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Per email: smartgrids@ergeg.org

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ERGEG public consultation on its "Position Paper on Smart Grids" (E09-PC-44)

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Dear Ladies and Gentlemen, dear Mrs Geitona,

EnBW welcomes the opportunity to comment on ERGEG's "Position Paper on Smart Grids" and answer the questions put forward therein, which relate to the four sections of the position paper.

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?**

Without any doubt the realisation of the European 20-20-20 energy and climate targets, particularly the increase of renewable generation to 20 %, will have a great impact on the transmission and the distribution networks.

The integration of these renewable resources, which are strongly dependent on both, the location of their availability and the instantaneous hardly predictable physical availability of the renewable energy resource may lead to quit different and revere load flows within the low-voltage, the medium-voltage as well as the high-voltage network levels.

The intermittent generation for e.g. wind and photovoltaics (pv) that goes along with dynamic and stochastic in-feeds in conjunction with extreme generation peaks resp. generation lows causes significant problems in terms of the voltage stability at all network levels.

Even already today the network operators are faced with these challenges. However, these challenges will significantly rise in the next few years.

The improvement of the networks capability to cope with these enormous requirements plays a central role in order to be able to achieve the 20-20-20 objectives.

Beside the expansions of the networks due to new generation capacity at different locations, a permanent detailed monitoring at all voltage levels together with automatic control systems needs to be introduced particularly in the medium and low voltage networks to meet the needs of all grid users (generators, prosumers and consumers) and to ensure stable system operation.

In order to be able to assume the responsibility for a secure and stable network operation as well as a cost efficient integration of renewable generation and network expansion and, moreover, in order to be able to provide sufficient network capacity for prosumers and end-users to meet their needs as well as a more effective use of transport and transformer capacity, a coordinated load and generation management supported by incentives by the network operator (e.g., dynamic network tariffs and network condition signals to encourage the customers to shift loads) is required and crucial to avoid unnecessary network expansions and system collapses and, more generally, the endangering of sufficient quality and reliability of supply.

Smart grids are necessary to meet the new challenges. These challenges will be faced by the suppliers, which as the "interface" with the customers are able to control consumption via tariffs.

The metering companies and the metering service providers will also face new tasks: They must provide by innovative technologies data for both, the network operator as well as the suppliers in such a manner that they are able to make their correct accounts related to network using and energy consumption, considering dynamic and time independent tariffs for both.

In addition they can and have to provide the consumer with data that allows the consumers to recognise their consumption and tariffs to enable them to decide to shift, save or deliver energy. Additional services close to energy might be provided.

Although smart grids will enable more efficient grid operation, they will also lead to greater costs, at least at the beginning.

The realisation of smart grids requires sufficient investment in the grids and their automation, and thus also in the communication infrastructure between the grid operators and the grid and their customers (generators, consumers and storage) as well in adequate metering systems.

Without corresponding investment in the networks, the EU 20-20-20 goals will not be attainable. Regulatory approval of these grid operator-related costs and sufficient return on investment are essential for this implementation. The regulatory framework must provide incentives for achieving these goals.

The various roles and responsibilities should be defined more precisely, whereby existing contractual relationships with customers and end customers must be taken into consideration with respect to network usage and energy supply.

The transmission sector is also facing new and different types of challenges. These challenges can be divided into three categories: technical, environmental and economic.

Technical challenges

In addition to having to continuously adapt the transmission grid to meet consumer demand, the transmission operators also face new challenges as a result of generation plants at new locations. Some conventional generation plants will reach the end of their lifespan and others will be decommissioned. Meanwhile, the development of renewable energy sources in new locations means that the transmission grid will have to be adapted and new technical solutions developed for the connections (offshore grids for example).

Moreover, the need to reduce losses in the grid also requires the development of innovative new solutions.

Environmental challenges

The adaptation of the transmission electricity infrastructure is of crucial importance, both at the national and European level. However, the general benefits for the transmission infrastructure are less understood by the public at large. Therefore new approaches will be required to overcome the difficulties in achieving public acceptance for infrastructure projects.

Economic challenges

For the transmission sector, the economic model for the future is uncertain. With the centralised generation model, the transmission grid will continue to play an integral role. With a decentralised generation model, the transmission grid will play a reduced role.

The most likely scenario probably lies between the two extremes with a model that has greater efficiency, reduced time in using the transmission grid owing to decentralised generation but with transmission use continuing to be hugely important as backup in emergency cases.

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

In Section 1.2 several definitions are proposed. We would prefer a single, joint definition for the coming years. A too general or globalised definition may lead to misunderstandings.

For EnBW it is important that the definition incorporates the aspect of bidirectional communication. This is not completely clear in the ERGEG definition (page 12). We feel that the IEC's definition (page 11, Fn. 4) is more suitable. This also applies to key point number 5 on page 14: "active distribution grids" must refer to both communication directions in the grid.

The supplementary descriptions in Definition 7 (from EPRI) on page 12 would considerably improve its informative value.

Cost-efficient incorporation of decentralised generation systems and consideration of the behaviour patterns and actions of all grid users means that resulting grid expansion costs must also be taken into account that correspond to local and overall peak loads. These additional costs can only be minimised if grid operators can encourage consumers and suppliers to shift loads and store energy.

This can be realised actively through load and time-dependent dynamic grid charges (smart grid charges). By facilitating cost-efficient load and feed-in management, these will reduce grid costs and peak loads and thus limit the effort and outlay required for the system provision, thus making it technically manageable.

Since in this regard neither supply organisations with their temporally and spatially diverging turnover requirements nor individual grid users can assume system responsibility for securing grid operation, the grid operators will have to play an active and key role.

The smart grid concept should refer to a global electricity network with communication between users in order to achieve the energy objectives of the European Union.

But the limits of smart grids should also be clearly defined. In this respect it is more relevant to define what smart grids are not.

Another useful definition can be found in Wikipedia:

> "A smart grid is an umbrella term that covers modernisation of both the transmission and distribution grids. The modernisation is directed at a disparate set of goals including facilitating greater competition between providers, enabling greater use of variable energy sources, establishing the automation and monitoring capacities needed for bulk transmission at cross-continent distances, and enabling the use of market forces to drive energy conservation."

Smart grids increase the connectivity required for performing long distance transmission or local distribution tasks.

As a consequence, smart grids must be electricity grids with a high level of interoperability between all types of electricity suppliers, both centralised and decentralised, and between all types of customers with their own requirements. This is essential to achieve the efficiency expected by the EU energy goals and will require the involvement of all users.

Of course, smart grids can incorporate new technologies but old technologies should not be excluded.

This is comparable to the Internet, whereby the Internet enables a global exchange of data between users, without depending on the technologies used.

The technologies involved can be new, such as optical fibres for example, but also old, such as electrical telecommunication cable with a PLC protocol (Power Line Communication).

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?

As a result of incentive regulation in force in Germany, which is based on revenue caps, there is no longer any relation between the profits of the grid operators and the electricity volumes conveyed.

In Germany there are currently no load-oriented grid charges for domestic customers. EnBW considers it essential to introduce this. A load-oriented element in the grid charges will help encourage both households and industry to introduce grid-compatible load management. The load-oriented grid charges should depend on the grid conditions and not the energy supply.

As part of economically based local bottleneck management, grid operators should also be able to provide grid-users (generators, prosumers and end users as well as suppliers in cases they act as network users) with direct and dynamic grid charge incentives in order to achieve optimum grid loading, and thus minimise costs, without endangering the EU 20-20-20 goals.

In some cases the revenues for regulated companies and transmission and distribution operators are based on the volume of energy supplied. In a model where the transmission grid is used less but is needed as a back-up solution in the event of emergencies, new rules for the grid tariff must be established.

In other countries, such as in Germany for example, the revenues for regulated companies are not based on the energy supplied. Therefore, it is already possible to decouple regulated companies' revenues from the volume of energy supplied.

On the other hand, a reduction in energy consumption does not necessary mean a reduction in electricity consumption. Electric vehicles can replace traditionally fuelled vehicles, leading to improved global energy efficiency in accordance with EU energy objectives.

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.

The analysis is generally correct. In particular, however, more emphasis could be placed on the role of suppliers who, through their innovative electricity products, make it at all possible for consumers to play a more active role in the electricity market.

Dynamic and time/load-dependent grid charges provide consumers with further incentives to operate active load and energy management. Parallel to this, customers can avail themselves of the innovative energy supply services and offers provided by electricity suppliers by actively taking part in the electricity market. This could also be spelled out more clearly.

In addition, customers or their suppliers can carry out their own load management in order to reduce the cost of energy and of network usage within the technical limits. Global system stability requires the balancing by the TSO of total load with total generation. Local system adequacy in terms of ensuring the quality and reliability of supply of end users and avoiding emergencies requires regional congestion management by DSOs, which deals with technical limits.

The identified drivers are essentially correct but the item "improved operational security" should be supplemented with "cost-efficient grid expansion and automation" in order to achieve cost efficient integration for all actors.

A cost-efficient integration of all generation systems and consumers requires economic optimisation of the output balancing. This depends on the extent to which the balancing should be achieved by conventional balancing power plants (transmission network operators) and by existing controllable loads or decentralised, less controllable generation plants (distribution network operators), taking into account grid-related economic aspects (grid expansion).

The drivers proposed seem to accord with all the means for achieving the 20/20/20 objectives of the EU energy policy (Section 2.3), except the one concerning the reduction of losses.

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?

The implementation of the EU 20-20-20 targets requires investment in grids, their automation and necessary communication structures, which will lead to additional costs. The smarter the grids and communication infrastructures are designed, the more these growth costs can be minimised, which is certainly in the interest of the grid users.

Smartness therefore means that, by using grid tariff incentives (dynamic grid charges), grid operators are able to make it worthwhile for users to alter their consumption habits or, through incentives for load and feed-in management, help contribute to a cost-efficient grid infrastructure in order that they themselves can cut costs.

Therefore in meeting the interests of all users, i.e. the "user-centric" benefits, grid operators have a very important function as this relates to a comprehensive optimisation process. All incentives defined by the regulative frameworks must take this into account.

The "user-centric approach" as described in the paper is largely an empty formula. If the regulator wants to provide incentives for the grid operator to sufficiently invest in a smart infrastructure, then this must also ensure a suitable return on investment, especially when this investment provides no other advantages for the grid operator within the remaining regulations. User-centricity should not result in the needs of the grid operator being ignored. This does not exclude the needs of the users (and suppliers) to be determined when initially defining the investment requirements. For the grid operators, the focus is on system stability.

The main motivation for end consumers is to save money with smart grids, whereby the customer savings must be sufficiently large enough. All incentives defined by the regulative frameworks must take this into account.

Irrespective of the energy supply services offered, it should be ensured that the dynamic grid charges offer a decision-making basis for the grid users in determining their actions. Grid and energy costs should be transparently presented, whereby a pertinent contribution can be made to achieving a cost-efficient grid.

The design of products/supply services on the demand side should be viewed as a competitive area and thus assigned to suppliers or third party providers. However, supply activities that could unfavourably impact on grid costs should be viewed critically.

When it comes to a user-centric approach, however, grid users are not just the consumers (as KOM seems to imply in some parts) but also the generators.

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

Energy providers should use the smart infrastructure in order to offer their new contractual models within the competitive market, which can range from time- or load-based tariffs to convenience-centred energy services, while also helping consumers become energy providers themselves (e.g. balancing energy, peak loads, etc) as part of decentralised generation (virtual power plants, vehicle-to-grid, feed in of renewables, etc).

The expansion of the infrastructure, with the exception of the grid infrastructure, in particular the smart meters, should be conducted in the competitive environment.

Smart solutions to be used by consumers will become distinguishing features in competition. This will enable consumers to express their preferences for specific elements of the smart world, which supports the user-centric approach. This also means that the demand effect from consumers can lead to the development of smart grids.

In this context it perhaps makes sense to separate the tasks to be completed with meters between the grid operator tasks and the supplier tasks.

A basic problem of the ERGEG paper is its failure to clearly distinguish between the roles of suppliers, metering point operators, metering service providers and grid operators. For example, the distinction between the innovations from the grid operators that are essential and those that can result from healthy competition is not made sufficiently clear.

Although it is undisputed that the grids under the responsibility of the regulators will play an important and essential role in introducing smart grids, the competitive value added chain will play an equally important role.

What is important is that customers can respond discriminately to price signals and incentives relating to grid use and energy prices. By means of suitable tariff models (dynamic grid charges and incentives from the grid operator), the advantage here is that this can lead to improved grid loading with a reduction of both overall and local peak loads and thus a more cost-efficient grid expansion. In addition, customers can also minimise their energy costs, whereby smart meter technologies will be promoted.

In terms of the meters itself and the measurement service providers it must be ensured that both, the network operator as well as the supplier are supplied with the date they need for billing the network charges and the concession charges resp. the charges for energy. These between each other or/ and directly to the consumer.

Consideration should also be made to not just reducing peak loads but also making optimum use of renewable energy generation. For this reason an intelligent sharing of network capacity by means of suitable network monitoring and control systems as well as applying intelligent methodologies by the network operator is required to meet both targets.

ERGEG should make it clear that the regulators must concentrate exclusively on the grid area and, where necessary, also on their cooperation in defining standards. This is not always made clear in the paper.

For example, in section 3.4.2 (Challenges related to needs of customers) supply questions are examined with regard to the grid-related Section 3.4 (Network challenges). The selection of performance indicators for smart grids (see below) should not cause the results of genuine supply activities (tariff offers, energy efficiency offers, etc.) to be included in the assessment of the grid. On the one hand, the grid operator has no influence on these and on the other hand no incentives should be created for the grid operator to intervene in supply activities. However, supply activities that could unfavourably impact on grid costs should be viewed critically.

The widespread use of smart grid possibilities by all market participants presupposes that there is standardised communication access for the grid users (load, generators, storage). Only a sufficiently powerful and standardised communication access will enable use by small and innovative companies. The realisation of this infrastructure by the grid operator in the regulatory contract could be a sensible option.

In addition to the energy industry, the ICT sector must also be involved, which plays an important role in the smart world.

As indicated in Section 3.2, the energy suppliers and energy companies are the entities in direct contact with the final customers. They are therefore in a good position to find out the needs of the customers, to explain the goals in using electricity in a "new way" and therefore to promote new behaviour.

On the other hand, the network operator, in some industrial customer cases, is in direct contact with network users that prefer decoupled contracts for network usage and energy supply, which make maximum use of the benefits provided by suppliers and network operators. The network requirements are thus best and most transparently assessed by such customers.

Explanations made to the final customers should not be limited to the final products and services. The customers should also understand that even with decentralised generation plants, transmission and distribution grids are still necessary for securing supply. These global explanations could help the new grid infrastructures find public acceptance.

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

The depiction is certainly correct. The problem of data protection is also very important for end customers and should be correspondingly dealt with. The energy and ICT sectors should provide a detailed analysis of the special challenges faced in the smart world. It should also be clearly defined as to which actors have access to which data (and how this is processed).

Section 3.2 mentions that customers will continue to expect a quality of supply comparable to the one they have received in the past. And Section 3.3 mentions that some customers may accept a lower quality and reliability in return for a lower price.

This last statement is unreasonable. In future, all customers will expect to have reliable energy sources. Therefore it is inappropriate to claim that a reduction in the electricity price could be obtained by reducing the quality of supply.

For instance, within any one group of customers, one will require a low quality of supply while his neighbour expects to get a high quality of supply. What type of difference in the energy supply can justify the difference in price for these two customers connected to the same grid?

Section 3.3 mentions "...more monitoring, intelligence and control to be able to deliver these new services to consumers..."

The improvement in quality of supply is not limited to the introduction of new technologies, and can be provided with the present technology. An adapted organisation for emergency situations with the present technology can, for instance also improve the quality of supply.

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.

Section 3.4.2 focuses on supply and does not have to be necessarily discussed under Section 3.4 (Network challenges). The regulator generally needs to separate the competitive areas and functions when introducing smart grids from the areas and functions requiring regulation. Both areas need to be defined more clearly.

It is very important that the grid operators can use the right instruments to be created in the regulatory framework in order to create incentives for the end customers and to enable load management. A corresponding incentive could be dynamic grid charges, such as in local grid sectors, which are based on the current grid conditions.

The traditional challenges for network operators (Section 3.4.3) could also mention the objective to minimise the impact of the infrastructure on the environment, especially in regard to greenhouse gas emissions.

Concerning the network operation (Section 3.5.2), the objective of optimising the use of power cables and critical overhead lines can also be extended to other assets such as power transformers or switchgear.

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.

Increasingly decentralised generation, in particular renewable generation that depends on the instantaneous physical availability of the renewable resource, has a direct impact on the design and operation of the grids.

In this respect, cost-efficient grid expansion means expanding the grid using modern communications technology in conjunction with the ability to optimise the load/feed-in control with the aim of minimising growth costs. Optimised grid loading requires a high degree of monitoring, communication, sensors and actuators in the distribution grids and thus higher costs.

In order to meet the expectations for implementing the EU 20-20-20 targets time-wise, the regulatory prerequisites (e.g. investment budgets) therefore need to be created in good time to enable the preliminary work to be implemented and thus achieve a timely start for launching innovative business models.

In the next few years there will presumably be no fundamental changes. Smart solutions will become essential, however, during the second half of the decade. Here costs will arise just from the financially barely supportable power plant investments that would be necessary in the conventional world for meeting the peak requirements caused by electro-mobility.

"Reducing losses" can only be a sensible aim of smart grid concepts to a limited extent, as they depend on the grid structure and the feed-in settings. In individual cases (e.g. transport of CO_2-efficient wind energy from the Baltic Sea to southern

Germany) it may be sensible to accept higher losses, as the energy was generated in an environmentally friendly manner.

At first sight, smart grid solutions appear to be more expensive than conventional solutions. However, the cost calculation should involve all elements – not just the costs for new equipment but also the costs caused by the environmental impact of the different solutions.

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

We are convinced that this "smart revolution" will only happen if the investment incentives are also sufficiently high. The regulatory authorities could deploy already existing tools in the grid charges regulation to ensure adequate returns on the necessary investments at the TSO and DSO levels.

The implementation of the standardised communications infrastructure on behalf of the regulator, e.g. by the distribution grid operator, could reduce the barrier caused by high preliminary investment and foster rapid entry of innovative business models into the market.

We agree with the idea that innovation should be encouraged in order to ensure the successful deployment of smart grids.

We also support the idea that the regulators must remain technologically neutral, leaving the network companies to manage their business, while maintaining ultimate control in the most appropriate way.

Moreover it makes sense to harmonise the regulatory rules at the European level in order to promote cooperation between European network operators and thus share experience and solutions in an optimised way.

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)?

The lack of suitable or operational performance criteria means that it will remain difficult for the regulation to focus purely on output.

Suitable output criteria are sometimes difficult to define (see above). In this sense, the use of certain input criteria/processes should not be prevented: In a similar way to investment budgets, it may be necessary for pragmatic reasons to rely on a cost-based approach, assuming that the efficiency of the implemented technology has been proven (e.g. via a cost-benefit analysis).

Individual comments on the problem of output indicators have been listed below:

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 or the SG; depends on the generation structure and the market situation.
(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 physiccally installed grid capacity, which must be defined as the starting position; the lack of public acceptance also plays a role here and the grid operator has no responsibility for this. The challenge lies in providing an economically optimum (cost-efficient) grid capacity that ensues from using modern regulation/control technology in combination with sufficient grid expansion.
(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 taken to connect a new user	This must not lead to determination of the performance through a portion of "intelligently" connected customers or prosumers because this would lead to the non-competitive, blanket introduction of meters by the grid operator; 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 lower 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 maintenance or unification of the existing levels of reliability and grid security under increasingly more difficult conditions can also be an aim.
(5) Enhanced efficiency and better service in electricity supply and grid operation	- Level of losses in transmission and in distribution networks (absolute or percentage) - Ratio between minimum and maximum electricity demand within a defined time period (e.g. one day, one week) - Demand side participation in electricity markets and in energy efficiency measures - Availability of network components (related to planned and unplanned maintenance) and its impact on network performances - 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. It might be worthwhile transporting CO_2-efficient energy (e.g. from offshore wind farms) over greater distances and therefore with greater losses in order to deploy this energy. However, it would be better to deploy smart control technologies/load management that uses the energy locally. 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 influenced by the grid operator to a limited extent; this is also the result of supply activities. The extent to which end customers respond to offers and incentives from electricity suppliers based on dynamic grid charges is up to them.
(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	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.

	on electricity cross-border exchanges and the congestion management guidelines - Congestion rents across interconnections	
(7) Coordinated grid development through common European, regional and local grid planning to optimise transmission grid infrastructure	Benefit (7) could be partly assessed by the: - 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 Internal Energy Market Package).

Technological neutrality, cooperation and subsidiarity are to be advocated as regulation principles, whereby in the case of subsidiarity it must at least be ensured that competitive areas are ranked equally with the grid area.

ERGEG rightly emphasises that state-specific issues need to be taken in account; at the same time, however, the principle of "commercial subsidiarity" must be adhered to.

In terms of realising and introducing smart grids, the grid operator must be responsible for the construction and operation of the grid infrastructure to the extent that this concerns the automation and control technology required and the monitoring of grid conditions – including the local, regional and system loading and the communication technologies required for this. This is because only the grid operator can assume responsibility for the system.

If end customers want the grid operator to be the metering point operator or metering service provider or it acts by default as the metering point operator or metering service provider, then this task shall also be the responsibility of the grid operator.

The optimisation of the energy consumption and its costs is a matter for the respective end customers, who can benefit from the competitively organised electricity suppliers and their products and services as well as from the tariff incentives ensuing from the grid charges.

As indicated in the previous point (question n°10), the regulators must remain technologically neutral. Therefore, we agree that regulators should focus on outputs. Moreover outputs must be analysed for an appropriate observation period. Enough time must be provided to assess the performance of new solutions.

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?

- Aim (1) (Increased sustainability): This will not make any contribution as long as it is assumed that the CO_2 volume is determined exogenously.

- Aim (2) (Adequate capacity of transmission and distribution): currently optimised in accordance with existing load conditions (e.g. current specifications for optimising the coupling capacities through market coupling, including Intraday from 2012). The new framework conditions with supply-dependent generation and decentralised feed-in will make optimisation considerably more difficult. Cost-efficient grid expansion and joint use of grid capacities will only be possible using intelligent monitoring and automation technology.

- Aim (3) (Uniform grid connection): This is already legally ensured in Germany and does not necessarily presuppose the use of smart grids.

- Aim (4) (Higher security and quality of supply): This can be realised with smart grids; the incentives for this depend on the regulation. The maintenance and/or unification of the existing supply reliability/grid security can also be an aim with an increasingly complex environment, which requires additional effort and expenditure. However, corresponding incentives are already being discussed as part of the incentive regulation in Germany (Q components). From the regulatory point of view, it needs to be determined which additional (assessed) security and quality improvements are still required as a result of the smart infrastructure and at what additional cost.

- Aim (5) (Enhanced efficiency and better services): Smart grids are particularly important when it comes to improving the involvement of the demand side. In conjunction with supply measures as well as grid operator-based incentives using dynamic grid charges, smart grids can help cut peak loads and thus make investment savings on the generation and grid side.

- Aim (6) (Effective support of transnational electricity markets by load flow control to alleviate load flows and increased interconnection capacities): An ATC-based optimised process (market coupling) is being introduced in the Central West region, whereby a load flow-based model is being pursued. Whether this will produce better results, however, remains a matter of contention.

- Aim (7) (Coordinated grid development through common European, regional and local grid planning to optimise transmission grid infrastructure): Although German legislation already requires this within the framework of the 3rd BMP (for Germany), this can be facilitated by the information provided by smart grids.

Generation diversification, as mentioned in the third part of question 12, could be added as an effect/benefit.

Even if innovation is not itself an objective, as indicated in point 10, innovation should be encouraged. Therefore, it makes sense to add an additional indicator relating to innovation. The associated effect/benefit could be "increased sustainability" and this could be measured as a ratio between research and development (R&D) expenses and company revenues.

We would rank the effects and benefits as follows, arranged in order of significance from the most to the least significant EU targets to be achieved: 1 – 5 – 2 – 6 – 7 – 4 – 3.

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?

It is not clear whether suitable indicators can be found (that do not lead to distortion and cannot be influenced by grid operators). In individual cases it will be very difficult to cleanse indicators of grid external effects and to some extent this will probably only be possible based on long-term data (see above).

The incentive regulation is not limited to "smart grids". Without deploying smart grids, the incentive regulation is already applied by some regulated European countries.

The performance indicators in Table 1 provide a first step and a good start in assessing grid external effects.

All the European countries can apply the same performance indicators. In order to analyse the results, however, explanations for the differences must take into account the peculiarities of each country.

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 for grid operators exist when there is a profitable return on investments.

A measure for smart investments could be intelligent equipment that minimises purely conventional grid expansion.

A substantial impulse here would be the provision of the system services at a reasonable technical cost, including with further increasing decentralised and volatile generation in future. The affected players are the grid operators, trade, supply. With the current underlying conditions, no implementation of smart grids can be expected without incentives for the distribution grid operators.

If an investment only (substantially) benefits third parties, investment budgets could also be used for example – after testing the suitability and efficiency of the technology.

Network companies should be encouraged to pursue innovative solutions.

As proposed in point 12, research and development (R&D) expenses could be a relevant output measure, considering that the management of the network companies will take care to avoid waste.

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

Yes. The question is, how detailed should the standardisation be? With the standardisation of smart grids (e.g. smart meters), it needs to be ensured in particular that the communication processes between the regulated and competitive areas are standardised.

However, with the exception of minimum safety requirements, etc, technical standardisation – such as for smart meters, which are subject to competition in Germany – is not necessary. Smart grids and their associated smart applications are closely linked to the ICT sector and develop/change at a rapid pace. Technical innovations would therefore be hindered by too restrictive standardisation.

Yes, the lack of standards can represent a barrier to the deployment of smart grids. Common protocols and standards are needed in order to guarantee efficiency for the deployment of smart grids and to facilitate the exchange of solutions between European stakeholders.

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

In order to interest customers for greater energy efficiency and active participation in the "smart energy world", they need to be considerably more involved.

These days static, time and load-independent grid charges mean that at least in the case of smaller customers, it is generally not the grid operators that make contact with them but mainly the sales and metering point operators or metering service providers.

However, the consumer has the choice for determining the metering point operator and the metering service provider that might also be the network operator e.g. in its role as default metering point operator.

A first contact to the consumers and generators by the network operator is always given in conjunction with the construction of new connections and the necessity for network connection contracts.

Incentives for grid operators also exist when there is a profitable return on investment. A measure for smart investments could be intelligent equipment that minimises purely conventional grid expansion.

A substantial impulse here would be the provision of the system services at a reasonable technical cost, including with further increasing decentralised and volatile generation in future. The affected players are the grid operators, trade, supply.

With the current underlying conditions, no implementation of smart grids can be expected without incentives for the distribution grid operators.

This is because attractive tariffs/products/offers will be necessary to encourage customers to become active participants in the "smart world".

A considerable barrier preventing the activation/involvement of customers is the lack of liberalisation relating to meter and measurement systems throughout Europe.

Smart grid technologies provide more data, with the possibility of remote access. However, there is also a risk that non-authorised stakeholders could gain access to confidential information.

n their missions, DSO and TSO must protect sensitive information, such as commercial information for example. Even if it is not a barrier as such, it must therefore be ensured when deploying smart grids that a duty of confidentiality is maintained for sensitive data.

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

This could indeed happen if grid operators (e.g. due to unsuitable performance indicators) are encouraged to engage in retail activities. However, regulation which properly addresses cross-subsidization should be able to prevent such intervention.

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

The fact that electricity grid operators have the greatest expertise and know-how as well as the possibilities to provide all the necessary grid solutions for their own business goes to the root of the matter.

There is little time available for attaining the goals. Before using smart grids, they have to be realised. That means that the regulation should recognise the costs of grid operators for realising the grid- and communication-based infrastructure, for example in the form of investment budgets, and so facilitate the prompt roll-out of the smart world. The grid operators will need to justify these investments (CBA).

Grid operators can generally help to achieve the goals for 2020 in a more indirect manner. Where it is sensible or necessary to upgrade the grids in order – using products and technologies – to promote energy efficiency, renewable energies and climate protection, the grid operators must be offered corresponding investment incentives as part of the regulation. A contradiction between the economic goals of the grid operators and the ecological goals of the EU will be created where this does not happen.

As described in Section 4, the role of regulators is important for cooperation, research and innovation in order to meet the 20/20/20 targets.

From our point of view, the priority in Europe should be to coordinate the R&D activities of regulated companies. Europe should in a sense follow the example of the USA, which decided last year to launch a special project to coordinate smart grid interoperability (IEEE P2030).

As a consequence of the 3rd legislative package for the European Internal Market in Energy, several European TSOs are now unable to use internal staff for R&D activities.

Therefore, it makes sense and would be efficient to manage transmission R&D activities and promote coordination between TSOs at the European level in order to facilitate innovation for an integrated and smart grid.

EnBW hopes that its comments contribute to answer ERGEG's specific questions in the context of consulting on its "Position Paper on Smart Grids" and we remain at your disposal should you have any further enquiries.

Kind regards.

Yours sincerely

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