Introduction:

ZVEI: manufacturer´s association of Germany´s second largest industry

The ZVEI – "German Electrical and Electronic Manufacturers' Association" promotes the industry's joint economic, technological and environmental policy interests on a national, European and global level. The ZVEI represents more than 1,600 companies, mostly SMEs, with round about 827,000 employees in Germany, plus 600,000 employees all over the world.
In 2008 the turnover was Euro 182 billion. The electrical and electronics industry is the most innovative and the second largest industry sector in Germany. Every third innovation in Germany stems on solutions of this sector. 20 percent of all industrial R+D spending comes from this industry.
One of ZVEI's main objectives is to secure the innovative ability and competitiveness of the electrical engineering industry in Germany, Europe and worldwide. We, the electrical industry, are the most important creative thinkers for product and process innovations in German industry, with a wide range of products varying from electronic components to system solutions for automation, energy, transportation, safety and medical technology.

This document reflects very well the concern as well as the deeper interest of the regulators in the smart grid and it's implications. The analysis of the possible influencing regulatory framework, potential performance indicators etc. moves the regulators group into an active role. In this context also technical expertise in the regulators' group would be beneficial. This technical knowhow could give a broader base for regulators group decisions. It would also facilitate communications with the grid participants like energy suppliers, transmission and distribution companies and consultants if there would be a technical counterpart in the regulators group themselves.
Another support for the regulators group would be essential, too: the role of political leadership. It is their responsibility to actively support the regulars by creating the regulatory environment. This would move the regulators group further to a much more active role. This can only be done by solving the conflict between market and regulations. Only then the market can provide the needed resources for innovation.

1.3 Questions for public consultation (p.15)
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?
Future challenges for the grid will consist of predicting increasing power consumption and to influence the point of time when the power consumption will accrue, the continuing boost of renewable energy (= instable energy in feed) and it's integration into the grid while maintaining safety, security, independence and flexibility. These challenges will have impact on all parts of the grid: power generation, transmission, distribution and consumption. Equipment manufacturers need to adopt and add their products and offers to answer theses challenges.

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

ERGEG's understanding of the smart grid is a very good approach to the general term. In addition the smart grit definition on page 12 could be differentiated further:

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

Also the different targets on the bullet point list on the same page give a very good overview of future perspectives. As integration is key, the following bullet point could be modified:

- Allow consumers to play a part in optimizing the operation of the system
- Provide consumers with more information and options for choice of supply;

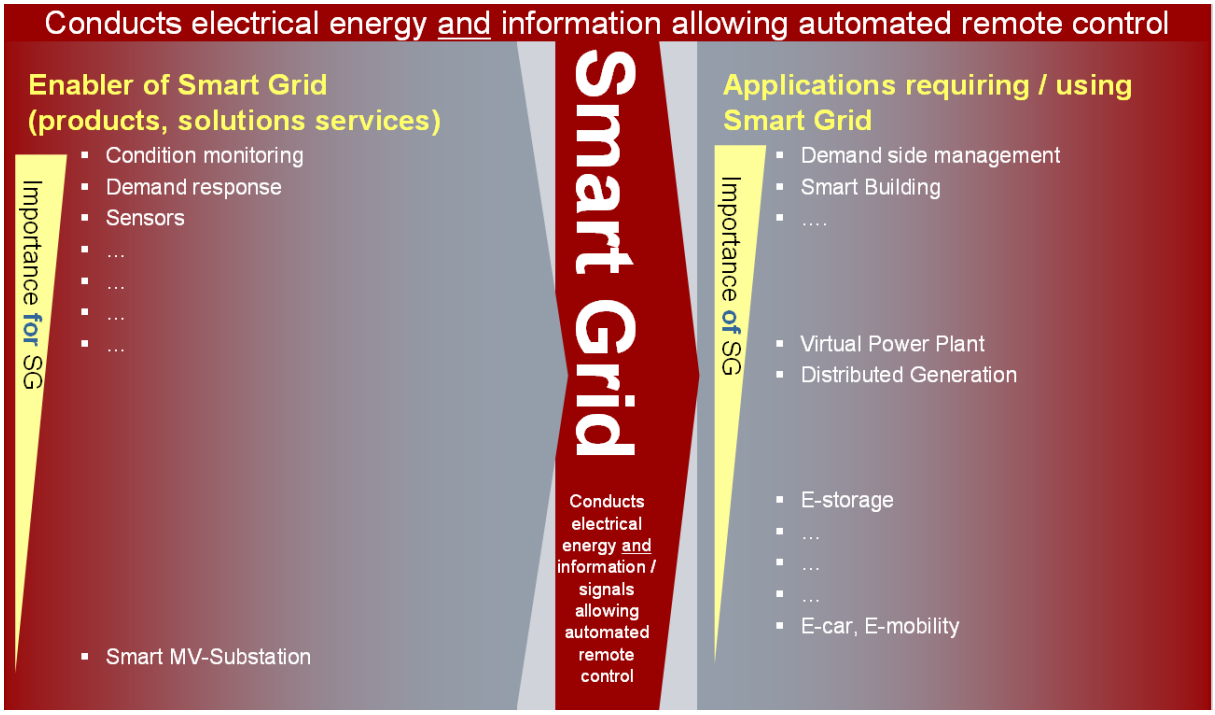
Speed of system integration will increase if equipment manufacturers are actively involved in most early state. The usage of their technological and market knowledge is essential for prosperous and smooth system integration.
A determination of technique /applications which is

➔ essential for Smart Grid

and technique / applications which

➔ requires Smart Grid

would help for better understanding of the various areas using "smart grid" as a phrase.
Following principle could be used for illustration:



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?

Not necessarily. Still the more electrical energy is provided, the more effort / invests are required. There should be a second stimulation / resource for income. E.g. the offered "back bone" energy, which can be used in case own (decentralized) generation capability is timely not sufficient to serve actual the demand.

In a future smart grid the volume of transportable energy through a grid could be an indicator for the flexibility, safety and efficiency, technically and economically for the grid owner. The regulation should provide the economical background for the concerned companies. This could also include the mentioned indicators (flexibility, safety, etc.) and create an efficiency rating as a base for decoupling.

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 two general drivers for the smart grid, namely the 20/20/20 targets and the needs of network users or better participants are the right one. An additional driver is subsidies. Whereby no additional subsidies are meant, but existing, sometimes hidden subsidies need to become recheck.
In that regard building of additional power stations are contra productive and can be named as "negative driver". Power stations (conventional or nuclear) are maintaining the generator-to-consumer-understanding of power supply, the actual grid philosophy. Smart Grid is caused by the need to incorporate renewable energy sources. The best driver for Smart Grid is to convey renewables and new power stations only for replacement for a clearly defined phase as long as renewables are not available in time. It would help as well if hidden subsidies (like the costs for e.g. final dispose of nuclear waste) would be considered by judging the profit ratio.

The second driver, the network user's needs, could also develop the needed dynamic if all participants are involved: The power generators, transmission, distribution, equipment producers and consumers/prosumers. With the economic and regulatory environment that makes the smart grid for all equally economically attractive the development toward a smart grid could be very dynamic.

Also the different drivers represent the requirements of the future smart grid from a technical viewpoint. In order to use all possible and efficient means drivers for the smart grid following point should be included, too:

-System equipment manufacturer's integration and system accessibility.

By integrating system manufacturer into the smart grid and making the system accessible for them, the speed of smart grids set up will increase: Instead of a sequential process: Net setup by generators and customers, then creating technical solutions, the early involvement of system manufactures will make these steps parallel and cut time.

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?

A user centric approach should be read as participants centric approach: Participants are as mentioned above power generators, transmission, distribution, system/equipment manufacturers and consumers/prosumers. By

making the transition economically attractive will ensure the needed commitment by the participants and also recognize their different demands.

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

Energy suppliers and energy service companies are participants for developing the smart grid. These companies should be provided with necessary regulatory background for economical growth and involve the other participants as well. They are important and will or will not giving the transition the needed speed. However the other participants will also have this capabilities. E.g. without the needed regulatory and economical backing neither consumers nor equipment manufacturer will be open for innovative ideas and slow down or stop the conversion. So it should be considered that all participants are equally stakeholders and movers for the smart grid. Balancing all the participants the regulatory environment will determine the transition speed directly. The participants should have the aligned targets, stimulated by connected or at least no competing interests. Supply and service regulations need to be in one hand to avoid contradicting interests. e.g. service: benefitting by reducing consumption, supplier benefitting by increase.

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

The needs are well described. Also important the involvement of all participants from power generation, transmission, distribution to consumers/prosumers and system/equipment suppliers. These participants constitute equally the base for smart gird. The contribution of all these is necessary in the smart grid set up. This contribution should be matching and parallel and reflect parity.

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 overall challenge to combine the different participant's needs and challenges is well described. Maintaining the parity of the parties, should also recognize the electrical industry equipment vendors and system integrators (section 3.4.4) not only as support but as active party.

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.

Essential smarter grid solutions are essential, however not automatically at lower costs. On the long term perspective cost might even increase. Solutions and applications will and need to have additional features like signal processing, communication and telecontrol. These additional features will create cost at CAPEX side, but savings on the OPEX-side. As the grid is already changing, like the incorporation of solar or wind energy, future changes will need to have the needed regulatory setting: For all participants it needs to provide the economical attractiveness for smart grid innovations. So the new solutions could be more cost effective but also, as a result of the lowered costs, increase the volume of the overall energy market for the benefit for all.

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

Here the mentioned challenges give a very good overview. Also recognizing the bases for innovation and users needs. The regulatory changes should

actively challenge the participants (power generation, transmission, distribution, consumers/prosumers, equipment industry) while maintaining/creating parity. The parity of these parties will prevent provide the needed continuous development. In parity no single party could afford to step out of this process and create showstoppers.

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)?

It is a good idea not to regulate and hinder processes themselves. If the inputs are defined as "giving technical details" this could hinder developments indeed. Giving minimum requirements as well as using transparent, key performance indicators could create the needed environment for the parties. Completely in line with the approach to regulate output and not how to achieve the output challenge will be to benefit the party who has to do the invest and to benefit the party (generator) who will sell less amount of electrical energy by the invest.Reflected should be also the mentioned parity and accessibility for power generation, transmission, distribution, consumers/prosumers and equipment industry will be the base.

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?

Table 1, page 33, additions are printed in blue, significance is ranked from A as high to C as low

Benefits	**Potential Performance Indicators**
(1) Increased sustainability	Quantified reduction of carbon emissions
(2) Adequate capacity of transmission and distribution grids for "collecting" and bringing electricity to consumers	(B) Hosting capacity for distributed energy resources ('DER hosting capacity') in distribution grids (A) Allowable maximum injection of power without congestion risks in transmission networks (C) Energy not withdrawn from renewable sources due to congestion and/or security risks
(3) Uniform grid connection and access for all kind of grid users	Benefit (3) could be partly assessed by: (A) - first connection charges for generators, prosumers and customers (A) - grid tariffs for generators, prosumers and customers (A) - methods adopted to calculate charges and tariffs (B) - time to connect a new user
(4) Higher security and quality of supply	(A) Ratio of reliably available generation capacity and peak demand (A) Share of electrical energy produced by renewable sources (A) Duration and frequency of interruptions per customer (B) Voltage quality performance of electricity grids (e.g. voltage dips, voltage and frequency deviations) (C) Percentage of energy exported/imported from outside EU
(5) Enhanced efficiency and	(A) Level of losses in transmission and in

Benefits	Potential Performance Indicators
better service in electricity supply and grid operation	distribution networks (absolute or per-centage)[17] (B) Ratio between minimum and maximum electricity demand within a defined time period (e.g. one day, one week)[18] (A) Demand side participation in electricity markets and in energy efficiency measures (B) Availability of network components (related to planned and unplanned maintenance) and its impact on network performances (A) 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)
(6) Effective support of transnational electricity markets by load-flow control to alleviate loop-flows and increased interconnection capacities	(A) Ratio between interconnection capacity of one country/region and its electricity demand (B) Exploitation of interconnection capacity (ratio between mono-directional energy transfers and net transfer capacity), particularly related to maximization of capacity according to the Regulation on electricity cross-border exchanges and the congestion management guidelines (C) Congestion rents across interconnections
(7) Coordinated grid development through common European, regional and local grid planning to optimize transmission grid infrastructure	Benefit (7) could be partly assessed by: (A) - impact of congestion on outcomes and prices of national/regional markets (A)- societal benefit/cost ratio of a proposed infrastructure investment (A) - overall welfare increase, i.e. always running the cheapest generators to supply the actual demand) >this is also an indicator for benefit (6) above.

It should be taken into account that the mentioned indicators will change over the development of the mart grid. E.g. the maintenance downtimes will be an indicator in the beginning but as the grid becomes flexible and predictable, planned downtimes can be longer but influencing the grid to a lesser degree.

13. Which output measures should be in place to incentivize 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?

In general the performance indicators should be transparent and offer the parties the needed economical growth. One indicator for the flexibility of the smart grid will be the capability to compensate external effects. From this viewpoint e.g. the reaction time of such compensation would be an important indicator for network companies.

Also in general potential key performance indicators should be reviewed and if necessary revised on a regular base.

That depends very much on how the future smart grid will be.

- ➔ Will it become a mainly a “back bone grid” for self-sufficient prosumers or consumers with some big consumers which could not generate enough electrical energy to be self-sufficient and accordingly some big generators?

- ➔ Will it stay as it is, but added by communication ability only with the purpose to reduce are allocate consumption?
- ➔ Or others?

This needs to be answered at first. Then output measures can be defined.

14. Do you think that network companies need to be incentivized to pursue innovative solutions? How and what output measures could be set to ensure that the network companies pursue innovative solutions/technologies?
Yes, that needs to be done, since the network companies are interested in investing, if the invested CAPEX will become repaid by reduced OPEX. Making the grid smart (communication and automation) does not create OPEX for the network companies. Additionally, the definition of the benefits of innovative solutions for grid operators needs to be developed and specified. We consider energy efficiency improvements as one of the major benefits to be pursued.

15. Do you consider that existing standards or lack of standards represent a barrier to the deployment of smart grids?
Existing standards are also currently reshaped in the light of the new grid. E.g. in Germany DKE is already developing a roadmap for technical standards for Smart Grids. This roadmap, which is also supported by several German associations also considers the integration into European Standards and is predominantly intended to be in line with IEC. Furthermore, also quality and performance standards need to be developed and harmonized across Europe.

16. Do you think that other barriers to deployment than those mentioned in this paper can be already identified?
Aside from the mentioned, safety and security could pose a challenge. Not only from a technical but also for a data and personal data protection view. Data from individual citizen could be used or misused creating a personal profile. Also on greater level "energy fingerprints" or profiles could be used to identify, characterized and tracked network participants like individuals companies etc. So the point of transparency and data secrecy could prove to be challenging.

17. Do you believe new smart grid technologies could create cross subsidies between DSO and TSO network activities and other non-network activities?
Due to the nature of smart grid, namely creating new combinations, there are already new combinations e.g. telecommunication companies involved in electronic billing of smart meters. As the grid develops so will the new combination. Another possible opportunity for non-network service could be agents (virtual or human) checking the grid for defects, peaks etc. as similar agents do today in networks.

18. What do you consider to be the regulatory priorities for electricity networks in relation to meeting the 2020 targets?
Aggressive target setting for CO_2-emissions to foster the incorporation of decentralized renewables. Creating a benefit-scheme to benefit the parties which need to do the invest (CAPEX). This paper present many good concepts, for definition, to problem statements up to indentifying potential key performance indicators. Key priorities will be a useful definition of these indicators. This should reflect the requirements and parity for all network participants. Further the intended effects of indicators should be compared to reality in order to verify and correct the indicators. This "reality check" should be done on a regular base as the smart grid set up will be dynamic.

In this respect we highly recommend that the regulators will also built up technical expertise regarding grid technologies and grid operation to better understand opportunities and risk assessments concerning reliability of power supply. This could be achieved by a technical regulatory body.
Another aspect is the involvement of the legislative bodies and politics in the realization process of reinforcing and innovating the grid. This needs tracking the respective approval processes not only on EU level but also down to the EU member countries taking into account their specific legislative requirements. This seems to be very important for investing and building the future Pan-European grid, its cross boarder power exchange and balancing fluctuating in-feed mainly from renewables.