

To ERGEG

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Energinet.dk position and comments to ERGEG "Position Paper on Smart Grids"

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We consider the ERGEG Position Paper on Smart Grids a fine and most welcome initiative towards the foreseen implementation of increasingly more complex data communication and intelligence in the European power systems. Energinet.dk is therefore happy to offer our comments as follows:

The Danish experiences from daily operating a power system with more than 25% in-feed from distributed intermittent Renewable Energy Sources shows that in order to maintain unchanged security of supply and quality of supply it is necessary to introduce smart grid technology in a carefully phased process towards fulfilling the European 20/20/20 goals and the somewhat more ambitious Danish goal of a 50% RES integrated power system in 2025. Smart grid technology thus became our preferred and necessary technical prerequisite to operate power systems (both national and regional) with very high penetration of intermittent RES as compared to imposing severe restrictions on the daily operation of the RES in order to maintain power system stability.

Secondly in our work towards the future smart grid we have recognised the need for designing, pilot testing and installing a first level of grid-wide two-way data communication systems with integrated distributed intelligence before the first generator or consumer can be integrated and start taking benefit of any smart grid technology. A good comparison to this fact can be found in the introduction of wireless cell phones; No mobile phone could operate before a first nationwide network had been established. To achieve the first phased smart grid roll-out we believe that all future smart grid users should take their relative part in the initial up-front investments necessary.

The obvious smart grid users are the TSOs, DSO's and DNOs, generators, prosumers, consumers and Balance Responsible Parties (BRP) and their incentive to participate in the initial investment is the operational and market advantages they will achieve.

To support a timely deployment of smart grid technology we believe that new regulatory frameworks, supporting incentives and controlling benchmarking schemes should be developed by the European Regulators allowing for the initial up-front investments be done by the transmission and distribution system operators as well as generators and consumers.

This may very well be achieved by adopting the proposed Regulator user-centric approach as long as it is recognized by the European society that smart grid technology becomes a technical necessity to fully exploit all assets and safely operate the resulting active power systems.

Specific answers to official questions for public consultation

Section 1 – Introduction

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

Answer:

Yes - as explained in our position statement.

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

Answer:

Conditionally yes if based on the IEC definition on page 11. It is important that all controllable assets must be able to contribute to optimal system operation; this includes all types of DG, controllable loads, electrical storages, etc.

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?

Answer:

Not directly. Electric Vehicles (EV) and Heat Pumps (HP) will help to achieve the 20/20/20 goals, but at the same time these will increase the grid power volume. To be able couple EV and HP to achieve the 20/20/20 goals and to maintain security of supply and give access to markets, ICT is even more important. It follows that new regulatory frameworks must be flexible enough to allow for timely investment in new smart grid technology.

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.

Answer:

We agree with the identified drives but we also believe that full exploitation and integration into the power system of every kind of micro units (heat pumps, electrical vehicles, fuel cells, Photo voltaic systems, sterling engines, house hold appliances etc) can only be achieved by the development of a true and near real time market (e.g. 5 minute intervals) that needs to be developed and fully automated.

However it is just as important to be able to handle larger fluctuations in power flows, due to large concentrations of intermittent RES - especially offshore. This includes controlling voltage and other ancillary services with fewer fossil fuelled power plants and more RES-DG.

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?

Answer:

Conditionally yes as long as it is recognized by the European society that smart grid technology becomes a technical necessity to fully exploit all assets of more and more RES and safely operate the resulting active power systems. In an unbundled power sector with large amounts of DER, more assets and stakeholders must be able to support the common grid stability, maintaining frequency and voltage (ancillary services) - a task that was traditionally handled by the central players in the power system.

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

Answer:

Generally there must be more focus on what can be developed on competitive terms and what should be developed and provided by the monopoly entities. Most often competitive businesses requires a much faster rate of return on there investments. And to stay competitive they need to upgrade equipment faster than necessary in the monopoly businesses as the network companies are - often as non-profit companies.

Also it will become imperative for a successful deployment that all parties involved fully accepts operating on open international standards for data communication and control structures as opposed to a wilderness of different propriety "standards".

Energy suppliers and energy service companies should also accept the marginally increased costs involved in installing the necessary ICT hardware for smart grid roll-out at every generator and consumer included in their port folio.

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

Answer:

Mostly yes, though we have also identified the following needs to be included:

- the users need for stable grid voltage, and other ancillary services.
- the power markets need adopt to the intermittent generation which includes dealing with ramping problems.
- ramping problems on transmission level arising from large shift in power settings on large HVDC interconnectors due to the present market-shift each hour needs to be solved. This can be solved either by enforcing slower ramps on the existing market or by develop the market towards a true real-time market (faster time shifts).
- network companies in some areas have to implement smart grid features before the roll-out of new load such as HP and EV.
- activating a large bulk of all new types of loads (HP, EV, etc.) it will together with a more intelligent market design be necessary for energy service companies to develop intelligent software in order to provide automatic optimal operation of said assets.
- to speed up initial smart grid solutions to cope with fast emerging new types of assets. In some areas the grid stability can be at risk if NRAs expect time for an evolution of concept development. As an example DSOs and DNOs are generally hesitant to allow e.g. HP and EV because the local grids are not dimensioned for these non-traditional units in large numbers.

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.

Answer:

In addition to what have been identified we believe that guaranteeing satisfactory security of supply and power quality should be added.

Power quality in the network planning and in operation must be taken into account because smart use of DG to control Var and voltages (ancillary services) often can post-bone the need for costly reinforcement of grid infrastructure (see previous answer concerning need for stable grid voltages).

Furthermore we are not sure that the classical approach of building detailed dynamic stability models of the power system will be possible in the future. We are more and more faced with the challenge of aggregating thousands of different types of assets into single models. In Denmark this has been the case for several years especially concerning dispersed wind turbines and combined heat and power plant in the medium and low voltage distribution grids.

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.

Answer:

Some smart grid solutions will become a necessary prerequisite for maintaining security of supply in power systems with a high penetration of RES:

- developing new market designs to utilise the fluctuating generation from RES.
- utilising DG to support voltage control in those windy periods the bulk power generation moves to remotely placed offshore Wind Power Plants and centrally placed Thermal Power Plants are shut down.

In Denmark there are more cases where Wind Turbines are shut down and Thermal Power Plants are forced to run to supply either voltage control, short circuit power or to balance power. And every day there are hours where equal amounts of power is bought for both up and down regulation to cope with the unbalances from the deviation between market and the produced power (especially in hours with national surplus of generation from RES).

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

Answer:

It is vital that new regulatory frameworks, supporting incentives and controlling benchmarking schemes should be developed by the European Regulators allowing for the initial up-front investments be done by the transmission and distribution system operators before the first generator or consumer can be integrated and hence before any benefits can be measured by any stakeholder.

This is generally the case for the development of innovative solutions, where the pay back time is most often longer than implementation of already know technologies.

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)?

Answer:

Yes, though in some cases the benefits of smart grids are easier measured by technical details.

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?

Answer:

The following could be added to the performance indicators:

- (1): ratio of customers on real-time pricing.

- (5): ratio of customers on real-time pricing.
- (4): ratio of DER connected for active network management

Our view of the significance of the benefits listed in Table 1 are ranked in descending order: (5), (4), (2), (3), (7), (6) and (1).

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?

Answer:

The above mentioned additional performance indicators could easily be assessed and cleansed of grid external effects.

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?

Answer:

Yes. Though it is important that incentives for innovative solutions do incentivise long term investments.

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

Answer:

Many of the standards needed for smart grids already exist. Especially IEC have for years been preparing standards that are suitable for smart grid development. Part of this standardisation work is still ongoing.

Most important is though that only one open data communication standard should be encouraged. We propose the IEC 61850 group of standards to communicate between power system and assets in smart grids.

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

Answer:

Yes it is presently a barrier to achieve the initial start-up investments in smart grid technology. Especially the investment in secure and reliable ICT hardware and infrastructure is a major barrier.

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

Answer:

The utilization of smart grids as being supporting the transmission grid would make it relevant for the TSO to buy services from the sub grid if the price aggregated in the market is competitive with the alternative price from central power plants and other market players. It should not be a subsidy but a socio-economical sound business between the DSO and the TSO.

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

Answer:

Development of optimal regulatory frameworks, supporting incentives and controlling benchmarking schemes and the removal of any existing national barriers towards the necessary initial up-front investment in rolling-out of smart grid technology in a carefully phased manner.

Further to develop the regulatory framework that incentivise innovative development and deployment of long term solutions of smart grid technologies. And to insuring market development in Europe to cope with much more generation from RES.