ENTSO-E Vision 2030: The Future Energy System

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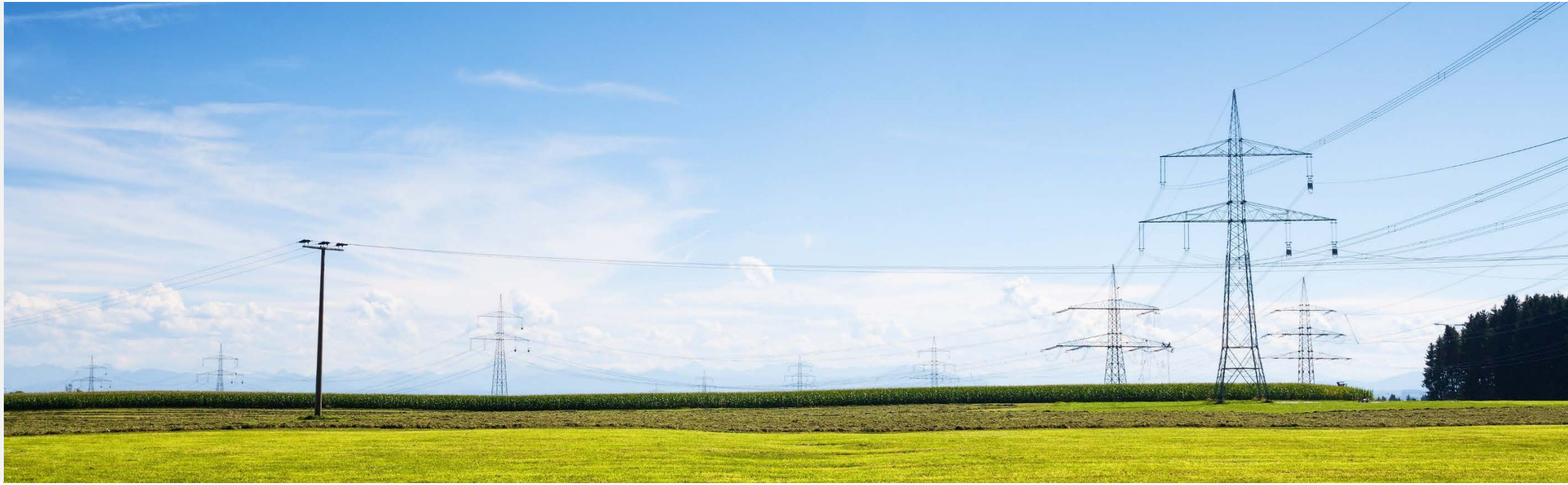

"Regional Energy Market Connectivity in the Western Balkans: Back to the Future",
5 December 2019, Tivat (Montenegro)

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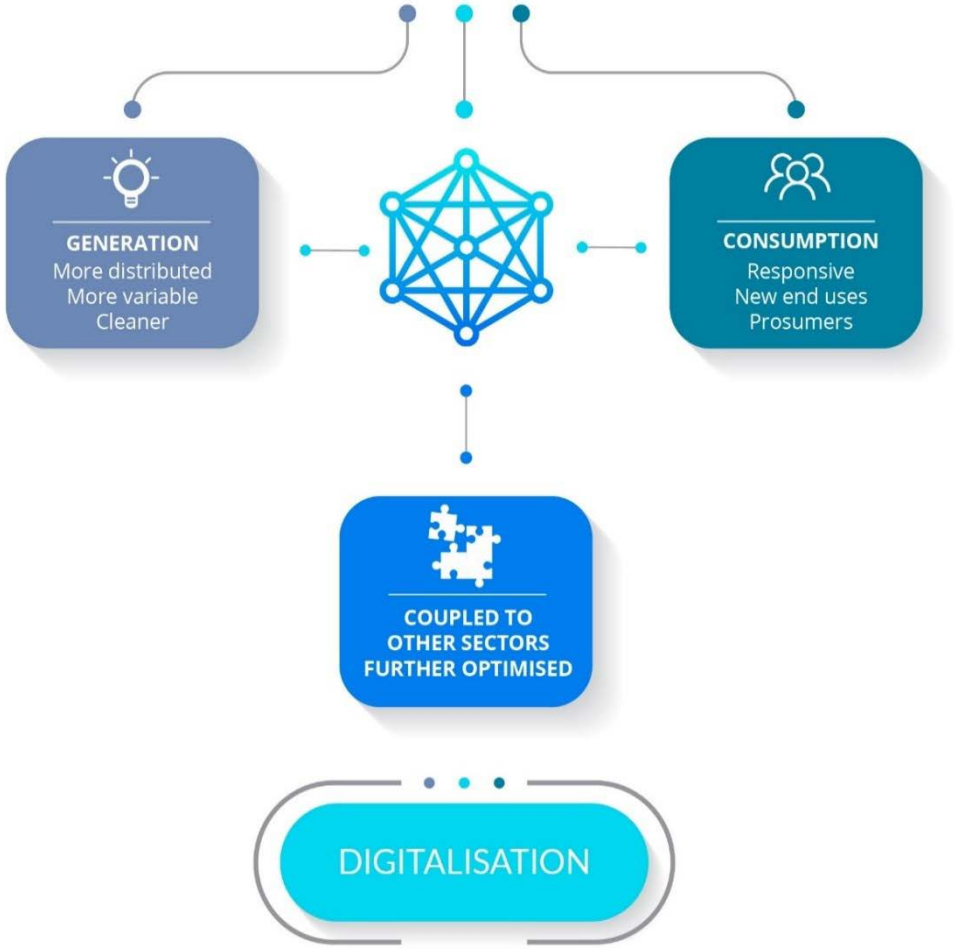
Reliable Sustainable Connected

Major trends in the power sector and new political framework



The European electricity system undergoes significant changes driven by a **strong climate action agenda** and related development of renewable energies.

These changes take place at unprecedented speed and add **further complexity** to system operation and electricity markets, while also offering **new opportunities**.

The Clean Energy Package is an important milestone for this transition. Its timely **implementation is the priority** for TSOs.

ENTSO-E's Vision aims to contribute to the shift of Europe's energy sector from a fossil fuel dominated and supply-centric model to a **clean, digitalised and electrified consumer centric system with many distributed resources**.

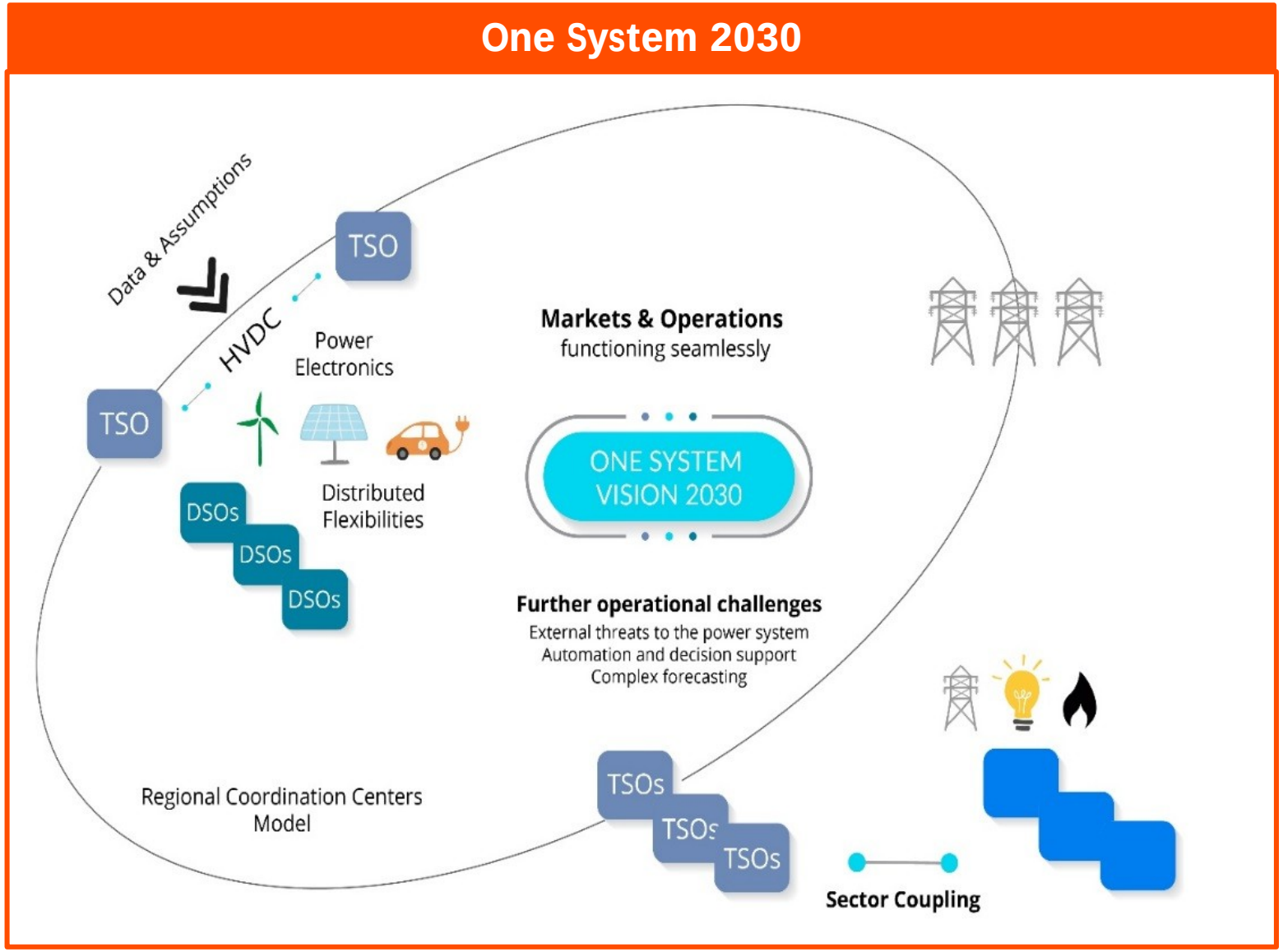
One System 2030 drivers

- **Distributed flexibilities** in future distribution networks with close TSO & DSO alignment
- **Power Electronics** towards hybrid AC / DC systems
- **Markets and Physics** seamlessly integrated within One System
- **Sector Coupling** where operators have pivotal role for “system of systems”, beyond power
- **Mastering future challenges** with resilience, forecast (RES), automation, Artificial Intelligence

One System 2030 key elements

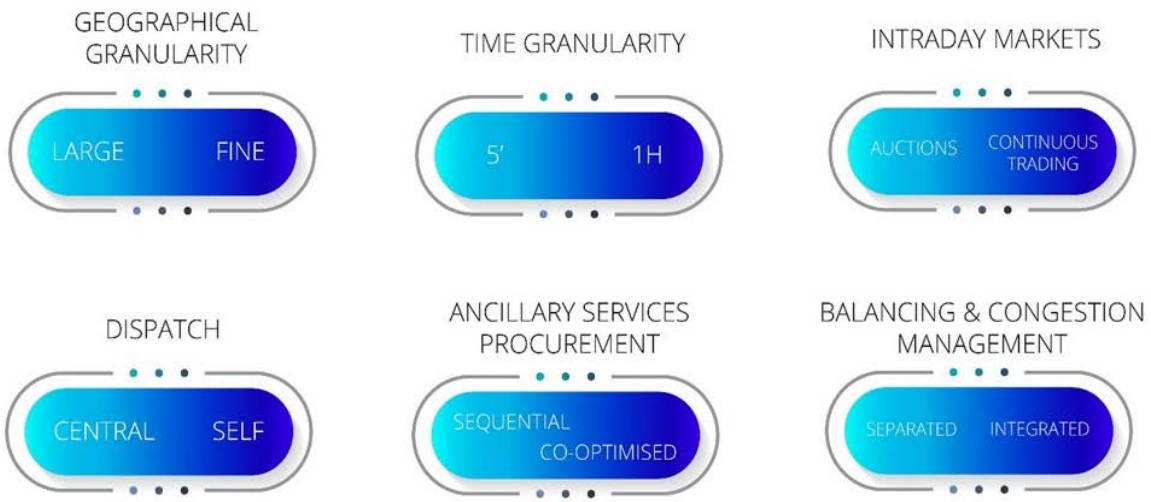
- Seamlessly integrated
- Decentralized resources
- New technologies
- Aligned with all connected assets
- Enabling cross-sector coupling

A true System of Systems



Market Design 2030 options & recommendations

no one-size-fits-all: Options*



**** Examples of market design options for short term markets and congestion management***

Recommendations

- No radical market design change
- Focus on CEP implementation: no need to introduce new EU legislation
- Foster efficient Internal European Market
- Solutions depend on national specifics
- Different fit-for-purpose solutions needed to avoid constraining innovation, but ensure preserving the IEM benefits

Market Design 2030 common principles

Fit-for-purpose solutions, reducing the gap between market outcomes and physics, enabling whole Europe to meet the 2030 challenges, and preserving the benefits of the IEM:

- Include **stronger locational signals**
- Increase the **locational visibility of resources**
- Enhance **short-term markets** to allow market participants to **trade closer to real-time**
- Facilitate provision of **new (including non-frequency) ancillary services**, in line with the CEP
- Ensure **efficient use of the grid capabilities** and of flexible resources
- Ensure **close TSOs' – DSOs' coordination**

Solutions for short-term market and congestion management should be part of a holistic market design addressing all 2030 challenges, such as investment price signals and system adequacy

TSO – DSO cooperation: the new chapter

Always in place, nowadays to be significantly adapted in order to cope with new challenges:

- more and more resources necessary for proper operation of power systems, i.e. distributed generation, active load and storages, **connected to distribution networks**
- one way power flow on T&D interface **being replaced by two way traffic**
- volatility of power flows experienced so far on transmission level **moves towards distribution grid**
- congestion management **becomes the issue also at distribution level**
- under deregulated conditions **relevant market design solutions shall cover also distribution level**
- DSOs set up varies among Member States **so will do future solutions for T&D interface, also**
- some guidance at European level recommended **to ensure interoperability, e.g. for data exchange**
- CEP requires **to set up EU DSO entity by 2021**

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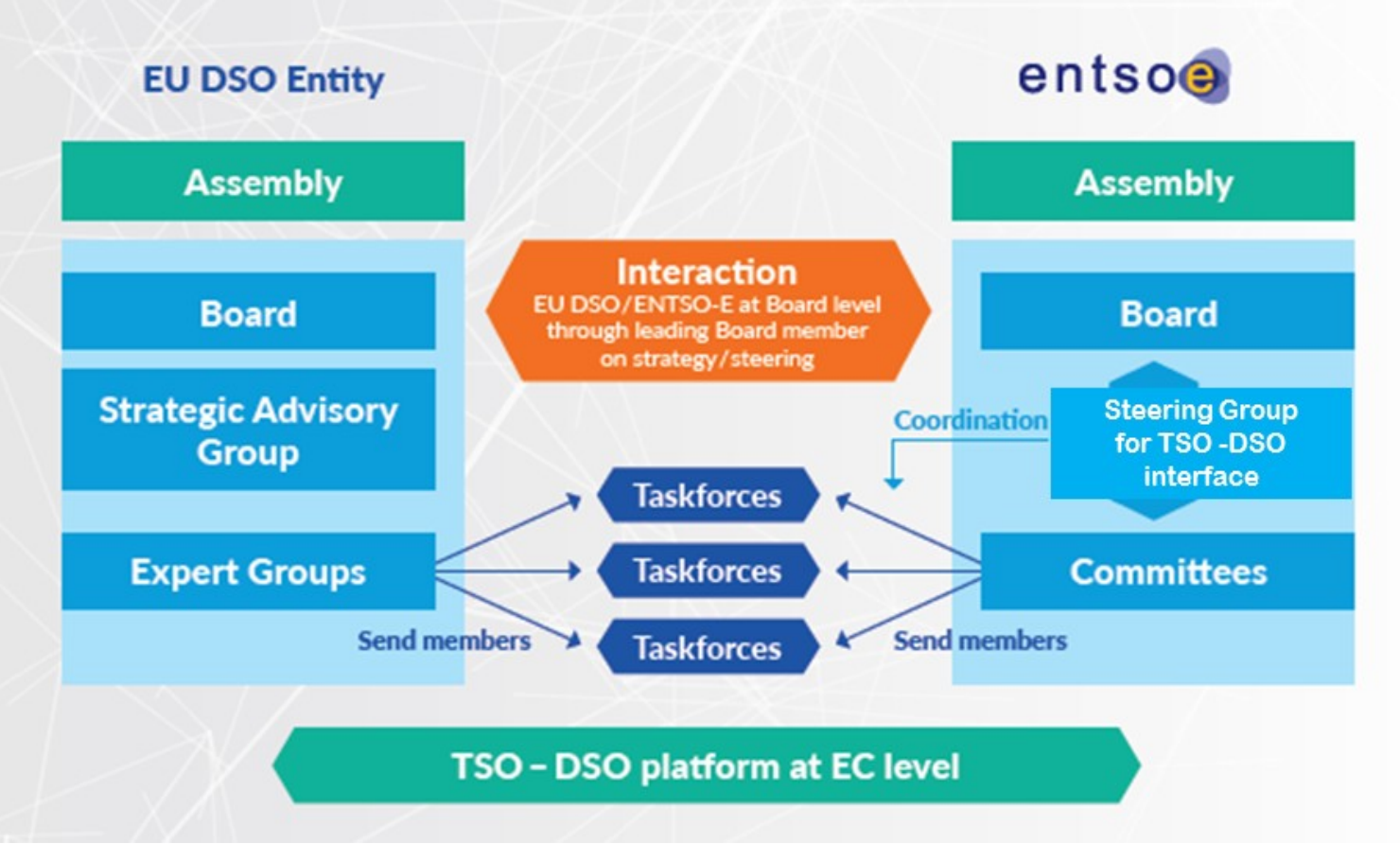
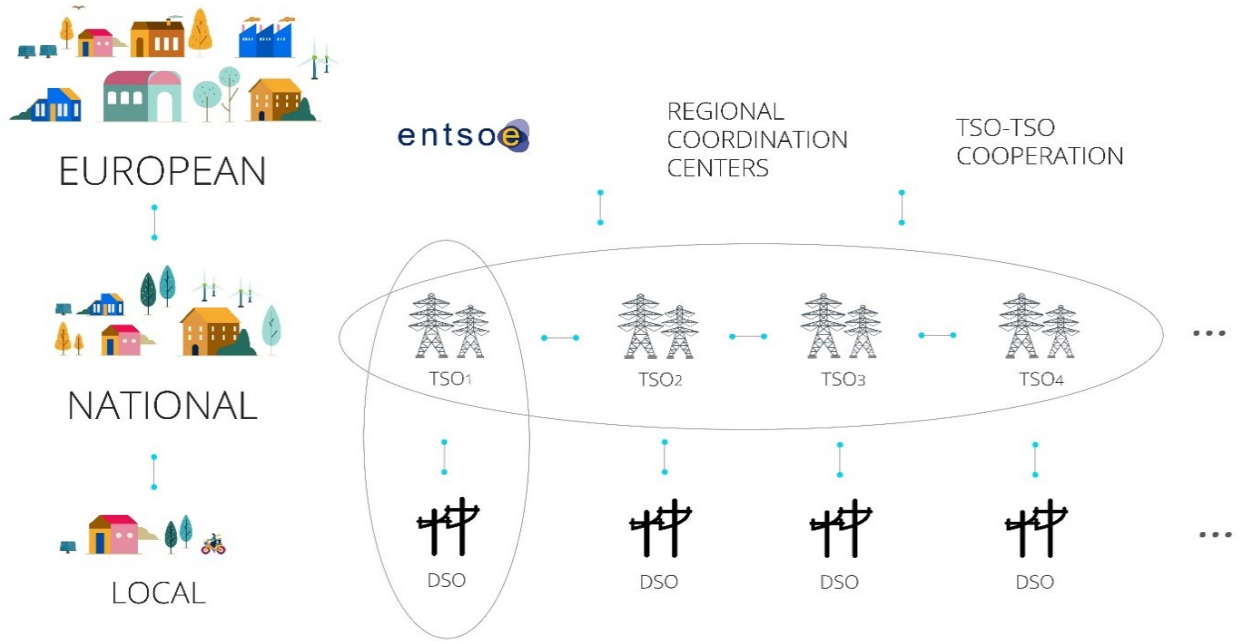
A new Steering Group for a sustainable TSO-DSO interface



Set up in 2019 in order to:

- ✓ provide strategic overview of the interface from TSOs side
- ✓ ensure coordination of the relevant work done within Business Committees
- ✓ prioritise topics for cooperation with DSOs
- ✓ be a single point of contact for DSOs and stakeholders

Our Vision: One System & Market 2030



- Multilevel architecture
- Different geographical scales
- Functional layers
- Multilateral interfaces
- Interoperability
- System operators = key facilitators
- Governance involving stakeholders

Let‘s build it together!

Thank you