being higher than those for meters in infrastructure terms. In this case, Smart Meters effectively become sensors for the Smart Grid
2. **Two separate infrastructures** – one infrastructure supports Smart Meters, and at a later stage, another, higher specification network is built to support Smart Grids and the transformers, phasors and other units that form the infrastructure of the Grid

The considerations around Smart Meters and the Smart Grid involve thinking about the Meters as sensing devices. The specification of the Meters in terms of Smart Grid capabilities depends on the requirements of the Smart Grid itself, and, as a result, the requirements to support various kinds of sensing, analytics, control functions and data transfers.

In other countries, pursuing option 2 has proved costly and challenging. In the Netherlands, roll out was stalled partly because the Smart Meters had a limited ability to register microgeneration. Accenture recommends that Smart Meter functionality and specification support Smart Grid considerations from the outset. Therefore:



The inclusion of 'rich' functionality in the CCM will mean that the infrastructure deployed now will cater to the needs of the future. Again, however, Accenture would urge the Government to tie up thinking between the objectives sought through Smart Meters and Smart Grids, and identify the potential business benefits that may be achievable through implementing both Smart developments, whichever technology framework is adopted.

Benefits to Customer Experience

The broad benefits to customers around Smart Metering have been often cited, and are well understood. However, Accenture believes that the specific benefits around a Central Communications model – and particularly the central store of data – are worth highlighting. With a central store of customer data, such as that offered by CCM, a scenario where there is a loss of data during a change of supplier or a meter fault, for example, will not result in estimated reads and a disputed bill – a process that could continue for months and lead to much customer ill will. Instead, the last centrally held meter read held in the CCM can be recalled, and a more appropriate service provided to the consumer.

In short, Accenture believes the CCM will provide a core central platform to improve the customer experience – a smoother supplier change, stored and accessible usage data to ensure accurate billing, and a level of interoperability that will provide a customer with a seamless relationship with their Utility, and improved customer service levels.

3. QUESTIONS FROM SECTION 2: PROPOSALS FOR THE DOMESTIC SECTOR: DELIVERY MODEL

Q1. Do you have any comments on the Government's preference for the Central Communications model?

We agree with the Government's preference for the Central Communications model, and our thoughts on the Central Communications model are offered in Section 2: Overview. It is our belief that the Central Communications model should fulfill the market requirements of central data store, process simplification and interoperability.

Q2. Do you have any comments on the analysis and conclusions on the delivery model contained in this consultation document, the reports prepared by Baringa Partners, or the Consultation Impact Assessment?

Following BERR's work, Accenture conducted our own re-evaluation for the Impact Assessment as a Point of View. The salient points of this piece of work were:

- Re-assessment of the risk and optimism bias factors and the meter replacement rate delivers a positive AMI business case of £888 million
- Additional savings could arise from a more substantial review of the costs associated with communicating with meters
- By selecting AMI as the UK utility technology option of the future, the United Kingdom would secure a place on the international utility stage and in the fight against climate change.

Aside from the above, at this stage in the Consultation process Accenture is in agreement with the analysis and conclusions of the delivery model, reports and impact assessment, except stated otherwise in these questions.

Q3. Do you agree that the Central Communications model effectively facilitates 'end to end' management of the electricity networks system needed for Smart Grids?

The CCM can potentially facilitate the end-to-end management of the network in order to make Smart Grid possible. Accenture agrees that it is a beneficial step forward in enabling the distribution companies to have access to meter data, depending on the speed of the central communications method selected. Whether it facilitates 'end to end' management of the networks system for Grids depends on the specification of the Grid chosen (especially in terms of communications speed), and this will not be established for some time yet. Furthermore, it should be remembered that 'end to end' management of the networks goes beyond the CCM and its design, and involves potential process redesign and more fundamental changes to the networks industry structure and governance.

Q4. Do you consider that Government should adopt measures to promote co-ordination of roll-out at local level? If so, what measures would you support?

Around the deployment of meters, a street-by-street roll-out by a single organization has been shown, in other geographies, to be the most efficient and effective roll-out strategy to install the meters. However, if the Government pursues a competitive model for meter installation in line with existing market rules then Accenture does not believe that it is feasible to coordinate individual suppliers, as this will add complexity and delay to the process. We therefore believe that it is best to allow suppliers to manage their own Smart Meter roll out plans to meet the Government's target.

However, we believe that it is appropriate for the Government to coordinate local awareness campaigns. Before, during and after the deployment, this campaign could concentrate residents' attention on the benefits of Smart Metering, increasing receptiveness to the change and smoothing the installation process. Doing such a campaign through a single organization in a reasonably small geographic region will provoke a concentrated 'feedback loop', ensuring the exponential awareness of Smart Metering, and, post-deployment, knowledge about the 'use' of Smart Meters, and the technology therefore quickly becomes 'business as usual'.

Q5. Should any particular policy considerations be taken into account in considering whether there should be priority target groups for early deployment of smart meters?

There are a number of factors that could be taken into account when determining priority target groups for installation, prior to the full deployment.

A socially sensitive priority roll-out could be aimed at the fuel poor. A prioritized roll-out to fuel-poor customers could be delivered hand-in-hand with individualized energy-saving advice and tariff recommendations, at the time of installation, encouraging customer engagement, increased knowledge of energy usage and thereby driving through the energy-saving potential of Smart Meters further.

On a similar note, debt-prone customers could be among the first to receive Smart Meters. With Smart Meters, debt-prone customers would receive more feedback around their energy usage, allowing them to better manage their consumption and thereby reduce their debt.

The Government has made moves towards a major initiative to introduce microgeneration, and therefore the roll-out could focus on these customers too. By focusing on these customers, suppliers could reasonably rapidly establish experience, prior to the full deployment, of the effect of microgeneration on the grid, Smart Meter capability required for microgeneration, and potentially develop new tariffs in order to make it attractive to customers. Focusing on microgeneration as a priority group could accelerate developments towards a low-carbon economy, and may encourage quicker technical maturity of those specific solutions.

Q6. Do you have any comments on the merits of alternative approaches under which electricity and gas network businesses take on responsibility for aspects of smart metering?

Smart Metering is a disruptive technology affecting every part of the utilities chain, from generation to retail. At this stage in its technology development it therefore attracts a high-risk premium, and potentially large costs, if mistakes are made in strategy, technology choice or deployment. At Pacific Gas and Electric, recently installed AMR meters have since required a half-a-billion-dollar upgrade to enable compatibility with in-home display functionality and a load-limiting connect/disconnect switch.

Accenture would therefore support putting the financing of Smart Metering into a regulatory asset base, which should decrease the cost of finance. In addition, expanding the responsibilities around Smart Metering into the Distribution businesses makes sense from a technical and strategic point of view. For a Distribution business, a Smart Meter is a sensor; placing it within the control of these businesses thereby cements the Smart Meter within the Smart Grid and enables it to become part of the Smart Grid strategy.

4. QUESTIONS FROM SECTION 3: PROPOSALS FOR THE DOMESTIC SECTOR: FUNCTIONALITY

Q7. Do you agree with the functionality proposed for electricity meters? Please explain your reasons and if possible give evidence for your comments.

We would agree with the functionality proposed for Smart electricity meters, namely accurate remote reads, two way-communication, an open-standards HAN, multiple registers, load management capability, remote disablement and enablement of supply, exported electricity management, and the capacity to communicate with a measurement device within a microgenerator. The ERA has spent considerable time investigating the meter functionality, and these are broadly in line with what Accenture sees in other markets.

When the time comes to consider a more detailed level of functionality there may be one or two additions with respect to Smart Grid functionality, such as meter alerts.

Q8. Are there any additional requirements that will be needed to facilitate smarter network management, efficient energy management and the development of 'Smart Grids'? Please provide analysis, particularly on costs and benefits, where possible.

Accenture believes that Smart Meters should have a number of functions to enable them to support network and Smart Grid management. These include:

- Ability to generate asynchronous event messages for a variety of conditions, including loss of voltage, voltage restoration, tamper detect, loss of function (meter failure); this implies a last-gasp capability, which in turn implies some internal power source capability, such as an internal battery or super capacitor
- Ability to provide voltage readings
- Ability to provide measurement of real and reactive power flows, and power quality measures, including THD and harmonic content in both voltage and current
- Ability to detect, characterize, store, and report on voltage fluctuations, especially voltage sags – characteristics include time of sag, severity of sag and duration of sag

As discussed in Section 2: Accenture's Point of View, Accenture believes that it is critical to think of Smart Meters in the context of Smart Grids – namely, as the sensors. The functionalities above, if mandated as part of a Smart Meter specification, would go some way to assuring UK Plc's Smart Grid future.

Q9. Do you agree with the functionality proposed for gas meters? Please explain your reasons and if possible give evidence for your comments.

We agree with the functionality proposed for Smart gas meters, namely accurate remote reads, two-way communication, an open-standards HAN, multiple registers. Accenture believes this will provide a common level of service to customers to that provided by Smart electricity meters, and reduces complexity for meter and HAN manufacturers. However, an additional functionality that could be considered is a low-battery alarm – it would be beneficial to avoid a gas Smart Meter losing power altogether for a period of time, with the subsequent loss of read, configuration and event data (say, when a householder goes on holiday), if a warning alarm could inform them of this likelihood beforehand.

Q10. Is there significant scope for retrofitting non-valve functionality to gas meters? What are the costs and how many meters are capable of being retrofitted?

No comment.

Q11. Are there any additional maintenance, administrative or management costs associated with having all gas smart meters with a valve?

No comment.

Q12. Do you agree with the Government's position that a standalone display should be provided with a smart meter?

It is Accenture's belief that the *availability* of a display should be mandated. However, we believe that the exact *form* of that display should not be mandated and should be given to consumer choice. The display is crucial to educating the customer about energy usage, and it is therefore important that the display is appealing to use by the customer.

Suppliers could decide to offer a choice of displays with their Smart Meter installation. This introduces an element of free-market competition into the production of displays, encouraging innovation, and potentially additional carbon-saving products to be brought to market. It also ensures that customers can choose a device suitable for them; for example, a high-visibility display for a customer with impaired vision, or a display with more detailed two-way usage tracking for customers with microgeneration capabilities.

However, in order for this to work, all displays offered must meet an open standard, ensuring that meters are display-agnostic, and that there will be no problems at install. Therefore, Accenture recommend that the Government mandate an open standard for the display device. Furthermore, from an asset point of view, the display's asset details should not be held by the industry, as meter details are. We believe that the display is a consumer product and therefore not be part of the central data repository.

Q13. Do you have any comments on what sort of data should be provided to consumers as a minimum to help them best act to save energy (e.g. information on energy use, money, CO2 etc)?

A study in Canada of a major utility's program to push through demand-side management introduced time-sensitive pricing structures, and the utility notified their customers accordingly. Load shifting during critical peak times ranged from 5.7% for participants working with time-of-use tariffs to 25.4% for time-of-use tariffs with a critical price peak. From the results of this and other studies Accenture would strongly advocate for Smart Meter customers to be provided with a wider spread of time-of-use tariffs and data associated with each time period.

Welcome packs, featuring educational information on what activities are likely to use the most energy, are certainly another way of education consumers. Monthly statements, rather than quarterly bills, are a natural consequence of Smart Metering and also go some way to informing customers, especially combined with clear information about pricing plans. In addition, easy-to-access information about the plan, on a highly visible medium such as through a fridge magnet, allows customers to readily understand when and how they should use energy.

Increased data for customers, in a tailored and measured manner, will result in greater information and knowledge for customers, and knowledge will invariably alter behavior. To some extent suppliers are

responsible for providing the customer with the information that they need to change their energy behaviour – indeed, most suppliers do this currently.

Q14. Do you have comments regarding the accessibility of meters/display units for particular consumers (e.g. vulnerable consumers such as the disabled, partially sighted/blind)?

No comment.

5. QUESTIONS FROM SECTION 4: PROPOSALS FOR THE NON-DOMESTIC SECTOR

Q15. Do you agree with the Government's proposal to extend to the small and medium non-domestic sector the minimum functionality that we will require for smart meters in the domestic sector, with certain exceptions to allow for individual consumer requirements?

Accenture agrees that the minimum functionality for the domestic market should also be applied for metering at SMEs. Reducing the number of exceptions reduces the cost-to-serve and therefore such parity should be encouraged where possible.

Q16. Do you have any comments on how such a requirement, and the exceptions to it, should be framed?

A possible exception might exist around the display unit. Consumption usage through a small display may not be suitable or appropriate for an SME. Instead, thought should be given as to how that data is visualized, rather than displayed – for example, a web portal may provide a more suitable medium for an SME's energy usage. This may also be the case if the business or site has submeters, for example, and where a display may not have the facility to display the usage levels of more than one meter (depending on the mandated specifications, perhaps).

Q17. Do you have any comments on how the proposed new requirements should work in the context of the current developments in metering in this sector?

No comment.

Q18. Do you have any comments on the implications of the Government's proposed approach in this sector for the future development of Smart Grids?

Accenture believes that the Government's approach to the CCM for SMEs and Smart Grids is broadly correct. However, one aspect especially pertinent to this question is the impact of renewables from SMEs. Renewable energy generated by SMEs is likely to be in larger quantities than from domestic sites, and therefore the impact of large exports to the Grid from the SME sector must be taken into account. Again, the impact of this will become clearer further down the line as Smart Grid functionality and requirements are identified and deployed.

Q19. Do you have any comments on the revised Consultation Impact for this sector?

Following BERR's work, Accenture conducted our own re-evaluation for the Impact Assessment as a Point of View. The salient points of this piece of work were:

- Re-assessment of the risk and optimism bias factors and the meter replacement rate delivers a positive AMI business case of £888 million
- Additional savings could arise from a more substantial review of the costs associated with communicating with meters
- By selecting AMI as the UK utility technology option of the future, the United Kingdom would secure a place on the international utility stage and in the fight against climate change.

Aside from the above, at this stage in the Consultation process Accenture is satisfied with the analysis and conclusions of the delivery model, reports and impact assessment, except stated otherwise in these questions.

Q20. Do you have any comments on the implications for the non-domestic sector of the options identified for a domestic delivery model?

No comment.

Q21. Do you agree with the Government's approach to promoting interoperability in the non-domestic market? Do you have particular views about the interaction between the Government's proposals for the non-domestic sector and the domestic smart meter roll-out?

Accenture believes that the domestic and non-domestic market roll out should be identical, where possible.

For large SME sites, however, DECC should be cognizant of the potential for submetering, and how energy monitoring will work in this situation. Potentially this has consequences for the communications infrastructure – building in enough bandwidth for multiple sites over a relatively small area to transmit read and event data simultaneously.

6. QUESTIONS FROM SECTION 5: OTHER ISSUES AND NEXT STEPS

Q22. Has the Government identified the right issues for the immediate next steps? Are there other activities or key issues which you think should be addressed at this stage of the preparations for roll out?

Accenture believes that the main consideration at this stage is timescales. With the looming generation gap in 2013 and the growing importance of demand-side management, the early installation of even a small number of Smart Meters could go some way to alleviate the first, and encourage the second. There is still great confusion among all sectors of the market around the shape of the market and roles and responsibilities of existing and new entities. Accenture would request the Government expedite the ramp-up of the proposed industry transformation programme.

Q23. Do you have any other comments or evidence on issues relating to this consultation document or the accompanying Consultation Impact Assessments?

One voice still appears to be lacking in the debate and that is the consumer. The Smart Metering roll out is a huge opportunity to educate and transform consumer behaviour – indeed, its success is dependent on their willing participation. Accordingly more thought should be given to the potential involvement and benefits for customers, not just through the physical deployment strategy. DECC should ensure that all parties involved in every stage of the decision-making around Smart Metering do not lose sight of the customer benefits that may be achievable through each decision.