EURELECTRIC Comments on ERGEG Position Paper on Smart Grids

A EURELECTRIC position paper

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EURELECTRIC Comments on ERGEG Position Paper on Smart Grids

WG Smart Grids / Network of the Future
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1. Introduction

The European Regulators Group for Electricity and Gas (ERGEG) has recently published a set of consultation papers to which EURELECTRIC would like to respond.

One of these papers is a Position Paper on Smart Grids – an ERGEG Public Consultation Paper. This ERGEG position paper on smart grids aims to initiate a dialogue with all stakeholders of the European electricity power systems and markets, in order to assist regulators in understanding how smart grids can benefit network users and, assuming that cost-effective benefits can be identified, to explore ways in which the development of smart grids can be encouraged. This paper explores the drivers and opportunities for 'smarter' networks from the users' perspective. Most importantly, it discusses the regulatory challenges and priorities and proposes a number of questions and issues for stakeholders to respond to.

CEER invites all stakeholders interested in smart grids to respond to this consultation, both in general and in relation to the SPECIFIC questions in Section 1.3 of the report.

2. General Comments

EURELECTRIC welcomes the opportunity to comment Smart Grids approaches throughout the EU electricity grids. EURELECTRIC would like to point out that the regulation of Smart Grids has been a largely unexplored area until now. Thankfully, ERGEG has now highlighted the major challenges and has provided some suggestions for possible solutions. However, some of these are only partially feasible or are still under development. . The paper describes a number of important views and proposals regarding, but not all, regulatory aspects of electricity networks and its regulation in the future.

One of the main issues addressed in this paper that need clarification is the distribution of roles and responsibilities between electricity suppliers, DSOs, and, depending on the market model, specific metering companies (installation & maintenance) and metering service providers (reading & distribution of the meter data). For example, the distinctions between the innovations from the grid operators that are essential and those that can result from competition are not clear.

We suggest that ERGEG elaborates on the role of power, equipment and services suppliers in making sure smart grids are used to maximum effect and how they can be an essential link to the customer. Suppliers and ESCOs will be actively involved in offering energy related services and new products to customers. It is essential that the roles and responsibilities of the different actors are clearly defined, where a distinction is made between competitive activities of suppliers and ESCOs on the one hand, and regulated activities of DSOs on the other hand. Competition will encourage innovative approaches aimed at better meeting customers' requirements.

It cannot be questioned that the grid operators lying under the jurisdiction of the regulators are indispensable in the introduction of Smart Grids, but the competitive value-adding steps also play an important role. The added value can be enhanced by introducing flexible grid fee and power price structures which offer customers an incentive for better grid loading and a reduction of peak loads. In addition, the dissemination of smart meter technology is promoted.

EURELECTRIC recognises the need for continuous focus of regulators on the grid area and, where necessary, also on their cooperation in the definition of standards. This is not always made clear in the paper. For example, in section 3.4.2 (Challenges related to needs of customers) sales and marketing questions are examined with regard to the grid-related section 3.4 (Network challenges). The grid operator has on the one hand no influence on sales and marketing activities and on the other hand, for reasons of unbundling there should be no incentive created for the grid operator to intervene in these activities, which are the role of energy suppliers and other market operators.

In addition to the bi-directional communication network the grids of the future shall be transformed from being passive to be active at distribution level with adequate sensors that will provide effective distributed control and self healing capabilities. Microgrids shall emerge that will facilitate effective islanding, hence improved reliability for all customers and quality of supply at connection point.

EURELECTRIC would like to underline that there is a clear need for more discussion on the basic approach suggested by the ERGEG. More details must be specified and some elements could be reconsidered, as for example:

- **Technology neutrality and promotion of standardisation** as well as stakeholder and grid cooperation. EURELECTRIC agrees with this approach.

- **"User-centric approach":** A user-centric model is a model where the customer is at the centre and the supplier is their major point of contact, while ensuring that also the role and needs of the grid operator are correctly taken into account. We feel this should come across more clearly in the ERGEG document. The regulator should indeed provide appropriate incentives for the grid operator to sufficiently invest in a smart infrastructure, but he should also ensure a suitable return on investment, especially if this investment provides no other advantages for the grid operator within the remaining regulations. This does not exclude but rather requires that the needs of the grid users and the power and services' suppliers should be clearly determined and also taken into account when initially defining the investment requirements.

- **Subsidiarity**: ERGEG rightly emphasises the need to account for state-specific issues. However, a "commercial subsidiarity" is just as important, which ensures that the introduction and use of Smart Grids must be performed as far as possible by the competitively organised power suppliers and their customers. Only in cases where these cannot be active should the regulated area of the grid come into effect. In the sense of the ERGEG approach, this also conforms to the principle that regulation should (only) apply to monopoly areas and preference should be given to competition in the remaining areas.

The authors rightly highlight the problem that classical incentive regulation does not necessarily create compulsory incentives for technical innovation. In an incentive based regulatory regime, however, this innovation occurs wherever the grid operator can save money through the use of new technology. The introduction of "smart" elements can contribute to this objective, for example when a corresponding quality component is included in the incentive regulation. For example, under the conditions imposed by an incentive regulation, sensor innovations that provide early damage recognition or allow the creation of a "self-healing" grid would become attractive. Beyond this, the installation of smart elements in a grid may have certain uses that may not be of benefit to the grid operator under classical incentive regulations. In this sense, regulatory incentives for the grid operator to make the necessary investments must be created. This raises the problem of finding suitable performance indicators that can be used to measure

the success of an efficient smart grid strategy from the point of view of the users and provide suitable remuneration for this. As discussed in the paper, the major challenges facing the regulators are thus:

- the definition of a distinction between the measures that the grid operators can take and purely (or partially) external measures,
- the definition of a distinction between the grid performance indicators that the grid operators can influence and those that they cannot influence,
- the identification of suitable indicators.

EURELECTRIC agrees that the future smart grid will be technically very similar to the today's 'conventional' grid. The addition of the communications network to the electricity network will create the major difference. The cost-efficient integration of these communications systems, particularly at medium and low voltage levels, will be an important challenge.

Smart Grid will contribute to a paradigm shift in the way electricity networks will be planned, operated and maintained in the future. This paradigm shift will be achieved by incremental deployment of innovative new technologies and solutions as networks are renewed and expanded. With this evolution, the power grid will become a platform for advanced business and new energy services and products are to be provided by the suppliers and other market operators, for instance ESCOs. This is expected to offer added value for the customers, market players and the society. This will most probably require more changes in market structure, commercial arrangements and certainly regulation. Defining the interfaces between regulated and non regulated activities is highly needed. Within this framework and in order to optimise the possible benefits of smart grids, EURELECTRIC would like to underline that there is a need to develop new grid tariff and commodity price structures (dynamic pricing) ; in this context the introduction of a . fixed net tariff structure based on, for example, agreed power could also be assessed.

A vital precondition for a successful Smart Grid implementation is the neutral role of the Smart Grid and the DSO role / service provider responsible for access to the grid, metering, and depending on the market model also metering data management. Together this should create a neutral market platform where DSOs act as market facilitators. This optimally responds to the needs of the market parties.

The economic regulations for the DSO's should give suitable incentives for making the necessary investments according to regulations and market demands. Using a market based strategy and a technology neutral approach will contribute to an efficient and dynamic development to the best for the customers.

3. Specific comments

The comments below are related to specific chapters, page and paragraph on page as for example: 2.3-19-2 in which 2.3 is the chapter, 19 is the page number and 2 is the paragraph on page.

2.3- 19-2: benchmarking of planning criteria and infrastructure costs

EURELECTRIC experts believe that a meaningful benchmarking will be difficult, because of the very different situations in countries and regions a different historical evolution of grids.

2.4-20-1: electrical vehicles - storage of energy easy available

"easy" is not a suitable expression, because it is definitely not easy. "Better: could be a possibility of storage”

3.3-24-2 (Bullet point 4): improved quality per customer and tailored contracts

Quality generally cannot be designed per customer, but it is defined per region. Tailored contracts and quality will be exceptional cases, but not a general possibility or right.

3.4-24-last: the smaller the generator the easier the connection

This statement needs discussion. It may be correct for absolute costs, but not relative to the size of the generator. Investments into LV-grid for a small generator can be relatively more expensive than investments into HV grid for a large generator.

3.4.2-25 (Bullet point 4): tailored quality

See remark above.

3.5-26-2: new services with lower costs than existing solutions

This is not evident enough. According to the experiences out of different projects, new solutions may lead to fewer costs. As a result of the upcoming DER and the shift from fossil fuels to more electrical consumption, we believe that the overall costs of the DSO’s will increase and that a smart approach can limit/temper these increasing costs.

3.5.1-26-5 (Bullet point 1): probabilistic system modelling

Such a modeling requires escalation procedures. What happens, if probability fails and reality is different? E.g. who is responsible for quality violations, if improbable and therefore not considered cases happen?

3.5.4-28-3: Smart meters is not a real-time system

Two-way communication exists, but depending on the grid and on the metering system it may last minutes to hours, till information flows.

The information flow is not guaranteed. That is for meters no problem, because the values can be sent a second time, but for real-time processes it is not designed.

4. Questions for public consultation

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?

There is a clear need for innovative solutions to be implemented in the transmission and mainly distribution networks. Although the technology exists, and is already innovative, more efforts should be made in the implementation phase. This will require joint efforts and coordinated active participation by all stakeholders. There is not yet a common technology and standards in technology, in communication etc. are still lacking. The technology is currently mainly implemented in pilot projects.

The increased share of wind power and local micro-generation, as well as introduction of EVs will create a need for significant changes in TSO and DSO innovation in order to maintain an efficient and stable electricity system.

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

EURELECTRIC agrees in general terms with the description proposed by ERGEG and based on the definition the European technology Platform on SmartGrids. However, we estimate that the role of the smart meter might be insufficiently understood. It is fully right that a smart grid implementation can be partly initiated without the smart meter but we estimate that the full return will only be possible through an extensive additional capacity in measurements and a 2-way communication (figure 2 and belonging text are a little bit in contradiction with further explanations as for ex. par 3.5.4). Smart metering is not sufficient on its own, but it is certainly necessary to build a smart grid.

EURELECTRIC recognises that the concept of smart grids is very wide, as has been stated, and copes with many different fields of application from regulated activities (such as networks) to market related activities. For this reason it is important to specify the scope of the regulatory approach and to define a concrete regulation plan for each part of the electricity supply chain.

Also worthy of note is the need to develop a roadmap according to the definition of the smartness of the grid in the whole timeframe, so that the deployment of this new grid concept is affordable to accommodate the needed investment effort.

It must also be recognized that different countries are at different maturity level and regulation should not hinder the development on any level.

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?

EURELECTRIC recognises that energy efficiency does not always lead to reduction in electricity consumption. E.g. both heat pumps and electrical vehicles are both examples of fuel shift from fossil fuels to electricity with increased electricity demand but a lower overall primary energy consumption. Other energy efficiency actions and demand side management measures will decrease electricity consumption.

Network owners receive revenue from connection charges that have nothing to do with energy flow and use of system charge that is related to energy flows. Attempts to increase efficiency and peak load reductions do not necessarily decrease energy volume and instead we see energy volume shifting that makes the overall energy usage more efficient. In any case use of system charge is to be reviewed on a regular basis and the regulators could provide the right incentives to operators and network owners to pursue the efficient use of energy.

Reducing energy consumption by improving efficiency is a sustainable way of contributing to achieving the 20/20/20 EU targets. However, the current regulation, to which most European Distribution System Operators (DSOs) and other regulated companies in the electricity sector are subject, provides incentives to DSOs to increase their cost efficiency through reductions in operating expenses. Nevertheless, after many years of ongoing efforts to reduce operating expenses, DSOs' profitability is starting to be severely undermined by their current financing model and this comes precisely at a moment when important capital-investment projects are needed. It is questionable whether additional cost reductions can still be achieved. Indeed, further pressure on cost reductions may result in some loss of service quality.

EURELECTRIC believes there should be, in compensation, other flexible regulatory mechanisms allowing DSOs to recover their investments at a market rate, taking into account the type of investment and the corresponding risk. Nowadays, for many companies, their return on investment is lower than their cost of capital. The current incentive-regulation in most European countries aims for efficiency gains through reductions in operating expenses. Benefits from smart grids should be partially captured by DSOs and TSOs as well. There must be a balance between profits and costs for all stakeholders.

The grid access tariff, or Third Party Access (TPA) tariff, could be decoupled from energy supplied. The final "price" paid by customers, should differentiate between the energy price component and the grid access tariff component. The last one includes the transmission and distribution costs as well as other regulated costs.

The remuneration of distribution and transmission companies, as regulated companies, should not be subject to the volatility of the energy demand but should reflect the development, maintenance and operation of their networks and its components. Revenue costs could be recovered through the use of system charge based on energy flows.

A careful analysis is recommended on the effects the market may have on the network operators to move towards increased investments on smart grids.

Section 2 – Drivers for smart grids

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.

EURELECTRIC argues that the application of the Smart Grids concept can improve customer service. Smart Grids is felt to be a necessity for the integration of distributed generation, renewable energy sources and plug-in (hybrid) cars into the electricity grid. Utilizing Demand Side Management (DSM) for improvements in overall system efficiency (such as avoiding investments in peak generation) and customer dynamic pricing systems with incentives is a driver. The drivers listed are mainly internal to the grid operation and important. In addition, increasing flexibility in network operation (Distribution Management System - DMS, etc.) as well as the need to optimize network investments in order to achieve a cost-efficient network, and finally ageing assets can be considered. Furthermore, external drivers exist, as progress in technology or transformation of energy use towards more electricity is a big driver and at the same time may be regarded as an opportunity for future developments. Other relevant drivers are "the competitiveness of the European Economy" and the "Security of Supply of Member Countries".

To get the drivers and incentives for the grid user/end customer to engage in demand response, time shift of loads and other energy efficiency programs it is crucial to have increased price transparency for all customers, including low voltage household customers.

For this EURELECTRIC foresees a need for new products, based on hourly (or even less) metering to better reflect the volatility of the spot-market and temporary local grid congestions.

There is also a need for new rules and new products/tariffs for distributed generation as we expect that an increasing number of small and medium scale generation installations will apply for connection to a regional grid. Often the overall capacity to connect is higher than the technical grid limits and may lead to a challenge with prioritization among generation installations and an increased risk for over/under investment in the grid.

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?

EURELECTRIC wishes to underline that Regulators need indeed to take the consumer into account, but also other interests should be respected. If the regulator wants to provide incentives for the grid operator to sufficiently invest in a smart infrastructure, then it must also ensure a suitable return on investment, especially when this investment provides no other advantages for the grid operator within the remaining regulations. The user-centric approach should not lead to a situation where the grid operator was ignored. An optimal approach requires a clear definition of the end users and market parties' needs, when initially defining the investment requirements.

The electricity system and grid challenges must certainly be linked to the user approach. Without the connection to new system and grid challenges the need for a smart grid is vanishing. The challenge is to use the created link between new user needs and new user groups part of the system (e.g. new types of distributed generation e.g. wind and solar power increasing the need of back-up, balancing power and auxiliary services as part of production system and introduce the demand side with new types of demand response opportunities - e.g. EV.s - to the balance power market).

Care must be taken in order not to underestimate network developments that do not immediately impact or are not immediately required by the users but which should be addressed in the initial stage of smart grids, in order to guarantee the smooth evolution of the networks and their ability to respond to future needs. Part of the investments do not necessarily offer direct benefits to grid operators or users but can contribute to overall benefits such as CO_2 reduction (that are beyond the network users.) Stakeholders which are not mentioned in the paper are local and regional authorities (municipalities, cities, regions). By having a good long term policy and development plans (f.e. cluster regions for industrial local production, requirements for new industrial customers to develop sustainable activities, etc.) they can help to optimize the costs and benefits of a smart grid.

However, the level of compromise and willingness of end consumers in relation to this approach should not be forgotten. Depending on the grid tariff structure and energy market prices offered to the consumer, it would be possible to see a low compromise or engagement of these participants. This could be the case if the savings in energy bill are too low compared to the reference situation (i.e. when there was no smart grid). It is very important to offer a adequate energy price signals to consumers in order to get an appropriate answer in terms of smart consumption

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

Smart grids solutions, including ICT technology for collaborative technical-commercial aggregations, enable communication and interaction with both customers and energy devices in the network for energy efficiency as a whole. There is a need and an opportunity for new services to be provided, like for example data aggregation and an information and communication technology (ICT) for coordination in a smart electricity grid, capable of optimizing over high

numbers of small units: distributed and renewable generation and storage systems and responsive loads.

Energy suppliers and energy service companies acting in the process of deployment of smart grids solution should be able to offer more flexible services and products to customers when smart grids are developed.

In this context EURELECTRIC would like to underline the need for more dynamic retail power prices which better reflect the wholesale market prices. Variations in grid costs due to congestion, temporary local capacity problems or extra balance power costs should be integrated in the grid fee, which could also become more dynamic, in order to better reflect the actual cost of grid capacity.

The introduction of smart grids will also necessitate a review of the roles and responsibilities of the market parties, and new stakeholders and actors might enter the markets - e.g. aggregators, VPPs etc.

Energy suppliers may introduce more price transparent products, for instance, ones that are hourly based. Either they themselves or energy service companies can act as aggregator for demand response and distributed generation. Also they need to develop products and solutions to interact with the many small customers and act in different market places e.g. spot-market, balance and intra-day market etc.

Energy supplier and energy service companies (ESCo[1]) should be closely involved in the process of smart grids definition (functional requirements) and smart grid deployment. There must be a common interface to appropriate functions of smart grids between energy supplier and energy service companies and DSO/TSO to ensure non discrimination to all players. Common interface should simplify and unify the smart grid system functionalities.

On the one hand the network operators have to strive towards standardization (communication, design, etc.) and interoperability in order to reduce investment and operational costs. On the other hand it must be recognized that the move towards SmartGrids is a continuous evolution where the suppliers and service companies constantly need to improve and push the edge.

The roles and responsibilities of network companies on the one hand and of suppliers/ESCOs on the other hand should be clarified and respected. Network companies develop a regulated activity whereas suppliers/ESCOs are active on a liberalized market. The remuneration schemes ensuring a proper return of investments should of course only apply to regulated business, i.e. to legal monopolies.

[1] An ESCo is a business that develops, installs, and arranges financing for projects designed to improve the energy efficiency and maintenance costs for facilities over a time period. ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risk associated with the project. Typically, they offer the following services:

- develop, design, and arrange financing for energy efficiency projects;
- install and maintain the energy efficient equipment involved;
- measure, monitor, and verify the project's energy savings; and
- assume the risk that the project will save the amount of energy guaranteed.

These services are bundled into the project's cost and are repaid through the savings generated.

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

New services are expected to be provided by service providers and suppliers. EURELECTRIC is in favor of sharing direct participation of all stakeholders in the definition of the new functionalities to be achieved by the smart grids. Perhaps, more attention should be paid to the changing needs of the DSOs in relation with the TSOs. Enhanced cooperation amongst them will help.

EURELECTRIC noted that the needs of energy suppliers are not sufficiently identified in the ERGEG document (chapter 3.3 - Services needed), and that ERGEG is apparently not considering energy suppliers as a key network user group. In a liberalized market it's the primary role of suppliers to identify the needs of their customers – also if the latter cover part of their consumption with own generating facilities and thus can be considered as prosumers – and to offer them products and services which comply with their needs. EURELECTRIC is in favour of a market model, where the energy supplier is also the responsible party for billing of both grid fee and commodity, including all related costs. With these roles the supplier acts as the major point of the contact of the customer. The technical and functional specifications of services provided by DSOs should take into account the needs of suppliers, in order to enable them to optimally adapt their administrative processes and to adapt and extend their products and services portfolio, taking into account the new market context and the possibilities offered by the implementation of new technologies.

A Smart Grid will require an integrated approach between DSOs and TSOs. From the operations perspective the DSO and TSO will have to work together closely in the areas of outages, dispatch, voltage control and power flow control. Further areas for review can include a joint DSO/TSO strategy paper, organisation and systems in the Smart Grid environment, development of people skills and competencies, contestability issues, planning guidelines in a Smart environment, grid tariffs and customer benefits -regulatory support.

Power quality, supply reliability and personnel safety have to be considered when a change in network structure and operation of the electricity network is introduced.

However, concerning the new network services that distributed generation will require, there are some of them which are not accountable for network operators. For example:
• Access products designed for intermittent sources of generation;
• Balancing services that better manage intermittent generation; and
• Enhanced trade within national and integrated markets including intra-day trade until near the operating hour.

These equitable network users' needs are not foreseen to be provided by network operators.

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.

The main challenges for networks development and possible solutions have been identified in the report. The biggest will be anyway security and ICT solutions of smartgrids. Also scalability should not be underestimated.

EURELECTRIC would like to add the following remarks:

Efficient electricity transmission and distribution systems are a fundamental requirement for providing European citizens and companies with an essential energy source and meeting the demands of the 21st century. The need to strengthen Europe's electricity networks, meet growing electricity demand, support rational use of energy, develop a trans-European electricity market and integrate more distributed sustainable generation resources, including renewable sources, presents major challenges. The role that future electricity network design and investment will play in achieving wider EU energy policy objectives is decisive. To that end, the networks technologies will be the key enabler for the wider and deeper penetration of distributed low-carbon generation. EURELECTRIC encourages regulators and Member States to give attention to electricity networks and their future role in this respect.

Changes in Medium Voltage (MV) and Low Voltage (LV) network operation will strongly be correlated with the incentive scheme for renewable and distributed generation applied in each country. Future distribution network operation is still an issue. It can be expected that the MV distribution network will be more and more operated like a transmission network. Distributed Generation developments will influence future networks investments and the expected installed capacity for DG will be a criterion in network dimensioning.

Talking about item 3.5 Smart grids solutions, there is a dangerous spread thought which should be tackled as soon as possible. This is the thought about "There is a general confidence among relevant stakeholders that by doing this, new services will be delivered at lower cost than with existing solutions." Actually this belief is not realistic in short or medium term and this fact should be handled very carefully in order to not cast some expectations that could drive to disappointment and finally to criminalize all these developments.

It is remarkable as well and we fully support the need for a standardisation of the communication protocols which will prevent from expensive developments. This should be highlighted as much as possible.

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.

Some smart grids solutions (e.g. the AMR projects already deployed in Italy and Sweden and Finland) have already proved their benefits, while others (e.g. network automation, state of the art network technologies) require to be further proved by means of demonstration projects. Anyway it should be considered that costs will most probably not be lower than today, but the quality and services for all stakeholders may be improved and this improvement should be done at the lowest cost.

Most DSOs see active management of the grids as a complementary solution to network reinforcement. The actual degree will increase in order to ensure continuation or even improved quality of services to customers. It is expected that DSOs will have a more prominent role in system security in the future and a role in enabling DG to contribute to the system security. EURELECTRIC recognises the need for governments and regulatory authorities to work together towards an optimised target retail market model encompassing all parts in the value chain from generators to consumers in order to minimise total costs.

Data flows managed by the DSOs will increase as a result of more interaction between the DSO and other stakeholders.

The consumer should be properly informed and trained about all the information that is going to be available and the benefits that he can derive from that. Only in this way, the consumer will be receptive enough to assume all costs involved and the targets could be achieved.

The cost of implementing a smart grid solution or functionality should always be lower than a traditional solution or the cost of "doing nothing". Pilot projects implementing each technology/solution will reveal how effective and efficient they are. But when it comes to analyzing the overall costs and benefits for the whole system or society, it is important to keep in mind that system operators may have to invest and develop the basic infrastructure in favor of other agents. Therefore, it is important to analyze both the overall cost/benefit of each smart grid solution and the cost/benefit for each agent as well.

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

As mentioned before, the current regulation of distribution investment does not allow most European DSOs to recover their investments at a market rate. In other words, for the majority of the companies, their return on investment is lower than their actual cost of capital.

EURELECTRIC clearly points out that European electricity networks have to be prepared to cope with the ambitious EU sustainability targets. These goals add new items to the existing mission of DSOs which is to secure an acceptable level of network reliability and quality at a reasonable cost. The Smart Grids deployment not only includes innovative technologies, standardization, market considerations or the environmental impact but it also should consider legislative and regulatory schemes to secure the developments in a timely way.

Thus the regulatory regime should give incentives that foster the transformation from the current grid system into a Smart Grid or a comparable concept able to cope with the EU policy goals. If DSOs comply with the targets stated, the regulation system should allow an adequate rate of return. In particular ex ante regulation should be considered in order to address and provide incentives e.g. for R&D activities.

A key factor for an optimal user approach for Smart Grids is to establish full transparency of system and congestion costs to the end customer for a relevant time base (normally 1 hour). Regulation of smart metering and market access to metering data values are therefore a fundament for the Smart Grid technology and implementation. In some countries this is part of the DSO obligation. The ERGEG paper is emphasizing the importance that the regulation gives incentives to companies to pursue innovative solutions.

EURELECTRIC recognizes the importance for regulators to understand that often in deployment of new technologies there are significant costs from the early start of any project and that benefits may only come later in the future.

Furthermore, the risks associated with being first movers should be considered. The regulatory framework will play an important role in the implementation phase of smart grids. The regulatory framework should enable the integration of new services in the electricity network and sharing the possible extra costs in a fair way.

It is crucial to define the adequate incentives scheme in order to enhance the smartness but the starting point should be an adequate level of remuneration of network activities, which should imply an adequate return on investments made.

Section 4 – Priorities for Regulation

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

Regulators should focus on both inputs - mainly coming from the industry - and outputs. Utilities need to see and appreciate the benefits of smart grids through real deployment projects that will prove the proposed technologies and formulate the required policies that should be rightly be incentivised by Regulators for the needed investments to take place.

Output orientation, measured using suitable criteria instead of inputs (i.e. technical details). Suitable output criteria are sometimes difficult to define (see below). In this sense, the use of certain input criteria/processes should not be excluded: for pragmatic reasons it may be necessary to use a cost-based approach (like investment budgets), assuming that the efficiency of the implemented technology has been proven (e.g. via a cost-benefit analysis).

For some fundamentals as power quality standards, personnel safety, collection and reporting of metering values for different market players might be areas where input regulation might be needed, especially in countries with many DSOs.

EURELECTRIC would like to stress the fact that new types of IPP are entering the market, especially the wind-power market. They often have no historical background in power production and their view and demands on the TSO/DSO are quite different from the traditional utility owned producers. EURELECTRIC believes this will require more detailed and stronger requirements on grid-codes for connection and operation.

However, defining performance targets and indicators seems to be a hard and sensitive task to be developed. The success of the implemented regulation depends on these ones.

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

First, benefits should be carefully identified and allocated to stakeholders. Noting that mainly DSOs are investing in smart grids, but are not necessarily the only beneficiaries, some incentives should be given to them in order to invest, and this can be done through incentive regulation for smart grids. Investments for smart grids might benefits several parties but are often only done by DSOs (See Figure 1).

Another benefit from smart grids is improved knowledge of physical displacement of energy flows and increased load management capability.

Remarks on effects and benefits of smartness are presented in the ANNEX – Table 1.

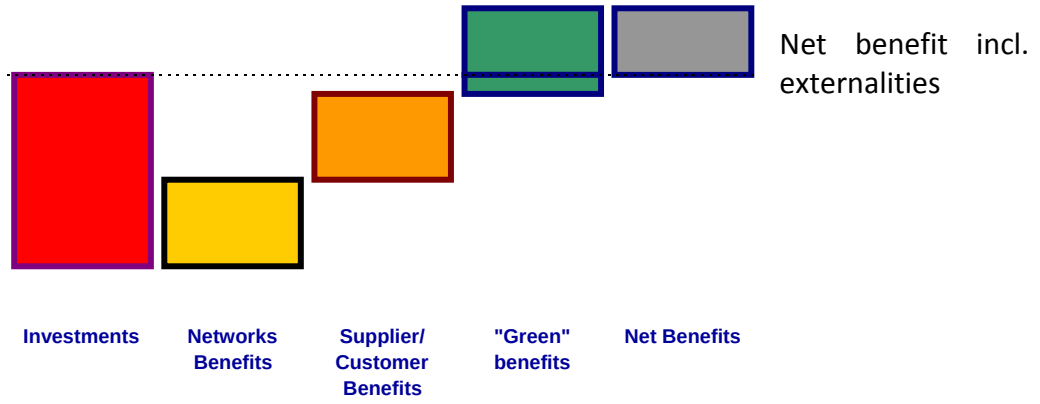

Fig. 1. Investments for Smart Grids and benefits.

The electricity industry is looking forward to the rising challenges and to the opportunities expected to bring benefits[2] to all stakeholders and society as a whole.

A uniform connection and access for all kind of grid users claimed in (3) should be achieved only under security and reliable conditions, where the requester assumes the reinforcements which are needed. With regards to uniform connection conditions the same conditions for the same kind of generator are addressed. It should be very clear that access procedures are a complete different deal from connection, e.g. there should be a charge for connecting a new generator to the network and a different charge for access to the system. This could be a charge which will serve to reinforce the network when necessary or an access tariff which will depend on the technology, the voltage level or any other network feature.

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?

A Smart Grid includes a smart meter management. This will bring new services for customers: remote meter reading, billing based on readings, diversified and variable rate offers, innovative solutions to facilitate demand side management and enable energy efficiency. Smart metering will enhance productivity for the metering business line. Installation of market agents (software) to facilitate the trading of energy on local scale seems to be one way towards increased energy efficiency and this measure should be taken into consideration.

[2] Dividing the assets into categories might be needed e.g.: Category A,B,C,D

Category	Assets	Benefits	Risk
A	Traditional grid assets (Capacity investments) - e.g. for normal connections	Generation diversification	Low risk
B	Grid investment for distributed generation -e.g. windpower in areas with several IPPS and stakeholders with different attitudes and decision criteria.	Sustainability and risk sharing	Medium/high risk
C	New Smart Grid assets, eg metering infrastructure, service platforms etc needed for new services offering from Suppliers, ESCOs, aggregators etc. (3rd part access to information & control), Power Quality, Upgrade control systems	Sustainability	High risk
D	New innovative grid designs	2020	High risk

One theoretical indicator might be the trend of utilization time for peak load (annual energy flow/peak load) at different levels of both TSO & DSO grid. This can shows the trend and success of introducing demand response and incentives for load shifting from peak load hour to other hours, at both the customer side and interaction with distributed generation. Losses reduction in a very long term perspective because of metering problems could be considered as well.

However, these indicators should be carefully analysed and any benchmarking exercise should take into account that the results depend not only on the actual situation but also on the characteristics of the demand and other factors such as climate.

The indicators should be carefully designed and take into account additional external factors which could be the historic evolution of the network infrastructure, the geographical location of regions, rural areas, etc. The indicators should be designed depending on the smart grid's definition and this is going to be developed in parallel. Therefore, it is not realistic designing some incentives for a smart grid which are not adequate to afford the challenge.

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?

Incentives given by Regulators to DSOs for their involvement in R&D work and for the development and deployment of new technologies supporting Smart Grids should be improved. Thus the regulatory regime should give incentives that foster the transformation from the current grid system into a Smart Grid or a comparable concept able to cope with the EU policy goals.

Present experiences for certain DSOs show that the only innovations with a positive business case in a short term perspective will be carried out. To start R&D projects, pilots and implementation of more long-term and risky investments needs to be incentivized. Example from UK with IFI is one way for incentivized R&D and pilots. Other incentives will be needed for the implementation phases, where a clear positive business case is not in place from a DSO perspective, even if it is from a society perspective. One way to handle this can be allowance for the DSO to add this type of investments to the regulated assets, if the asset base is the base for the regulated acceptable income level for the DSO.

Being part of the regulated business, network operators will be more in favor of costs reductions rather than markets changes. The investment return an incentive schemes must be put in place in order to achieve the targets.

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

Yes. There is a need to define new standards to facilitate deployment of smart grids (e.g. EVs charging stations, etc.). Cooperation among stakeholders should be developed in this area.

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

Today in many countries there are no explicit incentives for expansion and modernisation of the distribution networks through the tariff system. On the contrary, the distribution activity is often regulated through a price cap mechanism, with no incentives to encourage quality of service, although there is a system of penalties linked to quality of service. This may be a barrier as well.

A particular attention must be given to the education and availability of skills necessary for deployment as well as for maintaining the new solutions. "Change" will be one of the biggest barriers and this for all players in the landscape.

In countries where regulation does not guarantee a reasonable long-term rate or return for the investments efficiently done by the DSO in traditional assets (highlighted by ERGEG as an important regulation condition in paragraph 4.1), it is hard to expect that investments for deployment of smart grids will be recovered.

Not implementing an ex-ante remuneration scheme for all the investments needed in the network is considered as the most important barrier for the deployment of anything that needs an important amount of capital expenditure, and contributes to a more risky perception of a regulated activity for the markets.

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

This may be the case with regards to new communication services expected to be provided in the future. If communication services are provided over the smart grid data network, one question that follows is how to allocate the cost of the smart grid deployment between electricity customers and communications service subscribers to prevent customers from cross-subsidizing communications services.

Any threat of a cross-subsidy will draw the attention of the telecommunications and cable companies, and their participation in cost allocation proceedings.

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

EURELECTRIC is pleased to see that the European Commission has recognised the role of 'smart grids' in reaching the goals of the energy-climate package in its recent Green Paper on Energy Networks. European electricity networks will have to cope with the ambitious sustainability targets set by the EU policy makers, adding new items to the mission of TSOs and DSOs, which has traditionally been to secure network reliability and quality and, more recently, to act as market facilitators. Smart grids are a way to equip system operators with the necessary tools to contribute to the 2020 objectives.

EURELECTRIC stresses the need for a predictable and transparent regulatory framework for the European electricity market. We view an appropriate return as a basic prerequisite for investment, and we also recommend harmonising rules across Europe as far as possible. We call upon governments and regulatory authorities to work together towards an optimised target retail market model encompassing all parts of the value chain, from generators to consumers, so as to minimise total costs.

The current economic crisis provides extra motivation to accelerate the process, because electric grid infrastructure is the 'backbone of the economy' and as such, one of the best places from which to kick-start the recovery. Regulators need to take appropriate measures to support the development of smart grids, allowing a fair rate of return when DSOs contribute to meeting efficiency and RES targets.

The risks could be minimised by providing a clear definition of roles and responsibilities. This will contribute to defining the costs allocated to each stakeholder.

CONCLUSION

EURELECTRIC clearly points out that European electricity networks have to be prepared to cope with the ambitious sustainability targets of EU policy makers. These goals add new items to the existing mission of DSOs which is to secure an acceptable level of network reliability and quality at a reasonable cost. The Smart Grids deployment not only includes innovative technologies, standardization, market considerations or the environmental impact but it also considers legislative and regulatory schemes to secure the developments in a timely way. Thus the regulatory regime should give incentives that foster the transformation from the current grid system into a Smart Grid or a comparable concept able to cope with the EU policy goals. If the distribution system operators comply with the targets stated, the regulation system should allow an adequate rate of return.

EURELECTRIC stresses the need for a predictable and transparent regulatory framework for the European electricity market, we view an appropriate return as a basic prerequisite for investment, and we also recommend harmonising rules across Europe as far as possible. We call upon governments and regulatory authorities to work together towards an optimised market model for all parts of the value chain, from generators to consumers, so as to minimise total costs.
The current economic crisis provides extra motivation to accelerate the process, because electric grid infrastructure is the 'backbone of the economy' and as such, one of the best places from which to kick-start the recovery. Regulators need to take appropriate measures to support the development of smart grids, allowing a fair rate of return when DSOs contribute to meeting efficiency and RES targets.

For DSOs it is very important to reduce the regulatory uncertainty. One way to handle this could be giving clear and mandatory guidelines to the Member States. In this case they will apply the final policies in each country to meet the basic criteria in cost recognition and investments remuneration, and not only "*urge the NRAs to clearly distinguish between the cost / benefits for the grid users and the external costs / benefits which can by no means be attributed to the network users*".

DSOs have the primary responsibility for implementing smart grids. However the possible benefits of smart grids will only be optimally used if power suppliers and other market operators are closely involved in defining the required functional requirements of smart grids and in designing and offering services and flexible products to accommodate the new technology. In other words, power suppliers should play a key role as an enabling link between the DSO and the customer. In this way, competition will be promoted, which is necessary for encouraging innovative approaches aimed at better meeting customers' requirements.

EURELECTRIC wishes to underline that Regulators need to provide incentives to DSOs for their involvement in R&D work and for the development and deployment of new technologies supporting smart grids. These incentives should be further increased.

ANNEX

The paper makes suggestions relating to the last point but these are not fully developed. Specifically these are:

Intended benefit of the regulation	Performance indicator suggested by ERGEG	Remarks
(1) Increased sustainability	Quantified reduction of carbon emissions	**Can at best only be partially influenced by the grid operator, depends on the generation structure and the market situation.** **This is probably the most important issue from a climate mitigation perspective. The challenge is to define relevant and measurable KPIs. Two items from (4) below might be relevant here: Ratio of reliably available generation capacity and peak demand** **- Share of electrical energy produced by renewable sources** **Share of electrical energy produced by renewable sources can be part of this. Also number or total installed capacity (MW) of heat pumps can be part of a KPI (Key Performance Indicator).**
(2) Adequate capacity of transmission and distribution grids for "collecting" and bringing electricity to consumers	- Hosting capacity for distributed energy resources ('DER hosting capacity') in distribution grids Allowable maximum injection of power without congestion risks in transmission networks - Energy not withdrawn from renewable sources due to congestion and/or security risks	**Also depends on the physical installed grid capacity, which must be defined first; the lack of public acceptance also plays a role here and the grid operator has no responsibility for this.**
(3) Uniform grid connection and access for all kind of grid users	Benefit (3) could be partly assessed by: - first connection charges for generators, prosumers and customers - grid tariffs for generators, prosumers and customers - methods adopted to calculate charges and tariffs - time to connect a new user	**This must not lead to determination of the performance through a portion of "intelligently" connected customers or prosumers; otherwise this idea is to be welcomed if the indicators support innovative marketing models and grid charges and also a unification of the connection and feed-through conditions.**
(4) Higher security and quality of supply	Ratio of reliably available generation capacity and peak demand Share of electrical energy produced by renewable sources Duration and frequency of interruptions per customer Voltage quality performance of electricity grids (e.g. voltage dips, voltage and frequency deviations)	**Probably difficult to manage: The ratio of available capacity and peak loading in the starting position must be provided as a reference; peak demand cannot be significantly lowered when using Smart Grids; this is therefore a long-term point of view; the ratio of renewables cannot be influenced by the grid operator; duration and frequency of interruptions should be introduced as an indicator anyway.** **The first two items seem to be more relevant for (1).**
(5) Enhanced efficiency and better service in electricity supply and grid operation	a) Level of losses in transmission and in distribution networks (absolute or percentage) b) Ratio between minimum and maximum electricity demand within a defined time period (e.g. one day, one week) c) Demand side participation in electricity markets and in energy efficiency measures d) Availability of network components (related to planned and unplanned maintenance) and its impact on network performances e) Actual availability of network capacity with respect to its standard value (e.g. net transfer capacity in transmission grids, DER hosting capacity in distribution grids)	**Losses also depend on the average transport distance, over which the grid operator currently has no influence. Long-term monitoring and a suitable reference value are needed in order to determine the ratio between maximum and minimum demand (see above). "Demand side participation" and participation in energy efficiency measures can also only be partially influenced by the grid operator; at the very least this is the result of sales and marketing activities. This criterion must also not create incentives for the grid operators to take on tasks lying in the domain of the power providers.** **a) and b) very relevant** **c) How to measure this ? One way can be to report no of customers that has choosen tariffs that has a specific Demand response profiles, e.g high and progressive capacity prices for peak-load hours (might be based on hourly meter readings). Can also be combined with an extra congestion price for hours with grid capacity problems (and system capacity problems ?)** **d) and e) not relevant - to complex to monitor and follow up**

Intended benefit of the regulation	Performance indicator suggested by ERGEG	Remarks
(6) Effective support of transnational electricity markets by load-flow control to alleviate loop-flows and increased interconnection capacities	Ratio between interconnection capacity of one country/region and its electricity demand Exploitation of interconnection capacity (ratio between mono-directional energy transfers and net transfer capacity), particularly related to maximisation of capacity according to the Regulation on electricity cross-border exchanges and the congestion management guidelines Congestion rents across interconnections	**The level of interconnection also varies with the geographical position of a state/grid. Processes for optimum interconnectivity usage are currently being implemented; SG contributions to this may be helpful but are not really necessary at this stage.**
(7) Coordinated grid **development through common European, regional and local grid planning to optimise transmission grid infrastructure**	**Benefit (7) could be partly assessed by:** **- impact of congestion on outcomes and prices of national/regional markets** **- societal benefit/cost ratio of a proposed infrastructure investment** **- overall welfare increase, i.e. always running the cheapest generators to supply the actual demand**	**Can already be included and is not an SG-specific issue. A coordinated grid expansion is obligatory in Germany and will also become compulsory at an EU level (3rd Energy Package).**

Source (left and middle columns): ERGEG consultation, p 33

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