Bloomberg
NEW ENERGY FINANCE

1 March 2010

Consultation Response

Contents

Albert Cheung
+44 20 3216 4333
albert.cheung@newenergyfinance.com

Response to ERGEG Consultation Paper on Smart Grids

Overview

This document sets out a response to the ERGEG Consultation Paper on Smart Grids, issued in December 2009.

The views outlined in this paper are formed from Bloomberg New Energy Finance's research and analysis in the area of smart grid technology, policy and regulation, including collaborative work undertaken in conjunction with over 30 organisations in the smart grid industry – the Consortium on Digital Energy.

In this paper we voice our support for decisive regulatory action on smart grids, and offer suggestions in each of the areas identified by ERGEG. An upcoming Bloomberg New Energy Finance White Paper, to be published in March 2010, will provide a fuller view of the key issues surrounding the smart grid.

1. Introduction

Do you consider that networks, transmission and distribution, are facing new challenges that will require significant innovation in the near future?

We agree that new challenges will require innovation in the transmission and distribution networks, as well as at consumer premises. These challenges include increasing intermittency and distributed energy resources; increasing consumption and rising energy costs; and a greater requirement for energy efficiency, quality and reliability of supply. We believe that the innovation needed to address these challenges is also an opportunity to transform the power network.

Do you agree with the ERGEG's understanding of the smart grid?

We agree broadly with ERGEG's understanding of the smart grid, as laid out in Section 1.2 of the Consultation Paper. We place an additional emphasis on the importance of power storage technologies and their integration onto the grid, for the purposes of maintaining power quality and balancing supply and demand. We also note that smart grid technologies should improve the grid operator's visibility over the network and thus help to improve operational efficiency.

Do you agree that objectives of reducing energy consumption impose the need for decoupling regulated companies' profit from the volume of energy supplied? How can this be implemented?

We strongly support the consideration of decoupling as a regulatory tool in European markets, and believe that decoupling can play an important role in removing the incentives to generate, transmit and sell larger volumes of energy, as experienced in certain US markets. Decoupling can thus be a significant factor in a utility business case for investment in smart grid or energy efficiency technologies.

However, decoupling is not a sufficient measure to incentivise investments in energy efficiency. In order to achieve that outcome, decoupling should be combined with additional measures such as white certificate programs and financial incentives or rate recovery schemese for investment in demand-side efficiency. Decoupling can also influence other input incentives for utilities, such as the

effects of weather on energy consumption. For these reasons, a closer investigation into the effects of decoupling in specific markets - and liberalised markets in particular - is necessary to understand all of the implications.

2. Drivers for smart grids

Do you agree with the drivers that have been identified in the consultation document? If not, please offer your comments on the drivers including additional ones.

We agree that sustainability, security of supply and competitiveness are the major primary drivers of smart grids in Europe. We also agree with the technical drivers identified in the Paper; however we believe that the deployment of electric vehicles in European countries will be an additional major technical driver for the adoption of smart grid technologies. Considering that the energy drawn by an EV charging cycle can be comparable to the daily consumption of a home, it is clear that the impact of widespread EV charging on transmission and distribution networks will be significant and could drive a major increase in electricity consumption levels. Intelligent charging systems and improvements to the distribution network will be necessary to handle increasing penetration of EVs.

3. Smart grid opportunities and regulatory challenges

Do you agree that a user-centric approach should be adopted when considering the deployment of smart grids?

It is important to note that there are many stakeholders that will be affected by smart grid regulation, and that some of these may not be defined as 'users' of the network. For example, technology vendors and taxpayers (as distinct from the ratepayer or consumer) cannot be considered network 'users' in the same way that generators, consumers and prosumers are.

We agree that smart grid regulation should consider the needs of each of these stakeholders. In addition, we emphasise that the costs and benefits of smart grids should be distributed equitably amongst stakeholders, such that the benefits to a given stakeholder fairly reflect the cost and risk to them. Consideration of costs and benefits of smart grid goes beyond simply looking at 'needs'.

How should energy suppliers and energy service companies act in the process of deploying smart grid solutions?

These companies have two important functions to play in the deployment of smart grids. First, they are the main point of contact for consumers and therefore have a responsibility to lead the effort in consumer engagement and raising awareness of smart grids and their importance, as well as their likely impacts on the lifestyles of consumers. The importance of this role should not be underestimated and has been highlighted by recent events related to the Pacific Gas & Electric (PG&E) smart meter roll-out in California. A lack of consumer understanding of smart metering in PG&E's territory has led to a consumer backlash, with smart meters being blamed for increases in energy bills.

Second, energy suppliers and ESCOs in liberalised markets have the opportunity to innovate and provide new types of services, as outlined in the Consultation Paper. Many of the benefits of smart grid, such as improved consumption monitoring and demand-side management, depend on the availability and quality of new services provided by these companies.

Do you think that the current and future needs of network users have been properly identified in Section 3.3?

We broadly agree with the needs identified in Section 3.3; in particular we emphasise that new interconnection standards and reward structures will be required to enable widespread power storage and distributed energy resources to be deployed. For example, in certain North American markets, we are beginning to see rate recovery approvals for power storage projects, and new regulations allowing power storage assets to compete fairly with generation assets for provision of peak capacity and frequency regulation services.

In addition to these needs, we note that there are significant additional benefits, or opportunities, that are not classified as 'needs'. Examples include the ability for consumers to view, analyse and alter their consumption patterns, or the opportunity for new entrants to compete for provision of new services in the power markets (e.g. aggregators). This latter point is important as it can ensure higher levels of competition.

In regulating for smart grids, we believe that markets should be designed not only to meet the minimal 'needs' of stakeholders, but also to maximise the potential benefits and opportunities to them.

In general, we believe that this is achieved by opening up new services to competition, and encouraging innovation amongst energy utilities and suppliers.

Do you think that the main future network challenges and possible solutions have been identified in Section 3.4 and 3.5 respectively? If not, please provide details of additional challenges/solutions.

We think that the main challenges and solutions have been identified. Again we add that power storage can be as important a solution as distributed generation and demand-side resources.

Do you expect smarter grid solutions to be essential and/or lower cost than conventional solutions in the next few years? Do you have any evidence that they already are? If so, please provide details.

There are already areas where smart grid solutions are more effective and lower cost than conventional solutions. For example, the capital and operational cost of 1MW of demand response capacity is significantly lower than that of an equivalent gas peaking plant for balancing peak supply and demand. Cost-benefit analyses of AMI systems have concluded that operational savings and additional demand management benefits can outweigh installation costs. The incremental cost is even lower (and the cost-benefit ratio more favourable) if installations are in new-build houses or replacements for 'dumb' meters which have reached the end of their service lives.

Would you add to or change the regulatory challenges set out in Section 3.6?

We particularly support the sentiments outlined in the final paragraph of Section 3.6.1: *"It is vital, therefore, that in addition to pursuing established incentive regulation, regulators find ways of incentivising network companies to pursue innovative solutions where this can be considered as beneficial, taking account of direct and indirect benefits. Depending of the regulatory framework, regulators will critically assess incentivisation of network companies to pursue value for money of innovative solutions to the benefit of consumers. This overarching change of approach, including the expected effects and measurable quantities resulting from the deployment of the appropriate innovative solutions, is the key challenge for regulators."*

We believe that regulators must move from a narrow focus on cost minimisation to a broader set of objectives that includes environmental and societal benefits. This will require a shift from straight economic cost-benefit analyses to a more complex set of benefit considerations and performance indicators.

4. Priorities for Regulation

Do you agree that regulators should focus on outputs (i.e. the benefits of smart grids) rather than inputs (i.e. the technical details)?

Broadly speaking, we agree that regulators should steer clear of technology and implementation details, leaving these to utility companies, technology vendors and standards bodies. In general we believe that regulators should remain technology-agnostic, but seek to provide a level playing field for competing technologies and innovation. Regulators should instead seek to incentivise the desired outcomes.

However, there are a number of detail areas where regulatory influence can have a significant positive impact on outcomes, which should therefore be pursued, including:

- Developing and implementing regulations for open third party access to data and communication networks, since this access is crucial for stimulating competition in new services, while also maintaining data security.
- Enforcing the adoption of open, uniform interoperability standards, where these have been approved by standardisation bodies.
- Other market design initiatives for new smart grid systems, e.g. central repositories for metering data storage; regulatory structures for power storage, distributed energy resources, demand response and aggregation; design of new tariff structures for dynamic pricing, etc.

Which effects and benefits of smartness could be added to the list (1) - (7) presented in Section 4.1, Table 1? Which effects in this list are more significant to achieving EU targets? How can medium and long-term benefits (e.g. generation diversification and sustainability) be taken into account and measured in a future regulation?

We believe that the opportunity for new business models and opportunities in an intelligent energy system is a central benefit of 'smartness'. This includes such activities as demand response aggregation services, ownership and operation of energy storage or V2G assets for provision of grid

balancing services, provision of intelligence and automation technology for home and grid applications, and virtual power plant business models. We believe that these new opportunities will bring with them increased economic activity and innovation.

Which output measures should be in place to incentivise the performance of network companies? Which performance indicators can easily be assessed and cleansed of grid external effects? Which are suitable for European-level benchmarking and which others could suffer significant differences due to peculiar features of national/regional networks?

We believe those proposed are reasonable measures of performance, while acknowledging that some benefits are harder to quantify or measure than others.

Do you think that network companies need to be incentivised to pursue innovative solutions? How and what output measures could be set to ensure that the network companies pursue innovative solutions/technologies?

We believe that network companies should be incentivised to pursue innovative solutions, just as retail suppliers and ESCOs should be. However, the natural monopoly nature of the network business makes this very difficult, since competition is in general a powerful tool in stimulating innovation.

Encouraging innovation within a regulated entity requires different approaches. One approach would be to offer financial awards for projects which demonstrate innovative technologies, with the regulator responsible for making awards to projects it deems sufficiently innovative. The US Smart Grid Demonstration Program is an example of such a scheme. Another approach could offer incentives for deployment of particular solutions, such as phasor measurement units or flywheel storage.

The networks business is both monopolistic and risk-averse, so systemic incentivisation of innovation is difficult to achieve. It should also be noted that introducing innovative technologies in the network also carries technological risk, though this can be mitigated through careful design of pilot projects.

Do you consider that existing standards or lack of standards represent a barrier to the deployment of smart grids?

In recent years, some utilities have moved forward with smart metering or smart grid roll-outs despite the lack of international agreement on interoperability standards such as communication protocols and data structures. In these instances, such action has led to the establishment of de facto standards, which may in future drive up the cost of interoperability. There is a significant risk that future additions to such networks may require costly middleware, impeding the vision of a 'plug-and-play' smart grid.

In other cases, utilities have refrained from deploying technologies while standards-setting bodies complete their work in defining open interoperability standards. Here, a lack of clear standards has indeed acted as a barrier to deployment. Waiting for clear guidance on standards across the smart grid, from the home area network through AMI networks and electric vehicle charging, drives down implementation costs when the time comes, but delays the benefits that come with earlier deployment.

Interoperability is one of the most important barriers facing smart grid deployments, and the setting of open and uniform standards will be the solution.

Do you think that other barriers to deployment than those mentioned in this paper can be already identified?

We identify seven groups of barriers or bottlenecks, which will be discussed in an upcoming Bloomberg New Energy Finance White Paper. They are briefly summarised below:

- **Political will** is building behind the smart grid movement, and there is a growing recognition of the need for digital energy to enable the low-carbon economy. In order to develop full smart grids in the coming 10-20 years, continued support from policymakers is needed.
- **Regulatory structures and alignment of incentives** can be a major help or hindrance in encouraging both the right kinds of investments, and the development of the right technologies and services in digital energy. Energy regulators will play a central role in developing the structure of an intelligent energy system, by creating incentives for investment and encouraging new services and greater competition.
- **Access to financing** will be needed to drive digital energy investments. Trillions of dollars will be invested in moving to a low carbon economy, and digital energy will compete with other areas of clean energy for capital.

- **The utility business case** for digital energy investment will need to be carefully constructed and articulated, both for the utility and for the regulator. There must be a recognition of long term benefits, and the less-tangible societal and environmental goods promised by digital energy.
- **Technologies and standards:** In some areas, such as power storage, further development is needed to bring costs down. In others, reliability must be proven. Across the smart grid, standardisation is essential to guarantee interoperability between millions of devices from hundreds of vendors.
- **Data management, access and security** must be addressed carefully. Utilities have little experience managing the volumes of data that will be created by digital energy technologies. The concerns of different stakeholders will need to be balanced to implement effective access and security schemes.
- **Consumer engagement and awareness** is by no means assured. Governments, utilities and other stakeholders will need to do their utmost to win consumer support for digital energy investments. A concerted effort is also needed to effect behavioural change.

Do you believe new smart grid technologies could create cross subsidies between DSO and TSO network activities and other non-network activities?

The assignment of capital expenditure responsibilities and risk for smart grid technology roll-outs must be carefully examined to avoid cross-subsidies. For example, smart grid investments made by a DSO will drive up distribution network fees, while bringing benefits to other parts of the value chain, such as suppliers and generation companies.

What do you consider to be the regulatory priorities for electricity networks in relation to meeting the 2020 targets?

Renewable energy targets and carbon emissions legislation are typically the preserve of policymakers. We believe that electricity market regulators can make a significant contribution to meeting the 2020 targets in the following areas:

- Creating regulatory incentives and rewards for all parts of the electricity value chain to invest in energy efficiency. This includes TSOs, DSOs, retail suppliers and ESCOs, as well as the end user. Decoupling can play an important role. These are 'direct' measures aimed at improving energy efficiency.
- Encouraging investment in technologies and applications that are enablers, or 'indirect' measures, for renewable energy sources. Smart grid applications such as demand response, power storage and distributed generation are examples.
- Traditional regulatory objectives such as ensuring fairness of competition and low cost and reliability of supply remain as important as ever.

The upcoming Bloomberg New Energy Finance White Paper on smart grids also sets out recommendations for regulatory priorities, including the following:

- When considering utility investments in digital energy, regulators should move from a narrow reliability / cost of delivery paradigm to account for a broader set of benefits. Cost recovery structures for utilities should be re-assessed to consider whether they truly capture the wider benefits of digital energy.
- Regulators can help to ensure that the costs, benefits and risks of digital energy investments are distributed fairly amongst utilities, vendors, consumers and other players. This can be a particular challenge in unbundled, deregulated markets.
- As energy markets move towards more open competition, regulators should begin to encourage competition in new energy services, whether on the demand side (e.g. demand response; home energy management) or on the supply side (e.g. power storage for grid ancillary services). This includes setting clear data and network access rules that allow third party technology and service providers to compete with utilities for such services.
- Regulators should allow and encourage introduction of dynamic pricing where the appropriate AMI and HEM technology has been deployed, and design tariff structures that shift load effectively while minimising consumer risk and disruption. Mandatory dynamic pricing may make sense in particular regions once the technology has been rolled out.

About Bloomberg New Energy Finance

Bloomberg New Energy Finance is the world's leading provider of industry information and analysis to investors, corporations and governments in clean energy, low carbon technologies and the carbon markets.

This consultation response has been authored by the Energy Smart Technologies team at Bloomberg New Energy Finance, which provides subscription-based research and analysis on technologies and innovations that are changing the way we transmit, store and use energy – from the smart grid through energy efficiency to advanced vehicles and energy storage.

About Us

Subscription Details		sales@newenergyfinance.com
Contact Details	Albert Cheung Analyst, Energy Smart Technologies	albert.cheung@newenergyfinance.com +44 20 3216 4333