T&D europe

DATA: ENABLING THE ENERGY TRANSITION

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Driven by the Paris Agreement on climate change, the EU is going through an energy transition that will fundamentally transform its economy and society. The formerly straight forward design of the energy chain from bulk generation over transmission and distribution grid towards the energy consumer is evolving. We are moving to a decentralised system with increasing amounts of renewable energy resource. Moreover, in this new reality energy consumers are producing energy on their own, building up nano- or microgrids and even starting peer to peer trading with energy by means of blockchain technology.

Electricity is also entering new sectors, like mobility or heating. Battery technology has become price competitive with gas-fired plants. More and more generation as well as consumption is connected via power electronics with the electricity grid, HVDC (High Voltage Direct Current) technology increases transfer capacity and helps to bridge the increasing distance between generation and load. At the same time, the many components of the electricity grid have reached the end of their designed lifetime but are still performing well. This makes it more important to monitor their health condition to mitigate the increasing probability of power outages.

The new electricity system generates massive amounts of data on, for example, weather forecast, electric vehicle charging, traffic and security. This data from households, buildings, communities and industry helps to control and forecast energy flows. The opportunity and the challenge is to manage all this data in ways that facilitates life for the users of the electricity system and avoid that the exchange of data is choking the system. T&D Europe members have demonstrated its strong ability to enhance the grid, increase its flexibility, and anticipate requirements through strong real-time software, analytics, combined with active software grid management from smart meters to power generation.

Considering this fundamental transformation, the present and future grid can't be operated in the same way as it was done in the past. How can we make sure that we can manage the modernisation of the grid and continue to enjoy a secure supply of electricity? The answer: Through digitalisation and communication. This starts with the utilization of the Internet of Things and cloud technology to build up the needed monitoring and automation infrastructure for those parts of the grid that were formally operated manually and to integrate the many newly connected decentralised energy resources into an overall energy management. This requires a special focus on the application interfaces and the underlying data models to achieve interoperability and to reduce the effort for setting up communication links, e.g. between a solar inverter or a smart home and a virtual power plant.

DIGITALISATION IS ONE OF THE KEY ENABLERS FOR A SUCCESSFUL ENERGY TRANSITION TOWARDS A CARBON EMISSION FREE ENERGY SUPPLY

Digitalisation is one of the key enablers for a successful energy transition towards a carbon emission free energy supply[1]. There are at least 5 ways in which digitalisation and data help the EU to achieve its energy and climate objectives:

1. Increased transparency for energy prosumers, from households to industrial sites, about their energy footprint and the usage of their energy profile data;
2. Greenhouse gas emissions reductions due to increased integration of renewable energy;
3. Reliable and more efficient electricity grid operation by means of a better utilization of installed assets;
4. Energy traders and retailers can more precisely forecast their balance group to minimize the need of ancillary services;
5. Technology providers can receive feedback on the performance of the installed components, which helps to make the products more efficient, more reliable and to improve the overall sustainability of the energy system.

PRIORITISATION, FORECASTING AND ANTICIPATION BASED ON DATA WILL LEAD TO A BETTER AND MORE RESILIENT ELECTRICITY GRID

Prioritization is critical. T&D Europe brings a real know-how on managing electrical equipment and grid data by helping users to prioritize the information on an electrical grid, on a private network or in an energy community. By helping users to solve most of the issues locally, it is possible to avoid adverse impacts at a higher level. Typically, well managed data helps solving local congestion of the grid by anticipating consumption, renewable production and storage. Prioritisation, forecasting and anticipation based on data will lead to a better and more resilient electricity grid.

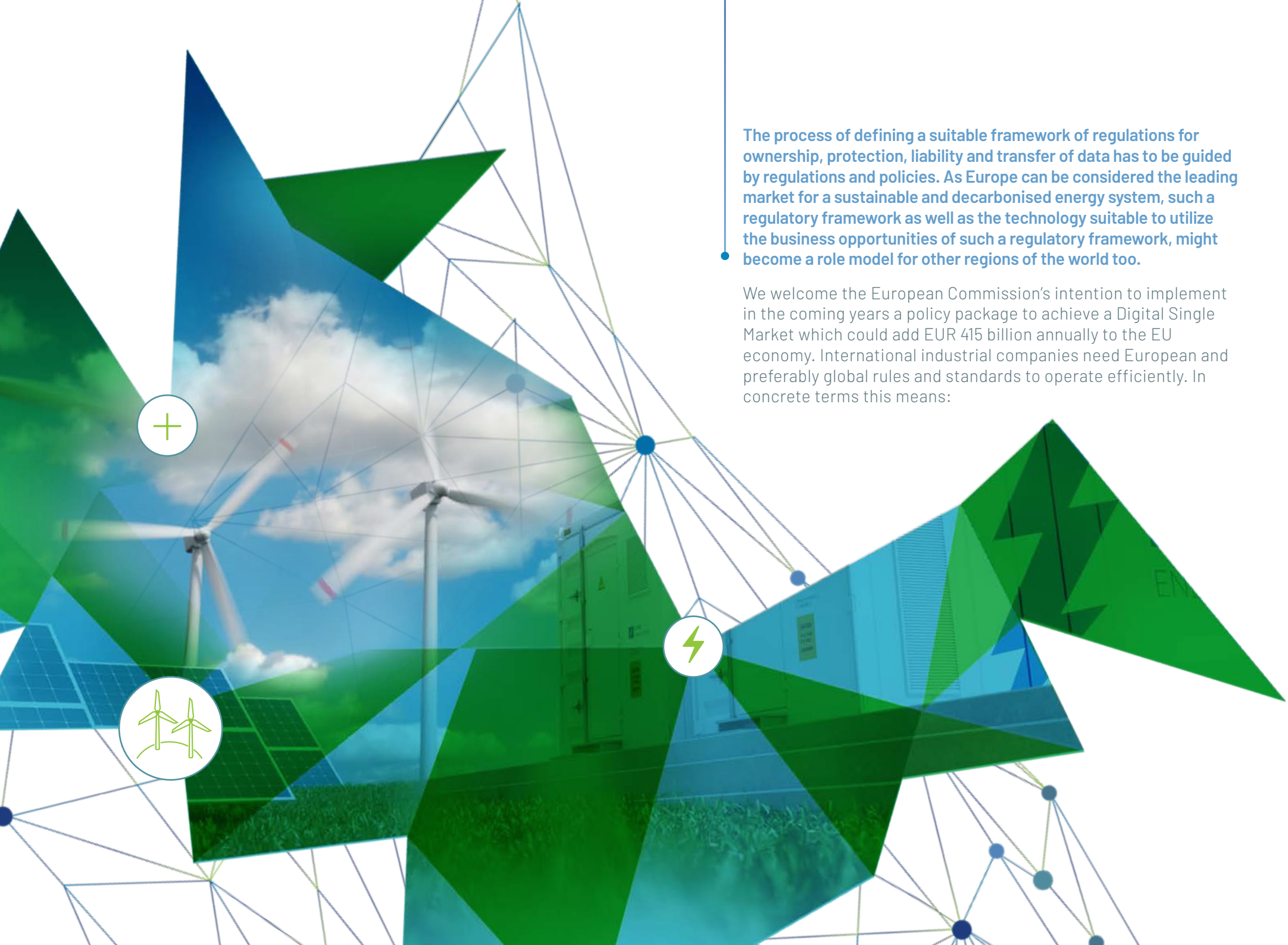
[1] The European Commission has already reacted on this issue and asked the Expert Group 1 – Smart grid standards [ ] to work on data format and procedures for data access and exchange for both electricity and gas, with the task of collecting information and investigating the way towards converging practices in the EU [ ]. However, the first Interim Report of EG1 [ ] focuses only on data formats and standards related to smart metering.

One example is a data analytics project at Gestamp, a world leading supplier for the automobile industry. Digital technology enables to cut energy consumption at its plants by 15 percent by monitoring in real-time the energy consumption at 14 factories spread across Spain, Germany, the UK, France and Poland. Based on the cross-country analysis of this data Gestamp is managing to reduce its plants' CO2 emissions by 15 percent and to use big data to optimize spending on electricity.

Another example is the utilization of data from installed PV-inverters by the PV-inverter manufacturer or other service providers to achieve precise information about the actual and near time future production of solar power. This enables the grid operators to maximize the usage of renewable and to reduce the redispatch and curtailment cost.

For a full and quick digitalisation, the energy sector needs smart answers to questions about ownership, protection, liability and transfer of data. In the energy sector digitalisation is often only associated with smart metering and the management of meter data. Digitalisation will affect many more areas in the management of energy system, and therefore data management regulation has to address many more data types beyond those coming from smart metering.

DATA MANAGEMENT REGULATION HAS TO ADDRESS MANY MORE DATA TYPES BEYOND THOSE COMING FROM SMART METERING



The process of defining a suitable framework of regulations for ownership, protection, liability and transfer of data has to be guided by regulations and policies. As Europe can be considered the leading market for a sustainable and decarbonised energy system, such a regulatory framework as well as the technology suitable to utilize the business opportunities of such a regulatory framework, might become a role model for other regions of the world too.

We welcome the European Commission's intention to implement in the coming years a policy package to achieve a Digital Single Market which could add EUR 415 billion annually to the EU economy. International industrial companies need European and preferably global rules and standards to operate efficiently. In concrete terms this means:

DATA SHARING WILL BE ONE OF THE KEY PREREQUISITES TO MAKE THE ENERGY SYSTEM READY FOR THE DECARBONISED FUTURE

- Adopting EU or international rules for ownership, protection, liability and transfer of all data types (not just smart meter) in energy markets and grid operation with the aim of ensuring it is available to identify efficiency improvement potential, to optimise participation in energy markets (including peer-to-peer exchange and blockchain) and to maintain or improve the performance of decentralised energy resources.
- Make data understandable to all by identifying and implementing a consistent set of international and/or European standards for communication and data model interoperability, especially at the grid-edge to ensure interoperability.
- Ensuring standardized access to household and industrial data with adequate real time and reliability performance to foster innovation and competition and avoid monopolies;
- Establishing open standardized interfaces especially for metering data;
- Ensuring strong cyber-security protection;
- Establishing an EU-funded interoperability platform for the deployment – not research – of operational data models for the energy sector.

Access to data and open and standardized modelling of data is paramount for the success of the energy transition. Data sharing will be one of the key prerequisites to make the energy system smarter and ready for the decarbonised future. EU policy-makers and energy sector stakeholders need to elaborate the potential for the overall economy and the sustainability of the energy system by defining the necessary rules for ownership, protection, liability and transfer of data.

Looking onto all these changes from an overall system point of view, it becomes obvious, that the grid can no longer be operated in the same way as it was done in the past. Since the construction of the first lines the electrical grid has become an intricate and complex system. Digitalisation and communication help to manage the operation of grid. New analytic applications must be developed to supervise the increased dynamic of the electrical system, caused by the intermittency or the renewable generation, and the decreasing inherent inertia of the grid, due to the ongoing shut down of large power plants and their huge synchronous machines. The volatility of the renewable generation raises the demand for better forecasting to secure the supply quality and to shape the load curve to maximize the utilization of renewable energy by means of energy flexibilities. All these digitalisation challenges have one thing in common, the dependency on data. Therefore, access to data and open and standardized modelling of data is paramount for success of the energy transition.

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