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Answer by SYNERGRID (the Belgian federation of gas and electricity network operators)
to the
ERGEG Public Consultation on Smart Grids (E09-EQS-30-04)

Section 1 – Introduction

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

   Yes of course. This note describes in a very exhaustive way the challenges of a DSO. The Belgian TSO, ELIA, also member of Synergrid, answers to this questionnaire via ENTSO-E.

   Besides the challenges due to the upcoming DER – such as, but not exclusively, more variability and less predictability in the energy flows and a shorter distance between generation and consumption –, we estimate that the 2020 objectives will engender a shift from fossil fuels to more electrical consumption. This major increase of consumption will have a substantial impact to the DSO's. We believe that this will increase the costs of the DSO and that a smart approach can limit these increasing costs.

   This applies for operations as well as for the technology. Upcoming new economic models will also impact the working of the DSO's and require, besides the necessary technology (a.o. ICT), an important evolution of the internal processes and even business models.

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

   Yes in overall. The increase of complexity and uncertainty, coupled to the requirement for extensive efficiency and a high quality of supply, is quite well explained in this note. But here are some remarks:

   - *One must always bear in mind that all the developments towards smart grids only make sense when they are profitable to the end users, i.e. the consumers.*
   - *It is fully right that a smart grid implementation can be initiated without the smart meter but we estimate that the full return will only be possible through extensive additional measurement and 2-way communication capabilities (figure 2 and belonging text are a little bit in contradiction with further explanations as for ex. par 3.5.4).*
   - *We think that the awareness of the users is the first factor that will affect consumption.*

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?**

Decoupling the profit of regulated companies from the energy consumption is a possible way to achieve these objectives. Indeed, if the revenues of the grid operators were negatively affected by a potential reduction of the energy consumption, it would in turn slow down innovation and investment.

The use of capacity based grid tariffs might be the right solution. However, a "bi-directionality factor" must also be provided. This because the local injections bring not only needs for capacity but also voltage regulation problems. The renewed grid fee solutions must cover also the technology and control systems needed to solve this kind of problems. The capacity based tariff should be based on the allocated connection power, not on the instantaneous peak load measured over the last xx (e.g. 12) months. The latter method penalizes network users that do not have active load management systems.

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.**

Yes in overall. The "drivers", as explained in detail in this document, are quite exhaustive. But here are some remarks:

- *We think that the economic models required to achieve peak-shaving could be more brought in the prominence. The decrease of investments needs for additional capacity could be important and thus affect the grid tariffs positively. This with a final positive result for the grid customers.*
- *However we must never forget that the only drivers for the customers to participate in active demand are financial and/or quality. The question is then how they will have benefits from this. The role of the supplier (or aggregator to sell local injection) might be crucial (e.g. will they apply short term price variations in the supply contracts, how will they inform their customers about these variations, will they directly manage loads in the customer premises,…).*
- *The relative weight of each driver depends partially from the legislation put in place by the politics. This legislation should remain aligned with the expectations and the needs of the grid users.*

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?**

As the final beneficiary is indeed the network user, it is the best idea to start from a user-centric approach to analyze the costs and benefits of smart grids. The users' readiness to participate and willingness to pay are essential elements for the deployment of smart grids.

But other stakeholders than those mentioned in §3.2 are important for the success of this deployment:

- *The local authorities (municipalities, cities, regions). By having a good long term policy and development plan (e.g. cluster regions for industrial local production, requirements for new customers to develop sustainable industrial activities…) they can help to optimize the costs of the (smart) grid.*
- *The 'energy professionals' (e.g. architects, service companies, goods manufacturers). Because a majority of the grid users are not aware of the role that they (can) play in the functioning of the grid, those professionals will also play a key role towards a successful deployment of the (smart) grid.*

Therefore, the deployment should not only be user-centric, but more generally society-centric, i.e. ensuring that all stakeholders are actively involved.

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

Energy services companies will achieve their goals in assisting the users behaving more efficiently. The use of smart grid technology and services can help them reach these objectives.

Suppliers however, have their incomes mainly coupled to the delivered energy volumes. There is a risk of conflicts of interests between suppliers and grid operators, especially if the revenues of the grid operators are no longer proportional to the energy consumption. To avoid these conflicts, new collaborations between suppliers and operators are required. One way for suppliers to benefit from the reduction or the smoothing of the energy consumption is by selling ancillary services to the network companies, whereby the suppliers manage the load diagrams of their customers, according to the needs of the grid operators. Hence these ancillary services will help the network companies in achieving their goals.

Due to the increase of locally spread generation on the distribution grids, the transmission grid operator will have problems in achieving his role of Frequency/Voltage controller. The most logical and cost-effective way will be the use of services offered by the DSO's. The DSO' s have a key role in combining measurements and controls together with contract agreements and offer the needed services to the TSO's.

The new roles of aggregators of injection capacity could be explained also. Small prosumers will only be able to sell their energy to the whole-sale market by subscribing to a "Virtual Power Plant".

However, one should avoid the multiplication of the number of players involved, directly or indirectly, in the grid operations. The reliable functioning of the grid could suffer if the number of players involved is too large. The same is true for the functioning of the market.

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

Our answer to question 6 is also applicable here.

It must be pointed out that the demand for the described services will highly depend from the price at which these services will offered. Some of these services are, in a short to medium term view, not economically justified.

More specifically, the network service described in §3.3.1 as "efficient provision of connections at all voltage levels and at all locations" is too extreme and definitely not justified economically.

Additionally, we want to highlight the absence of regulatory rules for storage capacity. We hope new technologies will come up soon but it is not possible to define the needed economic models (and thus the controlling models) without appropriate regulatory rules.

Concerning storage, it is perhaps interesting to make the difference between

- *"Electricity storage" (= electricity in and out) and "buffering" (e.g. electricity in but heat out)*
- *Short and long term storage. The former can be used to achieve additional gain in power quality (ultra-caps, flying wheels,…). The latter can be used to solve the problem of simultaneity between local generation and load.*

The "services" explained in §3.3.3 and especially the role of aggregators might be confusing. It is perhaps better to limit the possible offered services. Recent jurisprudence shows that the aggregation of load disconnection outside of the supplier role is impossible to offer as a separate service to network operators.

Finally the sentence "The challenge for network companies is to employ monitoring, intelligence and control to be able to deliver these new services to consumers and generators more cost effectively than with existing technologies" might be confusing. Most of the "services" discussed here are not yet offered to the users. However this sentence implies that these services already exist but will be offered in a more cost-effective way in the future. It would be more correct to state that these services should be developed in a cost-effective way, such that they would be economically justified.

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.

Yes in overall, but with the following remarks:

- *We believe that the role of electricity and electronic manufacturers' industry, described in §3.4.4, is not sufficiently highlighted – not only in this section but in the entire position paper. They make entirely part of the solution, and are not only there to "support" the other players.*
- *We think that the "readiness to participate" – or to invest – of the network users is different whether they are living in existing buildings or in new ones.*
- *We are not convinced that the financial incentives or penalties will be sufficient to make customers change their behavior. The discomfort and the risk to be penalized by a wrong choice will be a barrier to participate; only the most informed will do. The risk exists that vulnerable consumers will pay the full price, whereas educated and informed ones will benefit from the system.*
- *An important network challenge is missing in the paper: the management of congestions.*

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.

The integration of a huge amount of DER in the network of the DSO, combined with a major shift from fossil fuels to more electrical consumption, will definitely result in an increase of the network costs. Moreover these changes require – almost by definition – the implementation of 'smart' technologies (e.g. ICT) in the networks, at least to a certain level. This implementation represents by itself another source of additional costs, at least in the short term.

However we hope that the advantages created by the smart grid will allow DSO's to limit these increasing costs and will enable new services for the other market parties.

There is no doubt that smarter grid solutions will be needed. The unknowns are: "how far should smart grid solutions go? Is there an optimal combination between smart and conventional investments and what is this optimal? What is the ideal roadmap?..."

DSO's in Belgium are today analyzing in depth the necessary business case elements to be able to assess the right roadmaps for smart grids.

These elements, together with a probabilistic analysis of the upcoming technologies as well as regulatory and economic models, will help them defining the right strategies. The first findings show that the right combination in smart technologies together with "classic" investments will be the key solution.

Here are some additional reflections directly related to this question:

- *Increasing the usage rate of the network capacity thanks to smart grid technologies could result in a perverse effect: the accelerated ageing of the assets used at (or close to) their limits. This effect should be taken into account in any smart grid business case.*
- *The use of price signals must be analyzed with care. We think that all solutions must take the network needs into account and cannot be achieved from supplier directly to customer without the additional communication capabilities.*
- *The readability of the customer's bills must not be forgotten. Dynamic prices can significantly affect this.*
- *Because energy grids are essential and because electricity can hardly be stored, the redundancy of key components is mandatory to maintain a high reliability.*
- *The LENS report (Long Term Electricity Network Scenarios) published by Ofgem by the end of 2008 shows no evidence that a smart scenario is much more appropriate than a conventional scenario.*

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

Remark:

2nd par., last sentence: « The volume of energy… decoupled from companies' profit…" In section 1.1, only the network company is concerned.

Including suppliers and aggregators in this statement would address some remarks we had on questions 6 and 7.!

The major challenge for the regulators will indeed be the choice of the right incentives to encourage innovation and effectiveness. Furthermore, the definitions of incentives that do not prevent a fast evolution to economically balanced models are the key factor to the success of smart grids (and consequently the 2020 objectives).

The LENS-report proves that the regulator has to keep many options open because the future isn't very predictable and the "best" scenario can't actually be determined.

For sure, ensuring a transparent and stable framework and clear perspectives about the possible long-term evolutions of the rules is essential.

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)?

We agree on the principle but with the following remarks:

- *It will be hard to define the right targets based on European principles only; the local country situation should also be taken into account.*
- *The regulators should define targets in terms of quality of services for the users. The network operators have the responsibility to choose and implement technical solutions to achieve those objectives at the lowest cost.*
- *The regulators should keep in mind the optimization of the whole value chain. A costly solution for the DSO can be optimal for the whole value chain and sometimes the optimum lies in the allocation of the costs to other market parties.*
- *The economic value of the 'output' and the required investments must be fairly remunerated. There are many risks associated to the deployment of smart grids, including technical risks, market risks and financial risks. The return for the DSO/TSO on its smart grid investments should reflect this high risk level.*
- *The regulators have to evaluate properly the benefits of the smart grid for all user categories.*
- *The technology can't be a barrier to innovation but it has an impact on the implementation timeline.*
- *Some outputs might be contradictory with each other; for example, the more inverters connected to the network, the more perturbations (harmonics…). These perturbations might have in turn several consequences: the power quality decreases, the PLC communication (smart meters) is impacted,… Therefore the targets set by the regulators should take these secondary effects into account.*

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?**

As explained in precedent answer, it will be hard to define the right targets and thus the right indicators. The list is however quite exhaustive and covers most elements that can benefit to the targets.

Point 1 is almost impossible to measure objectively.

Point 2 and 3 are valuable indicators but perhaps not of too much relevance to the overall objectives. For example, the hosting capacity for DER (point 2) is an interesting criterion but it is not necessarily a relevant indicator for the overall objectives because other parameters play a role, such as the location of the hosting capacity with respect to the local consumption.

From point 4, only the last 2 items are under the control of a network operator. They are important 'smartness' indicators since the quality of supply might be affected by the massive introduction of DER. However some users might be willing to offer some 'interruptibility' against other advantages. One could also envisage, in a long term view, a smart grid scenario where most network users would have some interruptible loads. Note that the global level of interruptible load would therefore also be a good indicator of the readiness to participate of the users; hence this indicator should be estimated and taken into account in smart grid business cases. The first two items in point 4 cannot be taken into account because network operators are not able to influence them directly.

From a DSO perspective, point 5 seems the one with the most effect to the overall objectives. But it is also a very hard one to measure and especially to define a baseline and the right timeline. Here some additional remarks about this point:

- *Some benefits will only be measurable in the long term. For example the reduction of losses is highly dependent from the location of the new local production relative to the local consumption. Ideally, the local production should be instantaneously compensated by a local consumption (also at a user level, i.e. in the same building). There should be an indicator for this (but this is outside the control of the DSO's).*
- *The availability of the network components is less relevant than the availability of the network.*
- *As mentioned in question 5 local authorities play an important role in defining long term perspectives for the development of their territories.*

Points 6 and 7 are mostly TSO related.

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?**

See answer to question 12.

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?

Yes, these kinds of incentives are needed. As said above, there are many risks associated to the deployment of smart grids, including (but this list is not exhaustive) technical risks, market risks and financial risks. The return for the DSO/TSO on its smart grid investments should reflect this high risk level.

The performance indicators discussed in question 12 can be used to incite the network operators to make the risky investments required for the deployment of smart grids, by making a link between the remuneration of the operator and the achievement of specific objectives on the measured outputs. However this should be done very carefully. Indeed, output measurement is often hard to perform. Furthermore, the time span for the assessment of some indicators will in some cases extend throughout decades. In addition, many of these outputs are at least partially not under the control of the network operator. For these various reasons, it will be difficult to define the right incentives.

In conclusion, we are in favor of measures which promote innovation and a fast evolution to economically balanced final solutions.

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

Yes and no.

No in the short term, because:

- *Every DSO can already take some steps to initiate the development of a smart grid, taking into account the specific expectations of his network users.*
- *There exist already many standards, which are usable in several projects*

Yes in the long term, because if we want to achieve a massive and successful deployment of smart grid solutions, technical standards as well as models must be:

- *completed (there are gaps in current existing standards – e.g. there is a clear lack of standard at the interface between the network devices and the user devices : typically the communication port between the smart meter and the user's installation),*
- *adapted (some standards exist but require an adaptation to integrate recent innovations),*
- *and effectively adopted by manufacturers (it is an important lever to increase competition between manufacturers, and hence to reduce costs).*

Standards must absolutely guarantee a high level of interoperability, not only between different manufacturers but also between successive generations of tools.

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

As explained before, only the evolution to economically healthy final solutions will help to remove the necessary barriers.

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.

- the user acceptance (readiness to participate)

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

As explained before, TSO's will only be able to achieve their Frequency/Voltage control and in generally their network security role, in using the right services provided by third parties, in particular DSO's. As these DSO's must combine different services to assume this new role, there is in principle a risk for cross-subsidies. This risk does not really exist in Belgium since TSO and DSO's are clearly unbundled from each other.

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

- *Defining the right incentives and rules, and a stable framework with a medium and long term perspective, to enable the fast evolution of to economically healthy final situations for all players in the market. With this perspective in mind, it is essential a.o. to:*
  - *define rapidly appropriate incentives for DER to be located close to consumption places (or where there is free capacity available). It requires a clear definition of what the "relevant connection point" is;*
  - *define the budget available to deploy the smart grid;*
  - *determine how to ensure that vulnerable users (poor, unemployed, precarious,…) are not penalized.*