European Distribution System Operators for Smart Grids

‘Digital DSO’ – *a vision and the regulatory environment needed to enable it*

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WHAT ARE THE DIGITAL TRENDS FACING DSOs?

As highlighted by the European Commission's "Digital Single Market Strategy," digital technology has been changing not only our economy but also our daily lives for several years, and it is expected that this change will continue. A number of interdependent 'digital' trends are prompting distribution system operators (DSOs) to refocus their business and strategy on 'digitalisation.' The most notable trends include:

Connectivity: Every asset, every device, every person is now connected and inter-connected via electronic communications.

Collaboration: This connectivity allows for multiple forms of collaboration, increasing efficiency and improving performance. Examples of such collaboration include: consumer/prosumer to network operator via smart meters; machine-to-machine (M2M) smart appliance and meter exchanges in consumer premises; M2M network equipment, supplemented by self-learning software; intra-DSO workforce coordination; DSO engagement with market parties (e.g., aggregators, suppliers, energy start-ups).

Personal data innovation: data management innovations are emerging even while respecting the important EU data protection legal framework and the fundamental right of privacy.

Big data: With the deployment of intelligent sensors and smart meters and the proliferation of customer-owned connected devices (i.e., the 'Internet of Things' (IoT)), the volume of data is expanding by orders of magnitude. New forms of collecting, storing, processing and exploiting such data can give lead to improved operations and enable new business opportunities.

'Industry 4.0': A redesign of the industrial value chain is underway, embracing automation, IoT, data exchange and modern manufacturing/ industrial technologies.

Open data: the expectation that all government and other public data be published and made openly re-usable, encouraging the development of innovative applications and services. In the case of DSOs, an open data approach can be made in combination with the smart meter. Reliable metering data that is anonymised or is aggregated could be made publicly available to help public administrations and market parties offer smart energy solutions.

Cybersecurity: Connected, collaborative energy networks and systems and the use of cloud computing are potential target for cyber attacks. Securing these networks has to be a top priority.

Leading DSOs are increasingly deploying the digital technologies and data solutions associated with these trends to improve their business performance and customer service. In doing so, they are embracing the European Union's Digital Single Market and Digital Agenda.

WHAT IS THE VISION OF A DIGITAL DSO, HARNESSING THESE TRENDS?

Traditionally, DSOs have operated as asset-centric companies, physically managing electricity distribution infrastructure assets, such as electrical lines and cables, substations and transformers. With the upgrade of this infrastructure into 'smart grids,' however, their asset base is being expanded to include intelligent monitors and sensors and smart meters. This is resulting in DSOs becoming data-centric companies, using digital technologies to optimise asset management, integrate distributed renewable energy resources (RES) and improve network stability and security. They are also able to leverage consumer and network data to deliver better quality of service and engagement and to serve better as a neutral facilitator among market players.

A vision of a 'Digital DSO,' to which EDSO members are aspiring and already are transitioning today, is of an upgraded network and systems with:

Cyber-security for digitalisation in all domains.

Digitalisation in network management and operation, for example:

- ability to predict and handle power infeed with bi-directional power flow to manage Intermittent and decentralised power production;
- evaluation of energy data to predict grid loads and anticipate bottlenecks. This allows for the optimisation of network investments;
- real-time processing of load data and generation, enabling the integration with demand/supply balancing service to optimise grid utilisation;
- new capabilities in predictive maintenance and self-healing concepts help to further reduce operational costs;
- predictive analytics based on sensor data, enabling smarter asset management with a fully digital allocation of spare parts, work, and logistics;
- long-term system planning and integration with other (regional) grids;
- hardware-in-the-loop testing that can use complex simulation coupled with actual hardware testing;

Digitalisation in mobility and field operations, for example:

- digital support for grid operations, allowing very fast response, and/or allowing very thorough analysis of contingencies and their consequences;
- digital support for field technicians;
- digital business processes, replacing manual transactions in procurement, inventory management, invoicing and payment processing;

Digitalisation for market facilitation, for example

- meter-point operations to digitally connect to the consumer and enable value-adding services;
- collaboration with consumer and prosumer, consumers who produce their own energy, to reduce consumption and optimise network management;
- data-enabled transactions among DSOs, aggregators and supplier, aggregator and consumers, energy start-ups;
- fast transactions allowing close-to-real-time intra-day market closure for better integration of variable renewables in the wholesale market;

- standardised and secure data exchange to support market communications (e.g., supplier switching, meter data exchange, billing data exchange, nominations);
- provision of anonymised and/or aggregated data to public administrations and market parties – as mandated by regulation or motivated by market facilitation – to enable market innovation.

WHAT REGULATORY ENVIRONMENT IS NECESSARY FOR THE EMERGENCE OF DIGITAL DSOs?

Digital Single Market and related regulation

DSOs should be able to self-supply or commercially procure electronic communications networks and services in the way they deem most efficient and effective to achieve grid stability and security of supply and to upgrade their networks to smart grids.

Any reform of the "Telecoms Regulatory Framework" should maintain the 'virtuous circle' of regulatory-enabled competition in traditional and next-generation networks.

Adopting EU-level, pro-competitive spectrum policies will result in the rationalisation and modernisation of spectrum management and help reduce spectrum scarcity.

Exclusive spectrum assignment for DSO smart grid applications is desirable to allow optimal control over wireless solutions – especially, as certain non-exclusive spectrum bands or services offered by commercial mobile network operators may not be appropriate for mission-critical, cyber-secure applications.

DSOs are committed to keeping consumers' data secure and respecting the right of privacy. In this contest, we welcome a timely implementation of the Network Information Security directive and the General Data Protection Regulation.

Non-personal data, the use of which has been informed to the device owner, and personal data, which has been cleared and/or been 'anonymised' with the data subject's consent, should be subject to minimal additional restrictions regarding its management and transfer.

Standards priorities for data and ICT topics should be set at EU-level and accompanied by clear development time-tables. Such priorities would help standard-setting organisations better to support the digitalisation of industry

Digitally-oriented revisions to Third Energy Package

DSOs should be a key stakeholder for consultation when the European Commission intends to revise the minimal functional requirements for smart metering, as they are uniquely incentivised to harness the data of consumers and prosumers.

DSOs must be able to control the impact of consumers', grid users', actions on reliability, quality and continuity of supply. Real-time direct access to smart meter data is 'mission critical' for a DSO.

As DSOs are already regulated and neutral parties, they are best suited to collect, store and manage consumer data to facilitate a secure, efficient and transparent platform for data exchange among market parties.

DSO should be allowed to establish and upgrade platforms and protocols for exchanging smart metering data with transmission system operators and other market players without the appointment of a third-party manager.

Cost recovery to fund investment in digitalisation
As regulated companies, DSO remuneration is determined by national policy decisions. This national regulation should be consistent with EU digital economy policy objectives and legislation.

Distribution network tariffs should be more capacity-based, ensuring grid users – including self-generating and self-consuming energy consumers -- pay fair and cost-reflective rates.

DSOs' return on investments reflects their true cost of capital, including risk premiums and/or risk adjusted depreciation periods for projects with significant risks. The regulated return should be based on a long-term stable WACC, which is consistent with average asset lives

Research & Innovation
In their transition to digitalisation, DSOs would benefit from additional EU and national funding for research and innovation (R&I) projects for smart grids, piloting data-driven solutions and digital technologies.