

The Microsoft response to the Electricity Market Reform Consultation

Introduction

The Electricity Market Reform (EMR) consultation rightly highlights the need to reform the operation, incentives and structure of the electricity market to help the UK meet increasing energy demand whilst also meeting our GHG emission reduction targets in both the medium (34% by 2020) and the long term (80% by 2050).

Microsoft recognises the important role of this consultation at such a critical time. As part of a global company which employs 90,000 and whose products are used in businesses and homes globally, we would underline the need to balance solutions focused on de-carbonising electricity generation (supply side) with solutions that de-carbonise businesses and homes and manage electricity demand (demand side). We see the real opportunities for positive impact through IT being on the demand side.

IT has an important role to play in helping secure major improvements in both demand and generation. According to Gartner¹, 2% of global GHG emissions are accounted for through IT use. Whilst it is paramount that we tackle the carbon footprint of IT use itself, there is a much broader role for IT in enabling carbon savings.

Indeed IT has the potential to realise 15% carbon savings globally. This is a view supported by the Climate Group's Smart 2020 report which suggests the IT industry can help drive global emissions down by 15% by 2020 – an amount greater than the current total emissions from the United States.

This submission responds to a number of issues that are pertinent to the EMR consultation:

- ☐ The balance of focus of electricity market reform between generation and demand side responses
- ☐ The ability of current market arrangements to support investment in low carbon generation to meet environmental targets
- ☐ The role of a capacity mechanisms, including the introduction of a new feed in tariff for low carbon solutions to reward and incentivise demand side solutions, including energy efficiency technologies such as smart metering
- ☐ Changes to measures including the CRC Energy Efficiency Scheme and the evolution of the Green Deal, and their interaction with demand side responses

In addition, we set out how Microsoft is working with its partners to make significant advances in the process and practice of power generation and delivery.

¹ Gartner

Finally, Microsoft also sets out its recommendations for regulators and government over the policy framework to enable industry to meet the challenges of ongoing energy market reform.

The Role of IT in the Electricity Market Reform

The Climate Group's Smart 2020 report suggests that the IT Industry can help drive down global emissions by 15% by 2020 – an amount greater than the current total emissions for the United States. This can be done by reducing the carbon emissions from IT products through reduced energy consumption, using IT to make smarter decisions and enabling efficiencies through the use of technology across industries. Collectively these will greatly reduce the demand on the grid. In addition, specific to this consultation, IT can also help the Utilities sector to improve the generation, supply and delivery of a smart energy ecosystem.

Using IT to reduce overall energy consumption and thereby demand on the grid

□ Greener IT: Desktop and Server Energy Savings:

- Most power consumption discussions focus on the datacentre, however according to The Climate Group, PCs account for more than twice the carbon footprint of datacentres. Plus, according to Climate Savers, "the average desktop PC wastes nearly half of the energy it consumes as heat." Climate Savers points to power management as a key tool to address this waste and predicts that using power management on a computer can save nearly half a ton of CO₂ each year. The latest desktop operating systems have powerful tools to help with power management. For example, the Windows 7 operating system has been built with improved power management in mind and is 30% more energy efficient than Windows XP.
- In our experience the average server utilisation runs at 15% capacity. Virtualisation technology enables server consolidation and thereby reducing the number of physical machines. This can reduce server energy consumption by up to 82%.

□ Making Greener Decisions through the Use of IT:

There are a number of software tools to help customers manage, report and evaluate the energy efficiency of their IT. For instance, our Microsoft Assessment and Planning Toolkit includes a "power savings calculator" that provides a report of potential savings from adopting energy-efficient computing technologies such as enhanced power management and virtualization. As of 2009, over 690,000 Microsoft customers and partners have downloaded and used this toolkit.

□ **Greening with IT: IT as an enabler of energy savings:**

- Cloud computing - providing individuals and organizations with hosted computing services over the Internet can help enable energy reduction as part of an effective demand side response. A recent Microsoft commissioned study shows that cloud computing has the potential to reduce a company's energy use and carbon emissions by up to 90% per user. Savings vary depending on the size of the company. Smaller organisations realised the largest savings of up to 90% per user as they typically have fewer users per server, which means lower utilisation and they tend not to implement high-efficiency IT and data centre practices. Large companies saw savings of up to 30% as they typically have more efficient IT or data centre practices and higher server utilisation. Cloud computing's lower carbon emissions are driven by the efficiency of large scale datacentres operated by cloud service providers such as Microsoft. The key drivers for emissions reductions include being able to quickly match server capacity to shifting demands, sharing infrastructure to serve millions of users simultaneously and improving server utilization (the portion of a server's capacity that an application actively uses).
- The Microsoft datacentres running these cloud services are also built and managed to drive optimal efficiency. The Microsoft datacentre in Dublin has improved its Power Usage Effectiveness (PUE) by 50% compared to datacentres built 3 years ago. This is largely through the use of air-side economization rather than energy-inefficient chillers traditionally used in data centres to keep server rooms cool. This facility will therefore use significantly less energy and less than 1% of the traditional annual water consumption via supply and waste water. The Datacentre makes use of renewable energy.

IT solutions that help the Utilities Sector deliver the Smart Grid

New driving forces – including climate change, new market participants such as plug-in hybrid electric vehicles, and increasing energy demands – are combining to drive the development of what is being referred to as the 'smart grid'. A truly 'smart' electricity grid (or a smart energy ecosystem), – the underpinnings of an effective demand side response – will undoubtedly need to be supported by IT.

A 'smart grid' will need to enable two-way power flows and two-way information flows about consumption and pricing between utilities and consumers. This could entail millions of new electricity flow monitoring grid devices combining with end users' smart meters - requiring the transfer of terabytes of data to control systems.

Microsoft and partners like Alstom Grid, ESRI, Itron, OSIsoft, Telvent and others are preparing utilities for a new era of integrated grid, transmission, and generation. IT solutions address numerous energy delivery challenges including:

☐ **Business intelligence and analytics:**

The advanced distribution network envisioned as part of a smart grid requires the integration of communication networks and sensors with the analytical capabilities of information technology. The vision includes the ability for grid self-diagnosis and the best immediate response in real time. Such advanced analytical capabilities will rely upon an accurate and complete network data model to ensure reliability.

☐ **Distribution management systems**

Distribution management systems support the operations of the electric system and will process a huge amount of data, including geographic information, billing and system study load flow packages.

☐ **Energy management and information management**

As the smart grid evolves, it will require real-time monitoring and management of information is becoming a requirement throughout the smart energy ecosystem. New requirements include the automation of substations, optimization of markets, and archiving historical data to be used in planning and analysis.

☐ **GIS/ asset management**

Utilities will need a system which enables them to be aware of and manage the geographic location of their equipment and resources. Easy ways to visualise and manage the grid and various transmission and distribution assets will be needed, with accurate information on location and connectivity to the end user.

☐ **Home energy management**

A 'smart grid' will need to be underpinned with 'smart' technologies which are usable and adaptable to consumers.

☐ **Product intelligence**

There is a challenge for utilities in utilizing manual processes in large capital processes to simulate large complex projects and then identify problems before work begins.

☐ **Smart metering**

Once smart meters are installed, utilities will face the challenge of receiving data from millions of devices dispersed across their operating areas. Data will flood their IT infrastructures and pose unprecedented challenges for management and comprehension. Utilities will need IT solutions that help with meter data management (MDM) and the advanced metering infrastructure.

In short, unified technology architecture is needed to address these challenges, with IT at its heart. Such a solution needs to enable utilities to integrate virtually every operation of their enterprise to enable a smart grid and better coordinate their business operations with needs demands and generation and delivery from customers on a smart grid.

These solutions are in existence, for example Microsoft's reference architecture - Smart Energy Reference Architecture (SERA) – which utilises IT to integrate and manage operations and manage large data flows. The Microsoft SERA helps utilities by providing a method of testing the alignment of information technology with their business processes to create an integrated utility².

IT Solutions enabling the generation and supply of electricity

Microsoft partners with a number of companies to provide IT solutions that help utilities deal with the challenges of generation and supply. This covers a range of key areas including:

☐ **Emissions**

Due to growing public concerns about climate change, utility and merchant generators are being tasked with reducing their carbon footprint. Utilities need to maintain flexibility to adapt to carbon restrictions. Power generators seeking to improve their emissions performance need to assemble technology to support reporting, alerting, collaboration, and business and operational intelligence.

☐ **Plant and fleet optimisation**

Utility companies need to decrease plant downtimes and reduce the costs of preventive maintenance, manage their assets strategically, prevent outages, improve thermal efficiency, and optimize capital spending. IT solutions provides a business and technology framework that enable the management of complex portfolio of generation assets that include coal, gas, hydro, nuclear, solar and wind farms. Future delivery of plant and fleet optimisation solutions through the cloud will further reduce IT costs and streamline delivery.

☐ **Plant information and control systems**

IT solutions provide power plant control, automation tools and information systems that use the latest technology for power plant operations. Staff can access data quickly wherever they work, regardless of the application in use. The reporting and analysis function puts important information at the fingertips of power station conduction managers, making it easier for them to meet programming and supervision requirements.

☐ **Work and asset management**

² Further information on Microsoft SERA can be found in the annex

Asset performance management is required to improve equipment performance, reliability, maintenance and decision support information for all asset types. This allows maintenance and asset management teams to improve operational performance, increase asset availability/utilization and safeguard against system failure that can undermine energy supply.

Issues and recommendations

There are a number of barriers to the effective deployment of IT – particularly in a demand side response. These can be broadly categorised as: cost and financial incentives; an appropriate regulatory response; and leadership and education from the public sector, particularly for SMEs.

Further details on the issues and recommendations for improvements can be found below.

Cost and financial incentives

According to Microsoft commissioned research, over three quarters (78%) of businesses surveyed agreed that IT should be included in Government incentives to reduce their carbon footprint, whilst 62% of businesses are unaware of any green incentives available to them in carbon reduction³. More respondents would expect to be able to use financial incentives to use IT to reduce and manage their business energy consumption (48%) than to insulate existing business property (46%)

There is currently no incentive or investment help for businesses to report on these carbon emissions. This is despite the fact that a recent Verdantix report on carbon reporting in the UK shows that 44% of customers are relying on software to help them manage and report their emissions.

Recommendations

There are a number of routes to providing a level playing field in terms of financial incentives for IT.

As the EMR consultation document proposes, a capacity mechanism could provide a workable funding route to incentivise investment in technologies, including IT which drives energy efficiency eg operating systems, virtualisation, manages and reports emissions or rethinks business processes eg. Alternatives to travel.

This incentive could be administered through an institution such as the Green Investment Bank, or indeed an existing mechanism, such as the Enhanced Capital Allowance scheme (eg include energy saving IT on the Energy Product Technology List) or the Green Deal (eg extend the product portfolio beyond insulation).

³ BDRC, 2010

Funding from a capacity mechanism could be made available to either incentivise the development of ‘IT for Green’ technologies to manage demand, or to business to invest in IT which enables energy reduction

An appropriate regulatory response

The current regulatory landscape for large energy intensive companies actually discourages investment in IT used to drive energy efficiency and carbon reduction.

The CRC Energy Efficiency Scheme is intended to drive energy efficiencies. It actually deters IT companies from making big investments in datacentres in the UK. This will have a negative impact on the green economy and green jobs since such investments may be done offshore instead. The proliferation of cloud computing and digital downloads will inevitably mean that datacentres will grow. IT companies will be penalised for this instead of considering the overall reduction in emissions.

Recommendations

CCA could be extended to IT Companies with datacentres. In the energy context, IT is seen as a capital outlay instead of a service provider to help drive larger energy efficiencies as the cloud computing study mentioned above shows.

The CRC Energy Efficiency Scheme does not currently take the purchasing of renewable energy into consideration. Regulation should take into consideration that large datacentres can be run at highly efficient power usage levels and can save businesses energy and thereby reduce the overall energy consumption in the UK by reducing the need for less efficient on-premise computing.

Regulators should also consider examining how data regulations can be best amended to ensure efficient exchange of data between the grid and consumers of electricity. For instance, regulators should examine barriers to providing individuals and third parties access to energy usage and pricing information that can stimulate significant demand side management, while still ensuring this data is, subject to appropriate privacy protections.

For IT to enable the smarter use of electricity, regulators and standards bodies should require interoperability and appropriate standardization for information access and formats. This will help foster a healthy ecosystem of energy service providers and preventing vendor lock-in with proprietary formats. Standardization should rely on existing Internet Protocol and Web services standards and leverage the XML and extensible capabilities of Web services standards.⁴

⁴ We understand that data regulation issues with regards to smart metering are shared between DECC and a number of other departments.

Leadership and education from the public sector

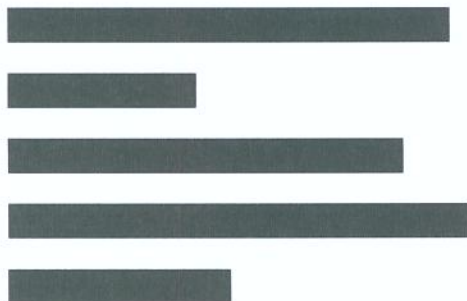
Governments can help save energy and benefit the environment by applying power management and virtualization to their IT infrastructure and by promoting telework. Microsoft, for example, is working with WWF on the 1 in 5 challenge to encourage businesses to replace 1 out of 5 meetings with a virtual meeting.

There is a strong need for education, particularly across small businesses, of carbon reduction incentives and of the potential for IT to reduce carbon footprint and drive energy efficiency, as part of an effective demand side response. As Microsoft's research suggests, one in ten (11%) UK businesses have no plans to reduce their carbon footprint with this figure rising to one in five for SMEs, and less than one in four businesses (24%) were aware of the Green Deal. Cloud Computing in particular can help drive massive energy savings for SMEs.

Recommendation

Microsoft is already working with partners across government to help it save energy and benefit the environment by applying power management and virtualization to their IT infrastructure. In achieving these aims, Government can provide a role of leadership across its own suppliers and partners to ensure best practice is achieved across a wider network of companies and organisations.

A concerted education and awareness drive to inform businesses on why they should participate in carbon reduction incentives and how it will benefit them is crucial to the success of the EMR. The language used to explain the benefits could include long-term cost savings.





IWEA response to the DECC Consultation on Electricity Market Reform

10 March 2011

The Irish Wind Energy Association (IWEA) welcomes the opportunity to respond to the Department of Energy and Climate Change (DECC) Consultation on Electricity Market Reform. IWEA is the national association for the wind industry in Ireland. IWEA represents interests in onshore and offshore wind energy in Ireland and Northern Ireland.

The Northern Ireland Renewables Industry Group (NIRIG), which is a collaboration between IWEA and Renewable UK, will be submitting a separate response to DECC outlining its concerns about the likely effects of market reform for the Northern Ireland renewables industry. IWEA supports this response. Given the importance of the UK electricity market to the Northern Ireland Renewables Obligation, any significant change to the UK's electricity market will also have a major impact on the energy policies in Northern Ireland. Before major change is made, the Government must give its close consideration to what its proposed market reforms will mean for Northern Ireland generators operating in the All Island Single Electricity Market.

Ireland has the potential to exceed its renewable energy target for 2020, and the opening up of the support to generation in Ireland would provide Irish generators with the opportunity to export the electricity from increased wind generation to the UK under a structured mechanism. This would provide extra market capabilities for renewable generators in Ireland, while at the same time helping the UK to meet its energy target in a cost-effective manner. IWEA requests that this consultation considers the possibility of supporting projects outside the jurisdiction which can contribute to the UK targets. This is particularly relevant in light of increased interconnection and future market coupling. In addition, developments in the Irish Sea can take advantage of the substantial supply chain being developed in the UK for offshore wind projects which will bring additional benefits to those of achieving renewable energy targets.

In order to take advantage of increased market coupling and interconnection it is essential that there is increased market liquidity in BETTA. An Ofgem report from 2009¹ found that liquidity the GB wholesale electricity market is low compared to that in many other European electricity markets, In general, increased market liquidity:

- Provides a signal to investors,
- Allows generators and suppliers hedge their position,
- Helps deliver competition driving down prices.

In the context of wind energy in Ireland the new East West interconnector is seen as an important tool to maximise the output of wind in SEM. However this is dependent on price signals encouraging the trade of power. Having a liquid market responsive price in the UK is a key element on this and IWEA supports steps by Ofgem to make improvements in this area.

In conclusion, IWEA believes that the impacts of the proposed changes outlined in this consultation need to be considered on a wider basis than has been done to date, particularly in light of moves towards market harmonisation throughout Europe. IWEA believes that any decisions made as part of this consultation should look at the options of supporting projects outside the jurisdiction with a view to contributing to the UK targets. It should be noted that any changes to support systems need to ensure that there is appropriate incentive on developers to build projects to ensure that the European renewable electricity targets can be met.

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<http://www.ofgem.gov.uk/MARKETS/WHLMKTS/COMPANDEFF/Documents1/Liquidity%20in%20the%20GB%20wholesale%20energy%20markets.pdf>