

Smart Metering Implementation Programme Prospectus

Department of Energy and Climate Change and
Ofgem, July 2010

IBM Response to Prospectus Questions

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Contact Information

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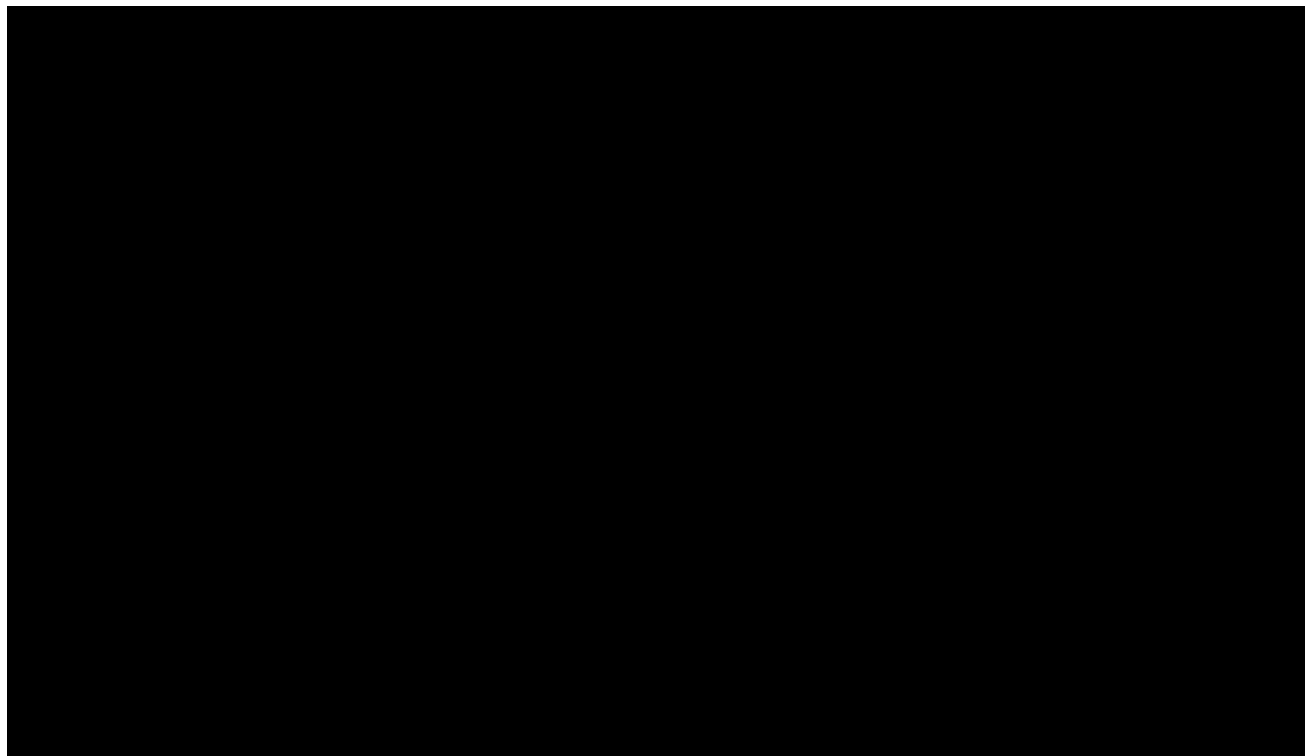


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1 Introduction

IBM United Kingdom Ltd is pleased to respond to the initial questions raised in the 'Smart Metering Implementation Programme Prospectus' issued jointly by DECC and Ofgem in July 2010.

IBM is a leader in the Smart Metering and Smart Grid market, being involved in more Smart Metering projects, in more roles, in more countries, than any other consulting and technology company. In this regard we have:

- Played a lead role in the majority of the announced second-generation Smart Metering deployments in the world;
- Worked on some of the world's most advanced Smart Grid projects, such as those for DONG Energy in Denmark and CenterPoint in the US, and currently hold the Chair of the GridWise Alliance in the US;
- Managed the implementation and operation of centralised Smart Metering operations, analogous to the proposed central communications model operating within a DCC; and
- Been working on Smart Metering and Smart Grid projects in the UK and Ireland for over four years, including leading roles supporting Energy Suppliers and Network Operators.

We are pleased to continue with our contribution to the development of Smart Metering in Great Britain, drawing upon our global experience to inform our views in response to the key aspects of the consultation, covering the proposals on the:

- functional requirements catalogue and the approach for developing technical specifications for smart metering equipment;
- strategy for roll out including the consumer experience, proposals for a code of practice on installation, the use of installation targets and potential future obligations on local coordination; and
- implementation strategy, including the proposed staged approach to implementation, the timeline for agreement of the technical specifications and options to bring the rollout forward.

1.1 The need for Smart Metering

We fully support the introduction of Smart Metering in Great Britain, and believe it will make a significant contribution in helping to improve energy management.

The provision of energy in Great Britain is facing an unprecedented set of interrelated challenges which impact right across the energy value chain, from generation, through transmission, to consumption.

Demand is ever increasing, as are consumer expectations for security of supply and service, yet, the power stations and network infrastructure which provides that energy are aging and in need of major investment. At the same time, the provision of energy is hugely reliant on finite resources, and produces a large amount of damaging emissions – 79% of UK electricity comes from fossil-fuel generation¹, and 25% of the worlds CO₂ emissions are from power production².

¹ BERR Energy Markets Outlook, December 2008

² The Climate Group and McKinsey & Co, "Smart 2020 Report"

To help meet these challenges and ensure a sustainable long-term supply of energy for Britain a number of key needs emerge. Firstly, our energy must come from a more diverse range of sources, including an increased role for renewable generation, new nuclear power stations, and investments in technologies to clean-up fossil-fuel generation.

Secondly, our energy transmission infrastructure requires investment to enable the increased use of distributed and renewable generation and to maintain network resilience. We need increased storage capabilities and sophisticated control systems to be able to utilise the intermittent supply associated with renewable energy.

Finally, energy must be used in a smarter way – we need to find new innovative ways to reduce our overall consumption, and to interact with consumers in a way which allows the proactive management of the energy available, and the increased use of distributed and renewable generation.

We believe that Smart Metering is a key component in meeting these challenges. Smart Metering is a means of providing instrumented, interconnected, and intelligent capabilities through which the energy industry and consumers will be able to address challenges around reducing energy consumption, proactively managing usage to reduce the need for infrastructure investment, improving inefficient industry processes such as customer billing, and as a fundamental element of a Smart Grid transformation which would enable the intelligent distribution of energy.

Through our work on Smart Metering projects throughout the world we have seen the benefits which Smart Metering can provide, and are pleased to contribute to the consultation process helping Great Britain achieve similar benefits.

2 Responses to Consultation Questions

2.1 Main Prospectus

Q3: Do you have any comments on the proposed approach to ensuring customers have a positive experience of the smart meter rollout (including the required code of practice on installation and preventing unwelcome sales activity and upfront charging)?

We support the proposed approach, however further information on the objectives of the code of practice (CoP) and reasons for including groups such as local authorities, housing associations, and voluntary organisations to support the deployment is needed.

Whilst we strongly support protecting the consumer, it is essential that the CoP isn't over engineered to avoid confusion and unnecessary cost. Key considerations for the CoP include:

- Avoiding unnecessary onsite activity;
- Recognising some activities may be better delivered remotely (e.g. energy efficiency advice) and allowing for a reduction in the time onsite;
- Allowing suppliers to design their own installation experience. Competition will drive them to engage customers and deliver a positive experience; and
- Providing a clear definition of "unwanted" sales activity to avoid confusion for suppliers and consumers.

Further to this, we would advise giving early and continuous visibility to influential parties such as the media. This will ensure that the programmes strong focus on protecting the customer and delivering value is well publicised driving positive PR and mitigating the risk of bad press.

Finally, we support the decision to prevent up-front charging. We believe this would result in negative press and opinion.

Q6: Do you have any comments on the functional requirements for the smart metering system we have set out in the Functional Requirements Catalogue?

The functional requirements for smart metering set out at a high level in the main Prospectus document are fundamentally unchanged from the DECC consultation on Energy Metering, May 2009.

The high-level functionality proposed for electricity meters is appropriate and can be delivered. Most of it has been used previously in other global implementations, however some areas are unproven and hence potentially increase the delivery risk.

The high-level functionality proposed for gas meters is appropriate and can be delivered; most of it has been used previously in other global implementations. It is worth noting that there are considerably fewer Smart Metering deployments for gas than electricity; consequently some elements of the proposed functionality are unproven, which introduces delivery risk.

The details provided in the Functional Requirements Catalogue are a comprehensive set of objectives, observations and lessons learnt. Many of the points raised by IBM in our response to the May 2009 consultation have been incorporated. The main challenge remains the timely development of the Functional and Technical Specifications which result in a solution at an acceptable cost.

Q7: Do you see any issues with the proposed approach to developing technical specifications for the smart metering system?

We believe that the Technical Specification could be defined by winter 2011 provided that the SMDG and DCG work-streams staffed with an appropriately experienced group of energy industry and technology experts, deliver against their published plans, starting in September 2010. Success of this work-stream will depend on strong governance, a clear project scope and very tight project management. The provisional Technical Specification should be assessed for cost at the earliest opportunity.

Q16: Do you have any comments on the proposals for requiring suppliers to deliver the rollout of smart meters (including the use of targets and potential future obligations on local coordination)?

We support the proposals for suppliers to be responsible for the deployment of smart meters. We believe that Government and the Regulator should define a balanced and realistic set of deployment targets, reflecting policy objectives, which suppliers are required to achieve, and that local coordination should only be considered further if these targets are not being met.

Q17: Do you have any comments on our implementation strategy? In particular, do you have any comments on the staged approach, with rollout starting before DCC services are available?

We support the Government's ambition to roll out smart meters faster than originally planned although we believe that a focus on reducing deployment timescales, rather than set-up time, is more appropriate. We believe the risks associated with a staged roll out are manageable but we are concerned that the proposed timetable may not allow sufficient time to build and test industry systems and processes.

Firstly, in the period before the DCC is established, suppliers will be required to develop independent data and communications arrangements in order to meet the mandated roll-out date. There is a risk of lack of interoperability if these arrangements are incompatible. Whilst we believe that this risk is manageable, the potential impact – in terms of barriers to customer switching, customer experience and the perception of smart metering are significant.

Of more concern is the proposed timescale of the staged approach, which allows only 12 months between granting of the DCC licence and DCC go live (and only 6 months between appointment of DCC service providers and go live). Consequently, there is a relatively short window for selecting, developing and testing DCC systems and processes. In IBM's view, this part of the programme is likely to take significantly longer.

This problem is compounded by the requirement that the DCC takes on any interim communications and data arrangements that suppliers have made prior to DCC go-live. Consideration will need to be given to the time it will take the DCC to migrate any such interim arrangements into core DCC functions, for example as a result of suppliers' interim data and communications arrangements being sufficiently different as to cause interoperability issues and problems with subsequent novation/migration to the DCC.

Q 18: Do you have any other suggestions on how the rollout could be brought forward? If so, do you have any evidence on how such measures would impact on the time, cost and risk associated with the programme?

In the period before DCC go-live, we suggest the Government should focus on identifying ways in which to provide more time for procurement and testing of metering systems and processes (including IT and communications systems, meters and in home displays) by accelerating the development of supply licence changes and the DCC licence application process. It is essential that meter specifications are developed as quickly as possible but

they must also be full and complete, in particular including any requirements for network information such as phase and quality of supply information.

In IBM's view, the biggest barrier preventing smart metering rollout to date is the absence of common standards. One way the rollout could be accelerated would be to advance the pace of development of communications protocols and service levels agreements. Earlier confirmation of these issues would give suppliers and their service providers a greater level of certainty, allowing them to commit to the large capital investments needed to commence rollout, and would allow the timelines for procurement and testing of industry systems and processes to be brought forward.

Q19: The proposed timeline set out for agreement of the technical specifications is very dependent on industry expertise. Do you think that the technical specifications can be agreed more quickly than the plan currently assumes and, if so, how?

We believe that the Technical Specification could be defined by winter 2011 provided that the SMDG and DCG work-streams staffed with an appropriately experienced group of energy industry and technology experts, deliver against their published plans, starting in September 2010. Whilst many of the core functions defined in the Functional Requirements Catalogue have been delivered in smart metering projects in other countries, the UK requirements do have some unique components and combinations of technology, in addition the number of stakeholders in the UK market is considerably greater when compared with smart metering projects in other countries, where the energy industry is typically more vertically integrated and the smart metering programmes have been more centrally controlled. We reiterate our strong belief that an early review of the provisional Technical Specification against the cost model will be required (please see our response to Question 7).

Q20: Do you have any comments on our proposed governance and management principles or on how they can best be delivered in the context of this programme?

We are in broad agreement with the proposed governance and management principles. We are concerned, however that the expert groups do not have a clearly stated objective to deliver technical specifications for the WAN communications module in time for suppliers to be able to commence target roll out in Summer 2012 on the basis of an agreed, stable and interoperable communications specification that can be adopted by the DCC when live operations are commenced in Autumn 2013.

2.2 Statement of Design Requirements

Q1: Should the HAN hardware be exchangeable without the need to exchange the meter?

We strongly believe that the HAN module should be separate from the electricity and gas meters as this will simplify maintenance and enable advances in communications technology to be accommodated.

Q4: Do you believe that the Catalogue is complete and at the required level of detail to develop the technical specification?

We believe that the catalogue is complete for core Smart Metering requirements to support the Supply business and that the level of detail is sufficient to develop a technical specification.

It is not clear to us that the Smart Grid requirements on Smart Metering are well enough defined, nor the cost benefits case well enough understood. We recognise that the network operators are actively involved in the ongoing definition of the solution to ensure that the

solution is designed to accommodate future network requirements and Smart Grids at an acceptable cost.

Q5: Do you agree that the additional functionalities beyond the high-level list of functional requirements are justified on a cost benefit basis?

We agree with the analysis set out in sections 3.37 and 3.38 of the Statement of Design Requirements 27 July 2010, to which we understand this question relates.

Q7: Do you agree that the proposed approach to developing technical specifications will deliver the necessary technical certainty and interoperability?

Please see our response to Question 19 in the general section of the prospectus.

Q8: Do you agree it is necessary for the programme to facilitate and provide leadership through the specification development process? Is there a need for an obligation on suppliers to co-operate with this process?

We strongly agree.

Q10: Are there steps that could be taken which would enable the functional requirements and technical specifications to be agreed more quickly than the plan currently assumes?

Please see our response to Question 19 in the general section of the prospectus.

2.3 Roll Out Strategy

Q4: What is the best way to promote consumer engagement in smart metering? As part of broader efforts, do you believe that a national awareness campaign should be established for smart metering? If so, what do you believe should be its scope and what would be the best way to deliver it?

We support the idea of a national awareness campaign, however a range of initiatives and a “So what!” factor will be required to effectively engage different customer segments and drive first time installation completion. A strong understanding of the drivers and concerns of different customer segments will be essential as this will differ greatly between different social groups. Using this understanding, a combination of national, targeted and 3rd party campaigns will be required to educate customers and clearly outline the reasons for the deployment and the benefits for them (the “So what”). This will be necessary to drive first time access to properties, ensuring a cost effective roll-out (especially when many installations will need to take place during business hours).

These campaigns should be targeted based on rollout schedules (e.g. geographically) to ensure they are timely and relevant to customers (not years ahead of deployment time). Given the relationship between customers and suppliers, we believe it to be essential that this is delivered as a partnership between suppliers, the government and consumer groups, to drive trust and avoid customers viewing the introduction of smart metering as a money making exercise for suppliers and other industry parties.

Recognition is needed that such campaigns require significant investment across a variety of media channels. Leveraging cross industry experience and lessons learnt from companies such as IBM, which have delivered smart metering in other jurisdictions will drive the success in effectively engaging customers.

Q5: How should a code of practice on providing customer information and support be developed and what mechanisms should be in place for updating it over time?

A clear understanding of the objectives of the code of practice is necessary. Based on this we would strongly recommend that the industry invests in customer research to understand the drivers, concerns and needs of different customer segments (particularly vulnerable customers). We strongly recommend that the industry learn from other global implementations, alongside the consultation of UK groups, (e.g. suppliers, consumer groups, consultancies) to understand, from experience, the type of initiatives/ regulation that will protect consumers and deliver value versus those that will simply result in red tape and deliver little or no benefit.

We believe that the commissioning of an independent consumer feedback programme (in parallel with the deployment programme) looking at the different parts of the installation process (pre, during and post installation) for different geographies and customer types (e.g. vulnerable customers, full time workers) will be beneficial in driving continuous improvement over the deployment programme and ensuring the code of practice effectively protects the customer and drives an efficient rollout.

Q6: Do you agree with the proposed obligation on suppliers to take all reasonable steps to install smart meters for their customers? How should a completed installation be defined?

We agree with the proposal for suppliers to take all reasonable steps to install smart meters.

We believe a completed installation should be defined as when:

- All physical components of the metering system for which a supplier is responsible have been installed and commissioned in the home – i.e. including smart meter(s), WAN module, HAN module and IHDs (if applicable);
- The installed metering system is operating in a smart mode such that two way communications between the data provider and the metering system are operational through the WAN; and
- The customer is able to access a defined minimum data set through their HAN and IHD (where installed). We believe there may be value in the minimum data set being reduced until the DCC is operational.

Q7: Do you think that there is a need for interim targets and, if so, at what frequency should they be set?

We believe that a central coordination body should set milestones and monitor compliance against those targets in order to ensure that overall meter deployment is aligned with the business case assumptions and that the benefits of the programme are not delayed.

Such targets would also discourage incumbent energy suppliers from back-loading deployment and prevent short-term entrants joining the market as dumb-meter only suppliers with no intention of deploying Smart Meters.

The smart metering programme represents a massive change and we believe that it would be appropriate for the rollout targets to be reviewed on no less than a quarterly basis, by fuel and payment type only and projected time to completion. Care must be taken not to create excessive reporting burdens that could detract from the focus on the roll-out itself.

Q8: Do you agree with our proposal to require suppliers to develop a code of practice around the installation process? Are there any other aspects that should be included in this code of practice?

We agree with the proposal.

Q9: What rate of installation of smart meters is achievable and what implications would this have?

As we stated in our response to the Government's May 2009 consultation, based on our survey of roll-out programmes elsewhere we believe that the deployment phase could be as short as 5 years - although this may be constrained by the market construct in the UK.

The industry's ability to recruit and train sufficient meter workers may be an issue, as may the lack of geographical coordination.

Whilst geographical coordination could significantly foreshorten deployment timescales, its benefits would be diluted by the initial period of supplier-led installations currently envisaged, (which would reduce the geographic density of meters available to be replaced later in the programme), and would increase stranded costs (because newer meters would be replaced at the same time as older meters).

Q10: Do you have any evidence to show that there are benefits or challenges in prioritising particular consumer groups or meter types?

In our view, early deployment to specific groups may have a detrimental impact on other outcomes, most importantly the possible opportunities and benefits for a geographically co-ordinated roll-out.

One of the most significant challenges that suppliers will face will be guaranteeing density of workload and access to properties. To accelerate the rollout, suppliers would benefit from rolling out to the widest customer groups possible. Placing too many restrictions or targets on specific customer groups, e.g. vulnerable customers, prepayment customers, etc. may limit a supplier's ability to meet the overall programme timeline.

Consideration should also be given to the opposite of this proposal, with the exclusion of certain customer types. There is a need to help customers in a vulnerable or fuel poor situation but it may be better to have large scale smart meter deployment to other customers to prove/test functionality before risking problems with, e.g., supply interruptions to vulnerable customers or adverse public reaction due to singling out specific groups of customers.

Q11: Do you agree with our proposed approach to requiring suppliers to report on progress with the smart meter rollout? What information should suppliers be obliged to report and how frequently?

We agree with the proposed approach. Reporting should improve transparency and help capacity planning, for example of the communications and data storage systems, and is an essential mechanism for ensuring the programme is a success.

In addition to information proposed by DECC, other information that might be beneficial includes: whether the installation was dual or single fuel, the number of visits required to install the meter and/or the number of 'no access' and the number of customer complaints.

We believe there needs to be government management of the messaging around the benefits of smart meters. There needs to be a coordinated campaign involving many parties, including energy suppliers, so as to manage the messages and react appropriately should there be any negative publicity.

2.4 Implementation Strategy

Q3: Do you agree with our proposal for a staged approach to implementation, with the mandated rollout of smart meters starting before the mandated use of DCC for the domestic sector?

As described above, we consider that the staged approach is likely to add additional complexity and technical risk to the programme. We believe that these risks are manageable but we are concerned that the proposed timetable may not allow sufficient time to build and test industry systems and processes. It may also delay the availability of benefits because of the delay caused by having to replace existing infrastructure.

Q4: Do you have any comments on the risks we have identified for staged implementation and our proposals on how these could best be managed?

As outlined above, our main concerns relate to the risk that suppliers' interim data and communications arrangements are so different as to cause interoperability issues and problems with subsequent novation/migration to the DCC.

There is also a risk that suppliers' interim communications and data arrangements are not of sufficient quality, which could adversely affect the customer experience and, therefore, acceptance of the smart metering programme. This latter risk does not currently appear to be addressed - by default, it would be a supplier responsibility with competitive pressure providing an incentive to ensure adequate quality and technology pilots and trials helping to mitigate any residual risk.

The timelines for DCC selection and testing are unrealistic and will potentially force the adoption of existing technology, rather than enabling cheaper technology that would take longer to roll-out. If DCC go-live is delayed significantly, then the risks associated with early deployment programmes increase substantially.

The risk of the DCC becoming overwhelmed could be mitigated if any interim arrangements could be novated to the DCC at a later date, such as by 2015/16. This would allow the DCC to concentrate on core functions and add some longevity to interim solutions, easing commercial considerations for suppliers when procuring solutions in the pre-DCC period.

We believe there needs to be government management of the messaging around the benefits of smart meters. Public acceptance of the programme is crucial, as is the change in behaviour needed to achieve the benefits in the business case. There needs to be a coordinated campaign involving many parties, including energy suppliers, so as to manage the messages and react appropriately should there be any negative publicity.

Q7: Do you have any comments on the activities, assumptions, timings and dependencies presented in the high-level implementation plan?

The proposed timescale allows only 12 months between granting of the DCC licence and DCC go live (and only 6 months between appointment of DCC service providers and go live), which we believe is likely to be insufficient to procure, develop and test systems of this scope and complexity – particularly if there is a requirement to integrate a number of interim communications and data arrangements.

We would also query whether 6 months is sufficient time (between confirmation of meter technical specifications and rollout, if EC notification is required) for manufacturers/suppliers to produce and procure compliant meters.

We are therefore concerned that the proposed timetable may not allow sufficient time for procurement and testing of metering systems and processes (including IT and communications systems, meters and in home displays) and would suggest that the

Government considers whether it is possible to bring forward development of supply licence changes and the appointment of the DCC.

We suggest that the government also assesses whether it is possible to bring forward the start of Phase 2 activities, such as development of meter technical specifications and supply licence obligations, which could start before the consultation response is issued.

Q8: Do you have any comments on the outputs identified for each of the phases of the programme?

Our principal concern with the phasing of the programme is the lack of time allocated to set up activities prior to DCC go-live. In phase two, the timeframe for completion of meter technical specifications potentially leaves the industry with only six months to procure, test and develop systems to support smart meter functionality.

3 Appendix - IBM Smart Metering and Smart Grid experience and credentials

3.1 *IBM's Smarter Planet strategy*

The world is facing a series of interrelated complex challenges, the impacts of which are being felt across all facets of our lives – from food shortages to transport inefficiencies, from managing pandemics to coping with energy shortages. These challenges are all occurring at a time when new interconnected technologies are emerging and maturing. These technologies both exacerbate the impact of these challenges, but also make new smarter solutions achievable.

Building a smarter planet is IBM's point of view on how interconnected technologies are changing the way the world works. Opportunities for change are being driven by the world becoming:

- Instrumented – taking advantage of the opportunity to measure, sense and see the exact condition of everything, and to do so in real-time or near real-time;
- Interconnected – enabling people, systems and objects to communicate and interact with each other in entirely new ways; and
- Intelligent – responding to changes quickly and accurately, learning from patterns of behaviour and activity, and getting better results by predicting and optimising for future events.
- Our vision of a smarter planet has at its heart a digital infrastructure which exists in parallel to, and fundamentally interconnected with, our physical infrastructure. The information sensed by this digital infrastructure drives analysis, insight and improvement. Either through automatic actuation or by embedding visualisation and decision making into business processes, the digital infrastructure is able to make the physical infrastructure dynamic, so that it rapidly and effectively responds to changing circumstances.

One of our key focus areas within our Smarter Planet strategy, both globally and in the UK, is Smarter Energy. We are already working on many of the emerging areas where instrumentation, interconnection and intelligence can be employed to help address many of the challenges being faced in the energy industry, including: advanced modelling and simulation of nuclear power stations, optimising electric vehicle charging to best interact with a Smart Grid, and the deployment of Smart Meters to help influence and control energy consumption.

3.2 *IBM's global Smart Metering and Smart Grid qualifications*

In formulating our response we have drawn upon our experience in the global Smart Metering and Smart Grid market. There are five aspects of our work which are particularly relevant to this consultation:

1. Network-led Smart Metering deployments;
2. Supplier-led Smart Metering deployments;
3. Central Smart Metering service provision;
4. Smart energy pilots with consumers; and
5. Smart Grid development.

Nearly all Smart Metering deployments in the world have been led by network businesses, and these large deployments present several learning points for Great Britain. IBM is currently

the lead consulting organisation on Smart Metering projects with eight major networks businesses in North America, who collectively serve more than 34 million customers. Our roles on these engagements include business case development, project planning and management, vendor selection and management, systems integration and deployment management.

IBM has also had a lead role in one of the few supplier-led Smart Metering deployments, with Oxxio, in the Netherlands. In September 2005 Oxxio announced a five-year agreement with IBM to provide Oxxio customers with new Smart Meters for both electricity and gas. We have been working with Oxxio since their initial preparations and deployment, and have been actively involved in the market model discussions in the Netherlands.

In global Smart Metering deployments to date there are a few examples of central Smart Metering service provision, equivalent to the Central Communications Market Model proposed for Great Britain. IBM is managing the implementation and operation of two:

- In Ontario, IBM was selected to design, build, and manage the provincial Meter Data Management Repository (MDM/R). The MDM/R system is designed to collect and validate hourly interval data from 4.5 million meters every day, then frame this into Time of Use bill determinants for use by over 90 local distributors and competitive Energy Suppliers.
- In Texas, IBM is building a Common Advanced Metering Web Portal and Data Repository that consolidates customer usage and meter data from five different network operators to provide to Energy Suppliers, end consumers, and other authorised parties via a web portal. The system will store four years of 15-minute interval data from 7 million meters, together with monthly billed usage data, and maintain current and historical views of meter attributes, premise and service point information.

Throughout the world we have been involved in a number of Smart energy pilots with consumers, evaluating how consumer behaviour changes in response to information and incentives, and considering how better to engage consumers in the management of energy:

- As part of the U.S. Department of Energy's GridWise Programme, the Pacific Northwest National Laboratory and IBM designed the Olympic Peninsula Smart Grid demonstration project to help consumers participate in the operation of the power grid in a way that benefited them and the network. In this trial, smart appliances, meters, and sensors adjust consumption dynamically based on real time pricing signals at five minute intervals. This delivered results that included: 10% lower electricity bills; a 15% reduction in peak loads over a 12 month period; and a 50% reduction in short-term peak loads.
- In Ontario, IBM completed an innovative pilot of Time of Use and Critical Peak Pricing tariffs with the Ontario Energy Board. Our analysis of the results included focus groups, participant surveys and statistical evaluation of demand response and conservation effects. The results formed an important part of the Ontario's policy to introduce mandatory Time of Use rates across Ontario.

Across both mature and emerging markets, IBM is working on nearly 50 Smart Grid engagements, these include:

- As part of the Smart Grid programme at DONG Energy in Denmark, where network operations were programmed to respond to outages faster resulting in significant operational benefits. These included a 52% improvement in Customer Minutes Lost through immediate identification and isolation of faults; faster response time to faults leading to a 35% reduction in restoration times; up to 80% reduction in Network Reinforcement; improved Customer Service and Outage Management; and better identification of Power Quality issues.
- As part of the EDISON project in Denmark (Electric Vehicles in a Distributed and Integrated Market using Sustainable Energy and Open Networks) which involves IBM, the energy industry, academia, and others, working together to establish how electric vehicles could be used together with Smart Grids to increase the share of renewable energy in

overall consumption. Researchers from IBM are developing smart technologies that synchronise the charging of the electric vehicles with the availability of wind in the grid to ensure that electric vehicles are recharged from renewable non-carbon sources. IBM is also working with the Technical University of Denmark to undertake large-scale, real-time, simulations of the energy system and the impact of electric vehicles.

3.3 *IBM's UK Smart Metering and Smart Grid qualifications*

In the UK and Ireland we have been working on Smart Metering and Smart Grid projects for over three years, including:

- Working with many of the Energy Suppliers, including helping them understand Smart Metering, develop their business strategies, design and run pilots, and plan for the business transformation Smart Metering will enable;
- Helping ESB Networks in Ireland plan and manage their far-reaching Smart Metering customer behaviour trials and technology pilots;
- Working with electricity Network Operators to conduct Smart Grid pilots and understand the possible benefits which Smart Grids could provide to them; and
- Chairing the Energy & Utilities forum at Intellect, and being members of The Application Home Initiative (TAHI) where we hold a Board level position.

