



**Consumer
Focus**
Campaigning for a fair deal

Consumer Focus response to the ERGEG Position Paper on Smart Grids

March 2010

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About Consumer Focus

Consumer Focus is the independent champion for consumers across England, Wales, Scotland, and (for postal consumers) in Northern Ireland. We operate across the whole of the economy, persuading businesses and public services to put consumers at the heart of what they do.

Consumer Focus was formed on 1 October 2008 through the merger of three organisations – energywatch, Postwatch and the National Consumer Council (including the Scottish and Welsh Consumer Councils). We are a statutory organisation that works in a devolved setting, with work priorities varying across different parts of the country, by all working to common strategic goals.

Through campaigning, advocacy and research, we champion consumers' interests in private and public sectors by working to secure fairer markets, greater value for money, and improved customer service. We have a particular focus on the interests of consumers in markets that are 'designated' by Government as requiring additional consumer advocacy. Currently these include energy and postal service consumers.

Consumer Focus also has a commitment to work on behalf of vulnerable and disadvantaged consumers, and a duty to work on issues of sustainable development.

Our response

Consumer Focus welcomes the opportunity to respond to this important consultation.

This first part of the response comments on high-level objectives and drivers, including the importance of smart grid development in empowering consumers in markets that are generator-dominated. The second part addresses the specific consultation questions raised by the European Regulators' Group for Electricity and Gas (EREG).

Defining the task

The development of the concept of smart grids is set against the background of the need to move swiftly towards a low carbon economy. Including much larger volumes of renewable output in the generation mix, which is frequently embedded in distribution systems and often intermittent in nature, will require wholesale changes to the planning, design and operation of the electricity networks to enable its benefits to be fully realised. However, the debate is presently high-level, and there remains a significant degree of uncertainty over the most appropriate shape of future power systems. The changes required to enable delivery go beyond technology for the networks and include regulatory, legal, commercial, market, industry and cultural changes. The whole area of customer interaction and impacts embraces many of these areas but is not well-understood, and engagement with consumer groups tends to be an after-thought.

One issue is definitional. The term 'smart grid' has been used as a catch-all for a variety of concepts and solutions. We are comfortable with the starting point definition proposed in the paper that a smart grid is 'an electricity network that can cost efficiently integrate the behaviour and actions of **all users** connected to it – generators and consumers and those that do both – in order to ensure economically efficient, sustainable power systems with low losses and high levels of quality and security of supply and safety.'

It is clear that smart grid development holds out the prospect of more active participation by consumers in the electricity sector but there remains considerable scoping work to be undertaken before delivery routes become clearer and options have been properly assessed. This is well-evidenced by technical work-streams to date. Here in the UK the British regulator Ofgem has been overseeing an important energy demand research project for several years, which has struggled to deliver clear results¹, and communication channels back to consumers are not well-defined.

Consumers have an interest at several levels in the process of moving towards smarter grids. They will, of course, be the beneficiaries from being more active participants in their consumption of energy (many with microgeneration for energy production), assuming they receive accurate and timely bills. This involvement over time might extend to consumers participating in the market themselves through suppliers or agents aggregating load response. But they are also the ultimate funders of the technology that will be provided, both through regulated charges paid to the network businesses for owning and operating the systems, and through the added-value services their suppliers or retailers provide. On a different front, there are also important data protection and privacy issues that will inevitably impact on them.

¹ <http://www.ofgem.gov.uk/Sustainability/EDRP/Pages/EDRP.aspx>

The reality is, however, that established industry players dominate the policy debates. All these players should make real efforts to be aware of the consumer implications of the options, and to do this they must actively engage with customers and consumer groups. Ultimately customer acceptance of measures and their cost should be an important pre-condition of progress and the mix of measures selected. It is also crucial that consumers can share appropriately in the value they help create.

Setting the agenda

We consider that there are a large number of important issues and challenges that will need to be addressed if **smart grids** are to realise their undoubted potential and maximise benefits for consumers. These include:

- adequately understanding the scale of the potential **costs and benefits** (and the likely trade-off). Any costs for infrastructure investment must be fair and transparent and be determined through established regulatory processes, and any savings from implementation of smart grids must be passed through to consumers too
- understanding and addressing the range of potential **impacts on consumers**, including the potential for more active engagement of consumers with their energy consumption and issues of social equity in their willingness and ability to engage. In this context it will be important to consider the ability of different customer groups to engage in these new opportunities and how rules and incentives can be finessed to make sure some customer types are not disadvantaged (eg vulnerable customers picking up costs but not sharing in benefits because they cannot invest in 'smart' appliances). Also consideration should be directed at any safeguards needed to be put in place to ensure that consumers are protected from any detrimental impact from new functionality resulting from smart grids
- the scope for the development of **new markets** and the impacts on competition, especially in the energy and communications retail sector

Particular issues in need of consideration are:

- **customer protection** – clear protocols need to be put in place relating to the use of appliances for demand-side management before this develops. When it comes to active network management in homes, how should the hierarchy of operational controls be set? Will it be network businesses, suppliers or customers who control demand-side use in the home and in business? How should an equitable balance be struck?
- **data protection** and privacy issues – privacy by design should be a key requirement. This means that the security architecture and standards should be built in at the outset for the hardware and software, as well as any systems and processes, rather than bolted on later. This should apply to connections between the home meter and the energy supplier, the in-home local area network and the wider grid communications. Systems and meters should be road tested for a minimum of six months
- **Security of networks** – are the networks hack and tamper proof? How do you ensure security of supply if a breach occurs? What protections will be in place for vulnerable consumers whose health and well-being could be put in danger if disconnected? IO Active has done a lot of work in highlighting serious weaknesses in smart grids and metering. They were able to hack into and spread viruses around smart grids with relative ease. These attacks were able to connect and disconnect customers at predetermined times, change metering

data and calibration constants, change the meter's communication frequency and render the meter non-functional²

- **choice** – should some arrangements be mandated or can consumers opt in and out of schemes?
- **cost allocation** – how should costs be allocated between different consumer types?
- **vulnerable consumers** raise particular considerations – how will they be protected from any adverse affects of remote management and customer profiling?

We think the ERGEG consultation provides a good basis for progressing the debate and addressing these issues. In particular we broadly support the proposed user-centric approach. In terms of the approach to regulation, we support the use of output-based regulation, and we also agree that encouraging innovation in network operators is a major challenge that needs to be addressed in an environment where many operators see their primary function as focused on cost control. The reality is that network regulation has historically focused on delivering cost efficiency, and careful thought is needed on the appropriate incentives that will bring about the necessary cultural change to deliver the 'smart' agenda.

Smart meters are of course essential for the deployment of smart grids. A proper assessment of the risks and opportunities needs to be developed to ensure the success of any roll-out. Experiences in the Netherlands, Southern Australia and California, where energy prices are under investigation – particularly in the Netherlands where smart meter roll out was halted – should be a strong reminder of the risks associated with failure to take consumer issues into account.

Understanding of the role of **smart tariffs** is another key area for assessment. Our experience is that customers are not perfectly able to assimilate price information and – as it is sometimes claimed – to make decisions around energy consumption in the interest of the wider market³. One important study has found that customers with load under 20kW of maximum demand were not price responsive at all to time of use or critical peak pricing and that only with automated technology did they reduce demand⁴. And for customers with maximum demand between 20kW and 200kW, they were twice as responsive with automated technology as they were without it. Such analysis would suggest that price is relatively ineffective in causing a demand response.

Energy efficient use is determined by a range of factors, and not just the price of energy and the value gained from using it, as is often implied by policy makers and regulators. Not all consumers will be impacted equally, with some potentially experiencing detriment. It is well-documented that consumers do not always choose tariff options in their best interest⁵. Ofgem's probe into the energy retail market showed that as many as one third of switchers may not achieve a price reduction⁶.

Smart grids are usually seen as the precursor to **dynamic pricing** structures, though we strongly believe that much more analysis is required in this area too. Time-of-use tariffs and critical peak pricing have many proponents. It needs to be remembered that they are often low value for retailers, because they are unable to add value through managing price volatility. There are risks that such arrangements would only be made available to

² <http://www.datacenter-edge.com/content/securing-smart-grid-road-ahead>

³ California's State-wide pricing pilot: Commercial and industrial analysis update (March 2006)

⁴ Ibid

⁵ Do consumers switch to the best suppliers? Catherine Waddams (2008)

http://www.uea.ac.uk/polopoly_fs/1.104632!ccp_07-6_pb.pdf

⁶ <http://www.ofgem.gov.uk/Markets/RetMkts/ensuppro/Documents1/Energy%20Supply%20Probe%20-%20Initial%20Findings%20Report.pdf>

low value – usually vulnerable – customers as retailers will look to maintain profits from higher value customers. Much more research is needed into the merits of exposing customers to wholesale price volatility. The impact of smart tariffs on different consumer groups and the incentives on retailers to offer them are also areas that need to be better understood.

In this context Ofgem's recent paper, *Can energy charges encourage energy efficiency?*⁷ states that 'different pricing structures could, in some cases, lead to negative welfare effects as there are significant differences across income groups in price sensitivity and the affordability of substitutes, including energy efficiency measures.' The assumption is that consumers will benefit from lower cost, off-peak pricing, but the reality may be that some groups such as the working poor, or those with little discretionary energy load, are unable to switch their energy patterns.

Another important development route is **direct load control** (for instance, load curtailment for industrial processes through to remote controlled thermostats at the domestic end of the market), which can operate independently of smart meters and prices. To realise potential, there needs to be effective integration of demand management with network planning, and systematic approaches are needed to identify demand-side opportunities as part of network planning. These issues should be another primary focus of work going forward.

More generally there is a strong evidence base that most consumers are reluctant to engage in real-time energy markets, smart or otherwise, especially where administered programmes are available⁸. There are evident opportunities from improved price signals, but added complexity, and it is important the trade-offs are identified.

Like any market, the energy market exists to serve the needs of consumers, not for consumers to serve the needs of energy markets. It follows that smart grid development needs to take into account the issues identified in this response. Above all it must be able to demonstrate and quantify the associated benefits to consumers and citizens from the very different delivery routes available and then ensure that regulatory structures are properly adapted so that they can be properly communicated and acted upon by consumers.

⁷ <http://www.ofgem.gov.uk/Sustainability/Documents1/Final%20discussion%20paper%2022%20July.pdf>

⁸ Empirical analysis from North America suggests, faced with choice, many consumers prefer direct load control to price response programmes. See footnote 2 above, plus evidence from Southern California Edison: http://www.hks.harvard.edu/hepg/Papers/2009/Jazayeri_Akbar_HEPGOct09.pdf

Our response to ERGEG questions

Section 1: Introduction

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

Yes. The imperative is to move to a low carbon economy. This will require major changes in the electricity networks that cannot be handled on a business-as-usual basis. The scale of this challenge requires an approach that will enable speedier implementation of some of the key elements in achieving lower emissions, such as the deployment of higher levels of renewable and low carbon generation – and more efficient consumption decisions by the consumer.

2. Do you agree with ERGEG's understanding of smart grid? If not please specify why not.

Yes. We agree that the difference between today's grid and a smart grid of the future is mainly the grid's capability to handle more complexity than today but in an efficient and effective way, and that this complexity is due to factors including massive implementation of distributed generation at low voltage level; implementation of large intermittent generation located geographically far away from load centres; and changes in customers' behaviour such that there is an active demand side.

3. 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?

The objectives of reducing carbon emissions and improving the efficiency of energy use and how it is delivered needs to lead to a reconsideration of the way that energy network companies earn revenues in a regulated environment. It may be that electricity consumption and network use itself does not reduce if, for example, there is widespread increase in the use of electric vehicles. But an important consideration must be to decouple profits from the volume of energy supplied. One approach adopted by the British regulator has been to focus more on wider consideration of the outputs that network companies may be required to provide in return for the revenue that they receive. Please see our comments below on output measures.

Section 2: Drivers for smart meters

4. 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.

Yes, we consider that this represents a full description of the relevant drivers presented from a technical perspective. We note that end-user participation is considered 'paramount' in increasing energy efficiency and demand response and that ERGEG

states that the possibilities for activity are largely dependent on the functionalities of the metering system, a proposition with which we agree. We would add that participation also depends crucially on market arrangements to facilitate participation as well as on the willingness of consumers to become engaged.

Section 3: Smart grid opportunities and regulatory challenges

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

Yes, the requirements of grid users – including customers – should be central when considering how to develop and deploy smart grids. We agree that network companies need to develop a more user-centric approach, explaining the role they play and proactively engaging with users of the network, supply companies and their customers.

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

A fundamental requirement in achieving the potential benefits of smart grids will be for energy suppliers and energy service companies to understand the needs of their customers. We agree that in order to fully realise the benefits of smart grids, users will need to be actively engaged in the process of shaping how they operate. In competitive markets energy suppliers will already have incentives to seek out the best ways of providing the services their customers want within the market and regulatory framework they operate in. They will also need to consider any measures imposed by regulators to ensure that vulnerable customers are treated fairly with regard to opportunities to participate and sharing the associated costs.

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

We consider that the main needs have been identified. We also agree that the transition towards smart grids will be an evolutionary process and that new requirements may well emerge over time requiring the development of new services. This requires both continuing engagement of the network companies and suppliers with their customers, and flexibility in market and regulatory arrangements in order to cope with change and innovation.

8. 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 consider that ERGEG has broadly defined the main future network challenges.

9. 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.

Smart grid solutions should provide significant opportunities to meet the objective of moving to a lower carbon economy more quickly and effectively than continuing along the path of large generators supplying inelastic demand. It is not clear at this stage whether smart grid solutions will be lower cost than conventional solutions, but it is likely that cost-benefit assessments would show over time real savings from foregone network investment.

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

We agree that (a) encouraging innovation and (b) enabling the network companies to identify and prioritise specific smart grid solutions that can more effectively meet users' needs, are two major regulatory challenges in moving to smarter grids.

But we believe that this challenge needs to be considered in the context of the wider regulatory developments which will need to support the movement towards smarter grids. Issues here include: how to ensure that consumers see the benefits, both in terms of the results of improved efficiency by the networks and through their active participation in the demand side; and how to ensure that network companies are effectively engaging with consumers in order to determine what it is they require.

Section 4: Priorities for regulation

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

Yes, we consider that focusing on outputs will give grid operators a clear understanding of what they are required to achieve, while allowing them the flexibility to determine the best way to achieve it. This is more likely to lead to innovative solutions that may benefit consumers than regulation focused on inputs. An important proviso is that the outputs should be discussed and agreed with network users and their customers.

12. 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 (eg generation diversification and sustainability) be taken into account and measured in a future regulation?

There are currently no measures included in the list that directly measure the impact on customers in terms of their experience and satisfaction with the impact of smarter grids. We believe that these should be included and that they should cover all types of end-users. For domestic customers it might be expected that performance measures would consider their satisfaction with the experience of smart meters where installed as well as any improvements to quality of supply.

We also consider that there should be performance indicators related, in particular, to the impacts on vulnerable customers.

13. 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 consider that a broad range of output measures may be appropriate to incentivise performance in a range of relevant areas, including network performance, service delivery, impacts on the environment and outputs relating to customer satisfaction.

14. 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?

By their nature it is not easy to define output measures for innovation as the output cannot be defined with any precision in advance. One approach, at least to start with, would be to adopt something similar to the Low Carbon Network (LCN) fund being implemented for the next distribution price control in Great Britain from April 2010. This, will put in place arrangements for a £500 million fund to encourage distribution networks to trial new technologies, systems and commercial and network operating arrangements. Up to 90 per cent of a project's finance will be covered by the LCN fund – with the distributor covering the balance – and a condition of participating is that the distributors will have to share learning between themselves in order to maximise industry benefit.

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

Yes. Differing standards could become a barrier to the development of more efficient electricity grids. Therefore we welcome the regulators' willingness to co-operate with European standardisation bodies in order to promote open protocols and standard models for information management and data exchange, to achieve interoperability of smart grid devices.

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

To realise the full benefits of smart meters for consumers, there will need to be a behavioural shift in the role of the consumer. We need to move from passive users expecting generation to meet demand to more proactive and thoughtful users who may reduce or change their own energy use and/or generate their own power in response to the usage and cost information provided. This is a critical and fundamental shift in behaviour by most consumers. There are presently barriers to achieving this, including lack of adequate information or inertia. Policy makers and regulators have an important role in ensuring regulated networks communicate the benefits in a way that customers can understand and act on.

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

The potential for this is identified in the paper, and it is one area that appropriate regulation will need to guard against.

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

ERGEG has identified developing output regulation, and for regulators to have an active role in favouring co-operation among stakeholders to achieve national and European targets by the various smart grid concepts, innovations and solutions. We consider that a third priority should be that regulators should promote the requirement of network companies to engage with their customers, to ensure that what they propose to provide meets consumers needs. Particularly as the idea of smart grids is a relatively new and evolving concept, it would seem vital that the providers of services keep close to their

customers. This could include consumers helping to determine the appropriate output measures.

We also believe that regulators should ensure that consumers should share appropriately in any cost savings achieved by the network operators in adopting smart meter technology, as well as any specific gains from their more active participants.

Consumer Focus response to the ERGEG Position Paper on Smart Grids

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