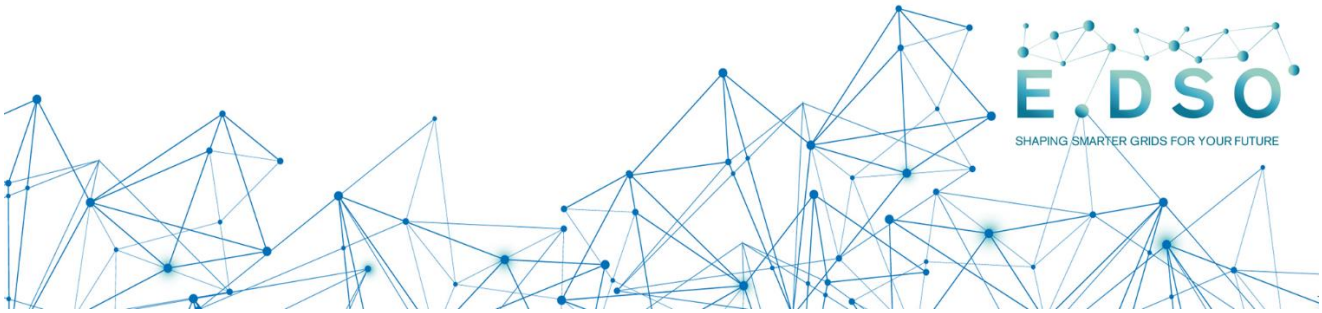

Stakeholders and Innovation Council

SCOPE OF THE PAPER

E.DSO gathers leading European electricity distribution system operators (DSOs) that are cooperating to ensure reliability of Europe's electricity supply for customers and enabling their active participation in the energy system. To this end, E.DSO works on distribution-related technologies, policies and projects. Connecting more than 350 million customers in Europe, E.DSO is the key interface between Europe's DSOs and European institutions, promoting smart grid models and technologies, as well as new market designs.

On November 30, 2018, E.DSO launched the Stakeholders and Innovation Council to jointly design the evolution of DSO models. The aim is to create value for all relevant stakeholders (citizens and society, industry, customers, and others), developing forward looking DSO strategies.

The Council has brought together 8 amongst the most influential leaders[1] from academia, international organizations, and business to develop new insights and perspectives on the major trends driving the evolution of DSO models – such as decentralization, digitalization, electrification, urbanization, and climate change – and open up discussion for new ideas, disruptive schemes and innovation, with a worldwide outlook.

BACKGROUND

The **energy transition** – driven by technology innovations as well as by the decarbonization ambition set by the Paris Agreement and the EU 2050 target – is shaping the future electricity systems. This new architecture enables and supports increasing shares of **renewables**, **energy storage** and **demand response**, all of which can increase grid **flexibility.**

By 2050, renewables could reach as much as 87% of the electricity mix, with wind and solar playing a dominant role. Cheap renewables, flexible demand and batteries will be combined to shift the European power system away from fossil fuels and nuclear power to one built around variable renewables and emissions-free energy.

[1] Ronnie Belmans, Hans Martin Henning, Dan Delurey, Patrice Geoffron, Guido Bortoni, Jorge Vasconcelos, Philip Lewis and Joisa Dutra Saraiva

Global power demand is expected to grow by 57% between 2017 and 2050 and reach 38.770 TWh, driven fundamentally by economic output and population. Cities will represent greater than 75% of global population in 2035.

Electric vehicles will add around 3.466 TWh of the electricity demand globally by 2050 (9% of the world total). However, EVs do not simply add to total electricity demand, they also provide demand side flexibility. EVs will change the shape of intraday load.

The Stakeholder Council discussed all different developments, focusing on four intertwined dimensions which will contribute to transform the future DSOs' role in a proactive way:

1) ***Futurability***
   Different scenarios involving new **system** paradigms in electrification, technology and sustainable resources, local energy communities and cultural preference will require a new mindset in designing "futurable" energy systems, with legislative frameworks articulating sustainable cross-sector regulations.

2) ***Grid Edge Transformation***
   Electrification, together with increased penetration of distributed energy resources, pervasive **digitalization, and new business and societal technologies** are shaping a grid edge transformation. This progression unlocks value creation and opportunities for innovation and technological development that will benefit the various stakeholders.

3) ***Innovative Resilience***
   Ever intensifying market dynamics, cybersecurity, large scale social events, climate change and related force majeure phenomena will affect the energy sector, requiring disruptive solutions to guarantee a higher degree of reliability, adaptation and flexibility of power grids. All this will challenge DSO operations and require new business and regulatory models and new types of governance of the **new energy architecture**.

4) ***Evolutionary customers and DSOs***
   Evolution of customers' behavior is being driven by new technologies, market, societal and environmental stimuli. **New customer expectations** will impact the evolution of DSO models and contribute to tackling of affordability as well as greater flexibility and simplicity.

The Stakeholder & Innovation Council is enhancing the debate about these main trends and impacts and will provide a view on what could be done to create value out of the transformation.

The initial outcome of the discussion has for all of the above dimensions identified key priorities and challenges for which the Council will define a path for exploring and analyzing in more depth.

KEY MESSAGES

Topic #1: FUTURABILITY

- The sharing economy and social participation is evolving the ownership relation between people and things, and having a huge impact on society dynamics and industry.
- There are drivers of electricity demand increase such as the growth of data centers and electrification of transport, heating, cooling, and industry. The way of operating DSOs has to be flexible to play different roles and serve society in different ways.
- Synergy among energy sectors and industries will reshape competition among energy vectors, requiring sustainable cross-sector regulation and innovative financial mechanisms. DSOs should position themselves to anticipate and actively enable sector coupling.
- Data intelligence and digital customer services will exponentially increase, with a predominant role of global IT companies. The consumer data, as collected by the DSO, have a major technical and commercial value, key to create value added services for society and industry. DSOs can operate a trusted data platform.
- DSOs need to digitalize their operation and planning processes to enable a highly dynamic energy system at all layers and timescales. DSOs have to be ready to be part of the digital society and to help build smart cities.

Topic #2: GRID EDGE TRANSFORMATION

- Digitalization, electrification and decentralization are paving the way for the *Platformization* of the energy sector.
- All aspects are impacted, including operational, technical, market and regulatory/ governance. A new role for DSOs is envisaged to include that of local dispatcher.
- The decentralization of the power system will require higher and extended visibility on the network of resources and customers.
- The operation of the grid should enable and benefit from flexibility services taking into account time and locational constraints and DER integration.
- Proper remuneration and incentives to foster the grid edge transformation should be established.

Topic #3: INNOVATIVE RESILIENCE

- Market disruptive dynamics, cybersecurity, large-scale social events and extreme climate conditions require a new approach to resilience.
- This new approach is based on the recognition that DSOs are at the cross-roads of energy consumers and all energy-related sectors; therefore their role needs to be substantially reshaped.
- Cross-sector partnerships, engagement of customers and new players are the key elements of this new approach, together with communities' and institutional support.
- The new innovative resilience approach requires stronger coordination among control layers and also take into account the new role of DSOs as *'market catalyzers'*.

- A comprehensive ‘resilient by design’ concept, including technical and regulatory dimensions, should be translated into plans, based on specific local needs and constraints as well as worldwide best practices.

Topic #4: EVOLUTIONARY CUSTOMERS AND DSOs

- DSOs should be perceived as reliable partners enabling a largest variety of customers, diversity of behavior and lifestyles, promoting and disseminating sustainability of change and innovation through user-friendly experience.
- Technology innovation must be beneficial for stakeholders, taking into account ways to help and incentivize consumers’ engagement (including a more active role for them).
- The golden rule and protocols of experimentation should drive decisions and actions from inception through design, execution and monitoring, to allow joint learning from demonstration projects, sharing expertise and experiences.
- More important, those initiatives should be based on co-ownership of experiments which leads to desired behavioral pattern changes as well as the emergence of new business models enabling retention of successful actions/experiences.
- New flexible and dynamic pricing options, granting fair treatment, should be made available to customers. This new design must put complexity in the background, and simplicity in the foreground.
- Incentives should help DSOs make use of flexibility services and distributed energy resources while ensuring an overall cost effective electricity system.
- Energy poverty and inclusion should be addressed through innovative models, including partnerships with communities, and cost-related measures.

NEXT STEPS

The above key messages represent an initial stage that will support E.DSO and its members to evaluate and revisit the priorities, and to start working in more depth.

With this aim in mind, the Council will now engage in defining specific task forces of analysis in order to pursue further development in finding a new models of collaboration and engagement, modernizing the pricing model, promoting innovative inclusion, supporting innovation and digitalization and developing new energy architecture (e.g. catalyzer).

Stakeholders’ involvement and consultation will be instrumental to this effort.