

## EUROPEAN ENERGY REGULATORS' VIEWS ON REGULATING SMART DISTRIBUTION NETWORKS

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### ABSTRACT

*The European Energy Regulators' Group for Electricity and Gas (ERGEG) launched a public consultation on its position on smart grids on the 17<sup>th</sup> of December 2009. The consultation period ended on the 1<sup>st</sup> of March 2010 and ERGEG published a Conclusions Paper, including an evaluation of comments received, on 10 June 2010. This CIRE D paper addresses the regulatory priorities highlighted by the consultation that the development of smarter electricity networks will present. Its focus is on distribution networks. It explains the drivers behind the consultation, reviews the key issues addressed and summarises the conclusions reached.*

### INTRODUCTION: ERGEG'S CONSULTATION KEY ISSUES

The European Energy Regulators have addressed the smart grids issue through their associations (CEER - Council of European Energy Regulators and ERGEG - European Regulators' Group for Electricity and Gas). In December 2009, ERGEG issued a position paper for public consultation [1]. The Consultation Paper explored the drivers and opportunities for smart grids and discussed the regulatory challenges and priorities. It posed a number of key questions and issues for stakeholders to respond to.

The ERGEG smart grids consultation had two primary purposes. The first was to collect the views of all stakeholders to assist regulators in understanding how smart grids can benefit network users. The second was to explore ways in which smart grids deployment, where cost effective, can be encouraged.

The consultation generated significant interest amongst stakeholders. 104 people attended the consultation workshop held in Brussels on 17 March 2010 and 50 written responses were received. The responses offered a

high level of support for the positions set out by ERGEG in the Consultation Paper although alternative views were also expressed.

The key issues were effectively captured by the questions posed in the consultation paper which covered four areas:

1. A common view was sought on the challenges for networks and the understanding of what a smart grid is. The important issue of how to reconcile energy efficiency with regulatory mechanisms was also raised.
2. The consultation discussed the drivers for smart grids.
3. It explored the opportunities for smarter grids and the regulatory challenges.
4. It sought stakeholder views on the regulatory priorities.

While the Consultation Paper and the Conclusions Paper [2] addressed all of these areas, this CIRE D paper focuses on the last of them – the regulatory priorities. The other areas are also discussed in a separate paper [3], which focused on the content of the Consultation Paper.

This paper initially provides a concise review of the European Union (EU) energy targets, the role of smart grids to help achieve them and a high level summary of the regulator's role. The paper's main focus is on regulatory priorities. Finally, it sets out ERGEG's conclusions and recommendations on smart grids and briefly describes the follow-up work by European Energy Regulators.

### EU ENERGY TARGETS AND SMART GRIDS

Key objectives of the European Union for the year 2020, with regard to energy, are to increase renewable energy supply to 20% of total demand, reduce energy consumption by 20% with respect to 2020 forecasts and reduce greenhouse gas emissions by 20% with respect to 1990 levels. More ambitious targets for 2050 are expected to be published in spring 2011. The electricity supply sector will make a major contribution to achieving these targets and the engagement and support of all stakeholders will be

essential.

The development of smarter grids will help meet the 2020 targets. It also has the potential to deliver additional improvements to network planning, operation, asset management and network engineering. Smarter grids should have a positive impact on the efficiency as well as on the quality and security of supply to the end users.

### **SMART GRIDS - THE REGULATOR'S ROLE**

It is important to state clearly the role of the regulator in relation to smart grids. Regulators approach this issue from a technology neutral perspective. The deployment of new technologies must be a means to an end, not an end in itself. Investment in 'smarter' networks must provide better value for customers, including indirect benefits such as diversification of supply. If smarter networks are to play a role in delivering the 2020 targets, it is vital that regulatory mechanisms stimulate such developments directly (e.g. by market and technical rules) and by adequate and cost efficient regulatory incentives. Regulators therefore act as key facilitators in this process, by identifying and removing possible barriers and by finding solutions that provide an appropriate balance between all the stakeholders' positions.

### **REGULATORY PRIORITIES**

The most frequent comment, especially from network operators, was that a stable regulatory framework was essential to encourage investment. ERGEG understands the importance of regulatory stability and that it is a necessary pre-condition for the significant investments that are expected in transmission and distribution networks. Given that changes in the electricity network sector will arise in the future, national regulators are recommended to pursue this goal where possible and appropriate. ERGEG still holds the viewpoint, expressed in the Consultation Paper, that it is important to ensure regulatory stability and a long-term reasonable rate of return.

Three main priorities were identified by respondents and by ERGEG in the Conclusions Paper published in June 2010:

- 1) to focus on the performance of network companies in terms of the outputs delivered (so-called "output regulation");
- 2) to encourage innovation while protecting consumers' interests; and
- 3) to encourage co-operation amongst stakeholders, with special care to standardisation and to identify possible barriers to smart grid deployment.

### **Network performance outputs**

The Consultation Paper proposed seven benefits that smarter grids could help deliver and the potential performance indicators for each of them. As a result of the consultation, this list of benefits was revised and expanded.

The national differences, as identified by ERGEG, regarding the choice of performance indicators were confirmed by many respondents. Developing a smarter grid is not a goal in itself but it is a means to reach efficient solutions. It is recognised that extant solutions may represent the most efficient measure in many situations.

The revised list of eight benefits and performance indicators addressed: 1) sustainability; 2) network capacity; 3) ease of providing new connections; 4) satisfactory security and quality of supply; 5) enhanced efficiency, balancing losses, utilisation and availability; 6) effective provision of interconnection capacity between countries; 7) co-ordinated network development, where beneficial, across Europe; and 8) enhanced consumer awareness and participation.

### **Potential performance indicators for distribution networks**

ERGEG proposed in the Consultation Paper a list of 23 potential performance indicators, which was expanded to 34 indicators after the consultation process. Of these, the following examples are particularly applicable to distribution networks (the number corresponds to the benefits identified above):

- 1-Quantified reductions of carbon emissions;
- 2-Hosting capacity for distributed energy resources ('DER hosting capacity');
- 2-Energy not withdrawn from renewable sources (RES) due to congestion;
- 3-Time to connect a new user;
- 4-Measured satisfaction of distribution grid users for the "grid" services they receive;
- 4-Duration and frequency of interruptions per customer;
- 4-Voltage quality performance of distribution grids;
- 5-Level of losses in distribution networks;
- 5-Actual availability of network capacity (e.g. 'DER hosting capacity') with respect to its standard value.

Some indicators are already adopted in EU or national policies or benchmarked in European practice. The consultation confirmed ERGEG's preliminary opinion that the choice of the best indicators to be implemented can vary from country to country. The consultation process also confirmed that performance indicators should not be distorted by effects outside the control of network operators. For example, force majeure events may be excluded in the calculations of continuity of supply indicators.

### **Potential indicators for users**

The most significant change in the list of indicators, following the consultation was the addition of five indicators focussed on the users of electricity networks. Benefit (8), 'Enhanced consumer awareness and participation in the market by new players', was also introduced after the consultation process. Such indicators

include:

- 8-Percentage of total demand participating in the market to provide demand flexibility;
- 8-Measured changes in electricity consumption patterns resulting from new (voluntary) pricing schemes;
- 8-Percentage of consumers on (voluntary) time-of-use / critical peak / real time dynamic pricing.

The pricing/offer schemes were not discussed in any detail in the ERGEG smart grid papers as they are primarily market rather than network issues. Smart metering and related regulatory issues are treated as a separate topic [4].

### **Research, development, demonstration and knowledge dissemination**

The consultation demonstrated wide support for regulators to encourage innovation. However, it is acknowledged that output measures, as discussed above, may not be appropriate for demonstration projects as they will have different success criteria than 'business as usual' activities.

It is also considered important to ensure that learning and results from demonstration projects, particularly those funded by network tariffs and other public funds at European and national levels must be widely disseminated between network companies, regulators and others. In particular, where regulators allow funding of innovation from regulated tariffs, the knowledge generated should be widely disseminated without commercial constraint.

### **Encourage co-operation**

The specific challenges facing network operators will differ depending on the particular characteristics of each network. Nevertheless, there is expected to be a high degree of commonality in the way that smarter grid solutions are developed. Also, in order to enhance the cost effectiveness of these solutions standardisation and interoperability will be essential.

One area where there was disagreement was in relation to the need for more standards for smart grids. Opposing views were expressed by different parties. The issue of orientating the standardisation activities is now being taken forward by the European Commission, as discussed in the section "Ongoing Work By Regulators".

It is therefore of fundamental importance that there is a high degree of co-operation between all stakeholders in the development of smarter networks. The Conclusions Paper recommended that regulators should participate in 'smart grids' discussions and cooperation activities among stakeholders. In particular, regulators should consider active cooperation with European and national standardisation organisations, network operators and

manufacturers in order to achieve interoperability of smart grid devices and systems. An example of the need for this was in relation to open protocols and standards for information management and data exchange.

The participation of regulators in this process could reduce the risk of having duplication of costs and financial burden for the consumers.

## **CONCLUSIONS AND RECOMMENDATIONS**

ERGEG derived a set of conclusions and recommendations as a result of the consultation for an effective development of smart grids.

There is an almost unanimous consensus that the network companies are facing significant challenges in playing their part in the low-carbon transition. There remains some confusion as to what a smart grid is but there is broad support for ERGEG's user-centric definition.

Smart Grid is an electricity network that can cost efficiently integrate the behaviour and actions of all users connected to it – generators, consumers and those that do both – in order to ensure economically efficient, sustainable power system with low losses and high levels of quality and security of supply and safety.

A significant number of stakeholders are calling for a step change in network investment (especially in distribution grids) to deliver a smarter grid and there needs to be clarity as to the roles and responsibilities of all parties involved.

A case can be made for the costs of initial demonstration, where risks are higher, being funded from regulated tariffs. However, there should be clarity about the difference between research and development and initial demonstration and the most appropriate sources of funding for each. The most appropriate approaches will vary between countries. It is expected that different incentive mechanisms will be appropriate for demonstration and deployment. A performance/output based approach could fit well with smart grid deployment.

Cost benefit analysis of smart grid solutions presents its own challenges. Agreement on the beneficial effects and of their performance indicators is necessary to perform this analysis both for demonstration projects and, most importantly, for wider deployment programmes.

Finally, ERGEG concluded that wide co-operation among stakeholders will be vital to quickly identify challenges that are unforeseen at present. Thereafter, policy and regulatory attention must focus on finding solutions that provide an appropriate balance between all the stakeholders' positions.

ERGEG's recommendations are:

- to ensure, as appropriate, a long-term stable regulatory framework and reasonable rate of return for network investments;
- to consider decoupling between network operators' profits and volumes of electricity they deliver;
- to pursue regulation of outputs as a mechanism to ensure value for money paid by network users and to investigate metrics for the quantification of the most important output effects and benefits at national level;
- to promote mechanisms favouring an improved awareness of consumers through actions of suppliers and other market participants and an improved engagement of network operators with their network users;
- to encourage the deployment of smart grid solutions, where they are a cost-effective alternative for existing solutions, and as a first step in this direction, to find ways of incentivising network companies to pursue innovative solutions where this can be considered beneficial from the viewpoint of the society;
- to evaluate the breakdown of costs and benefits of possible demonstration projects for each network stakeholder and to take decisions or give advice to decision-makers based on societal cost-benefit assessment which take into account costs and benefits for each stakeholder and for the society as a whole;
- to ensure dissemination of the results and lessons learned from the demonstration projects (co-)financed by network tariffs to all interested parties, including other network operators, market participants, etc.;
- to participate in 'smart grids' discussions and cooperation activities among stakeholders and especially to consider an active cooperation with European and national standardisation organisations, network operators and manufacturers, for example on open protocols and standards for information management and data exchange, in order to achieve interoperability of smart grid devices and systems;
- to carefully monitor the possible presence of cross subsidies between network activities by TSOs or DSOs and market-based activities;
- to continue their exchange of expertise at European level, in order to learn as soon as possible from best regulatory practices.

## ONGOING WORK BY REGULATORS

European Energy Regulators are now following up the priorities and recommendations set out in the Conclusions Paper. During 2011, a 'status review on regulatory approaches to smart grids' report will be published by CEER, including attention to output measures and performance indicators adopted in the various countries. With regard to innovation, some regulators at national level

are promoting demonstration projects. With regard to cooperation and standardisation, ERGEG was very active in the framework of the Task Force for the Implementation of Smart Grids, promoted by the European Commission. This Task Force is setting up a mandate on smart grids to the three European standards organisations; CEN (European Committee for Standardisation), CENELEC (European Committee for Electrotechnical Standardisation) and ETSI (The European Telecommunications Standards Institute). Further, the Task Force already identified the role and responsibilities of smart grid stakeholders.

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