



Geopolitics of Energy Transition

The European perspective

Dinner Debate

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EU Climate and Energy Strategy

New green ambitions for all



Keep global warming well below 2 C and target 1.5 C

= Halve the power sector emissions by 2030

COP25 – Implement the Paris Agreement



2020 Climate & Energy Package

20% reduction in GHGs
20% improvement in energy efficiency
20% of energy from renewables
10% electricity interconnection target

Clean Energy Package (2030) Targets

32.5 improvement in energy efficiency
32% of energy from renewables
15% interconnection target
Expected to deliver a 45% reduction in GHGs

2050 Energy Strategy

80 - 90% reduction in GHGs by decarbonising the entire energy system.

The 2050 Energy Roadmap explores the scope of available opportunities e.g. energy efficiency, nuclear energy, renewable energy and carbon capture and storage.



2030 targets have to be considered an intermediate step toward full decarbonization of the electricity system, which **requires taking action already today.**

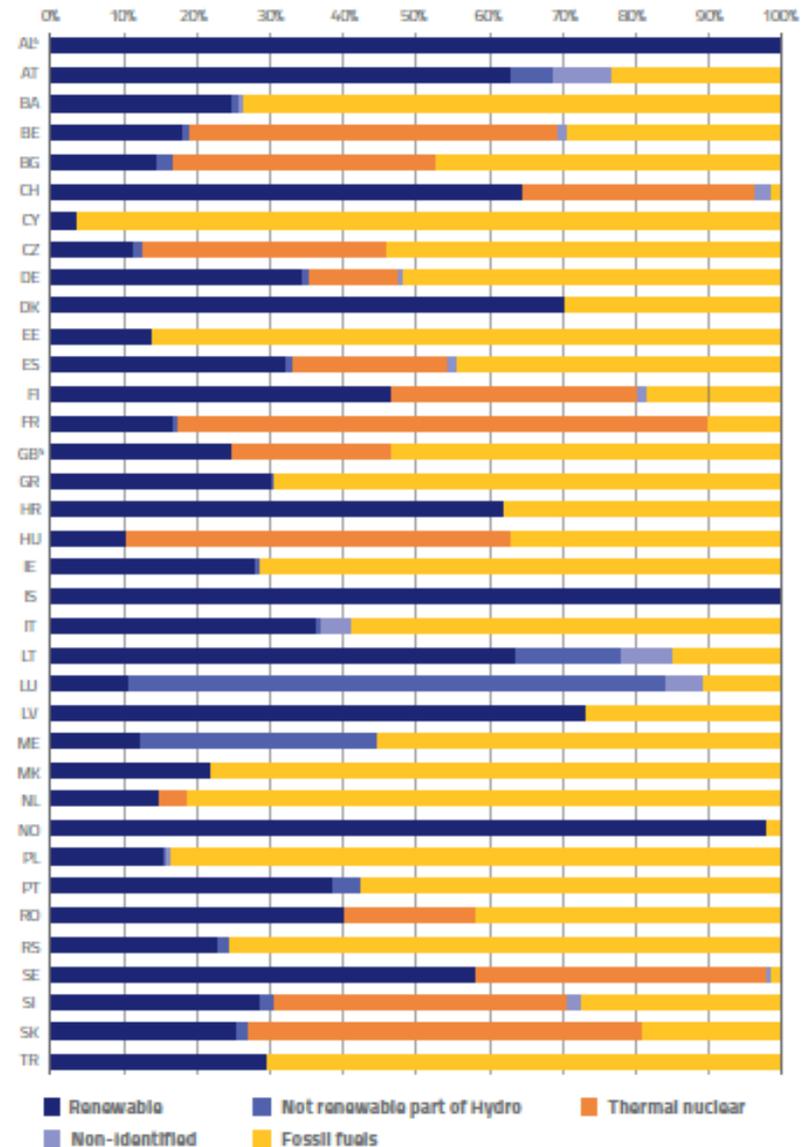
EU Renewable deployment

Share of energy produced by renewables in 2017

The share of total power generation delivered by renewable energy systems (RES) is a key sustainability data point.

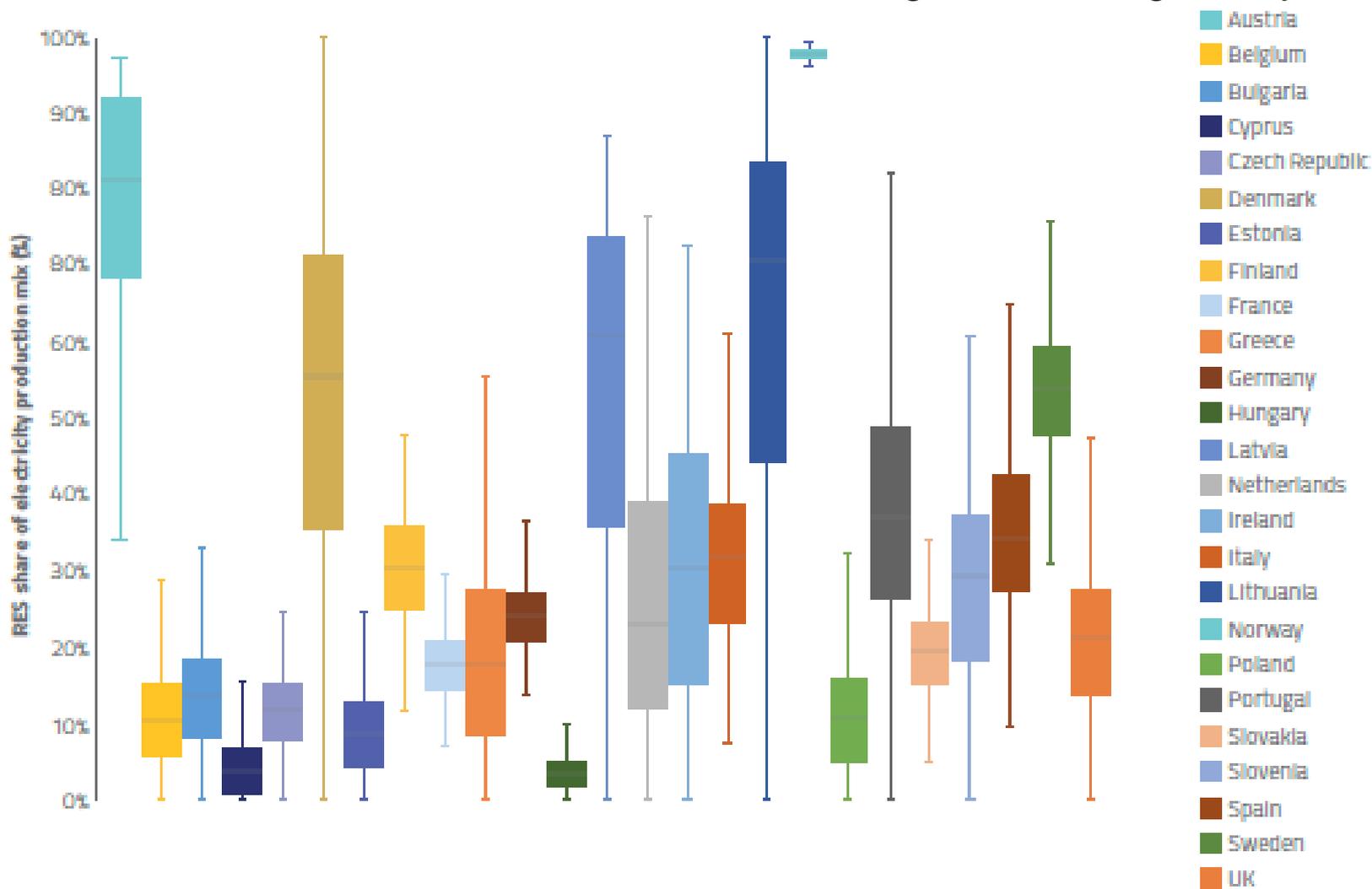
In Europe we see an **energy system** with different mix in different geographies: some countries have RES share in the range 90% to 100% of total generation and others less than 10%.

Since 2015, TSOs have helped to integrate 54 GWs of additional variable RES (wind and solar)



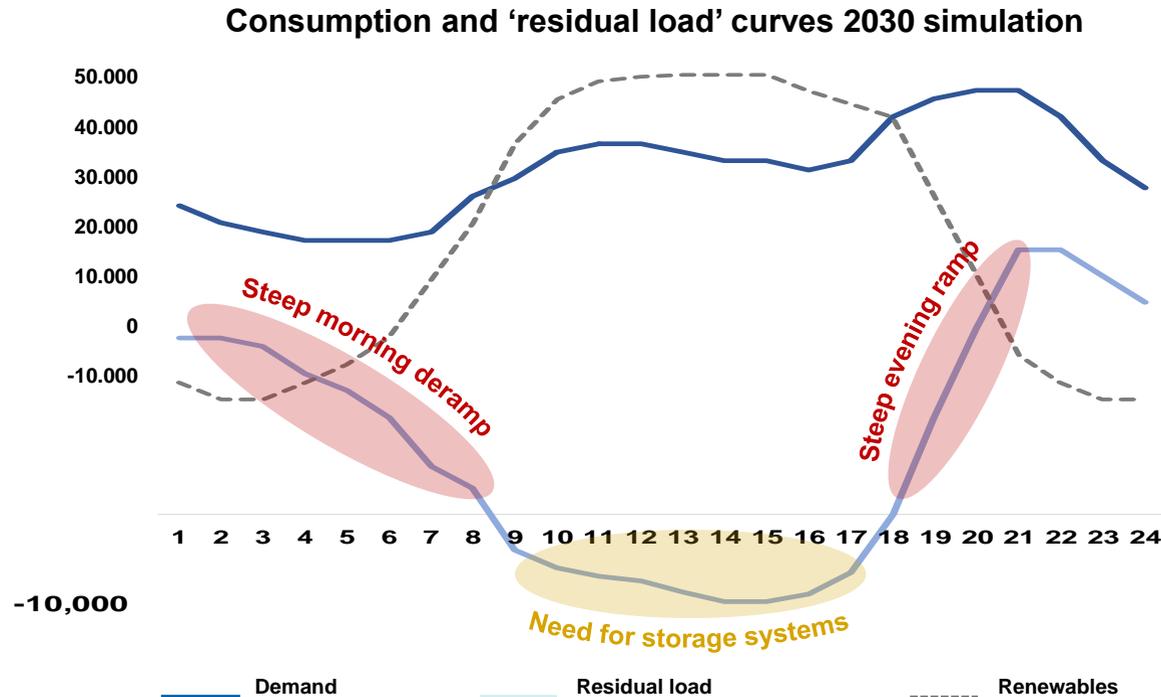
Distribution of RES-share throughout 2017

Higher distance between *High* and *Low* RES penetration shows **significant fluctuation** in RES share from the average value throughout the year



Integration of RES: main impacts on System Operations

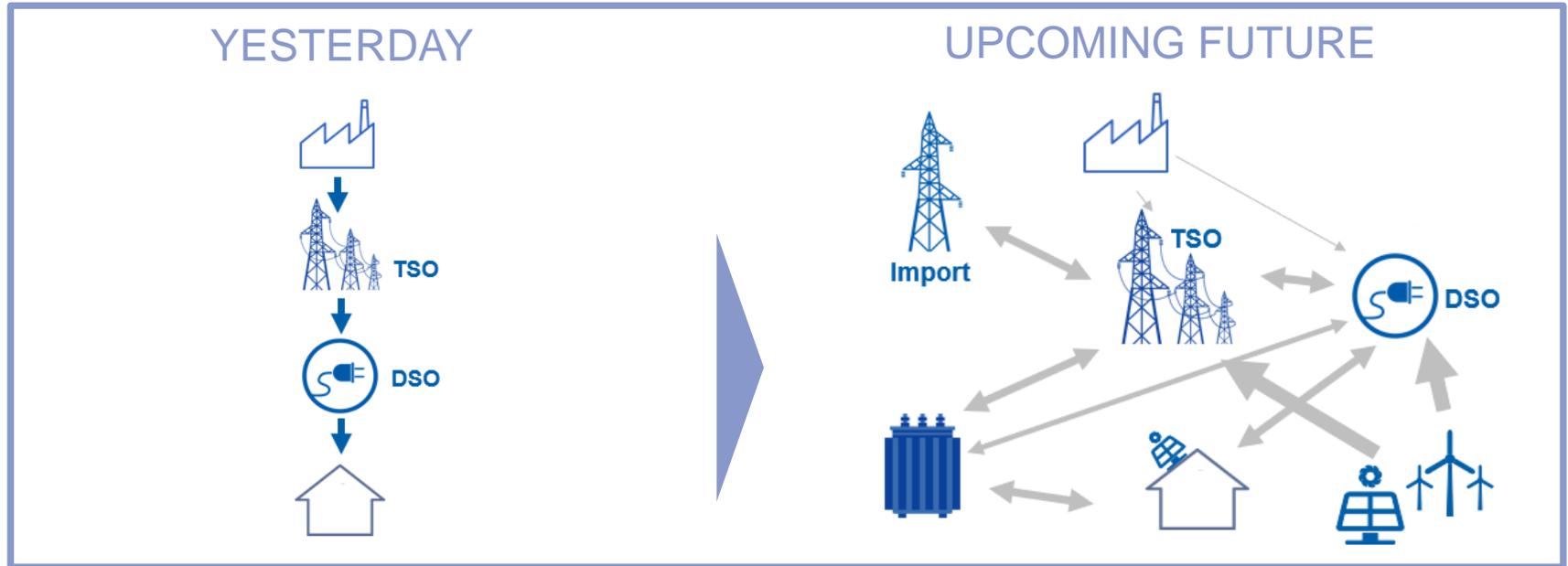
The increasing **penetration of renewable energy sources** in the generation mix is posing new challenges for the security and cost-efficiency of grid operation



Increased need of **flexible resources** (gas-fired turbines, pumped hydro storage and batteries, industrial & households demand response, interconnectors, active grid management, e-vehicles, power-to-gas, power-to-heat, etc.) and market options to unlock flexibility.

The TSO's role

A pivotal enabler in the energy transition

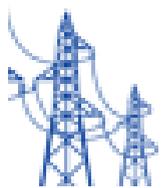


The electricity system is transitioning from a traditional model whereby power is sent from centralized plants to customers, to a new system characterized by multi-directional flows, dynamic-demand, and smart appliances.

TSOs have a statutory responsibility to guarantee security of supply in the operation of the network and in balancing the market: this requires a timely preparation of all the tools necessary to ensure it

Enabling factors of the energy transition

In this scenario, Three are the essential drivers to make sure TSOs responsibilities vis-a-vis the whole energy system are effectively respected

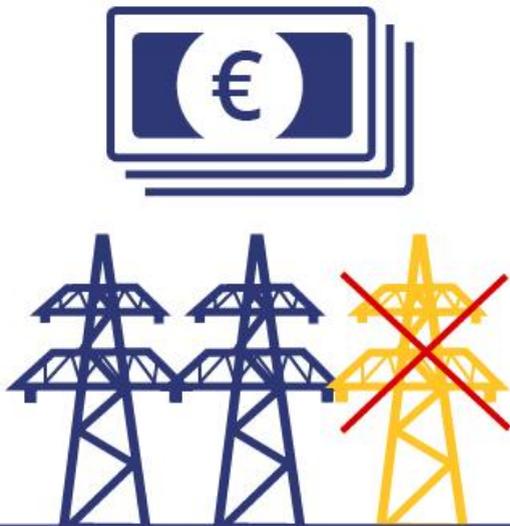
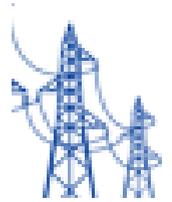


I
Infrastructure
deployment

F
Flexibility
resources

D
Innovation &
Digitalization

THE **NO GRID** SCENARIO will cost 40 bln€/year



Failing to invest in infrastructure will cost Europeans 40 billion euros per year as of 2040.

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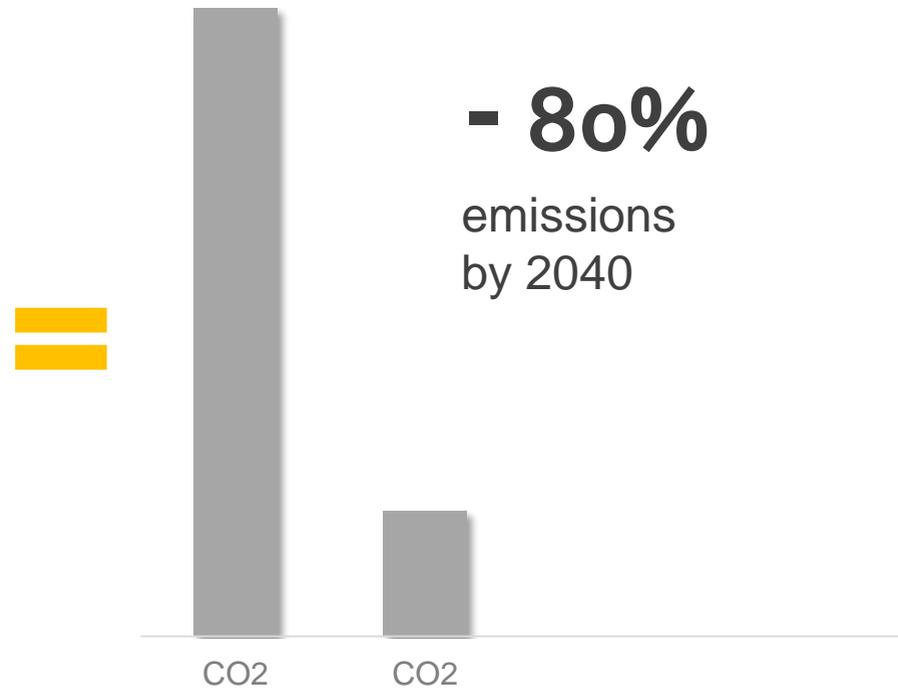
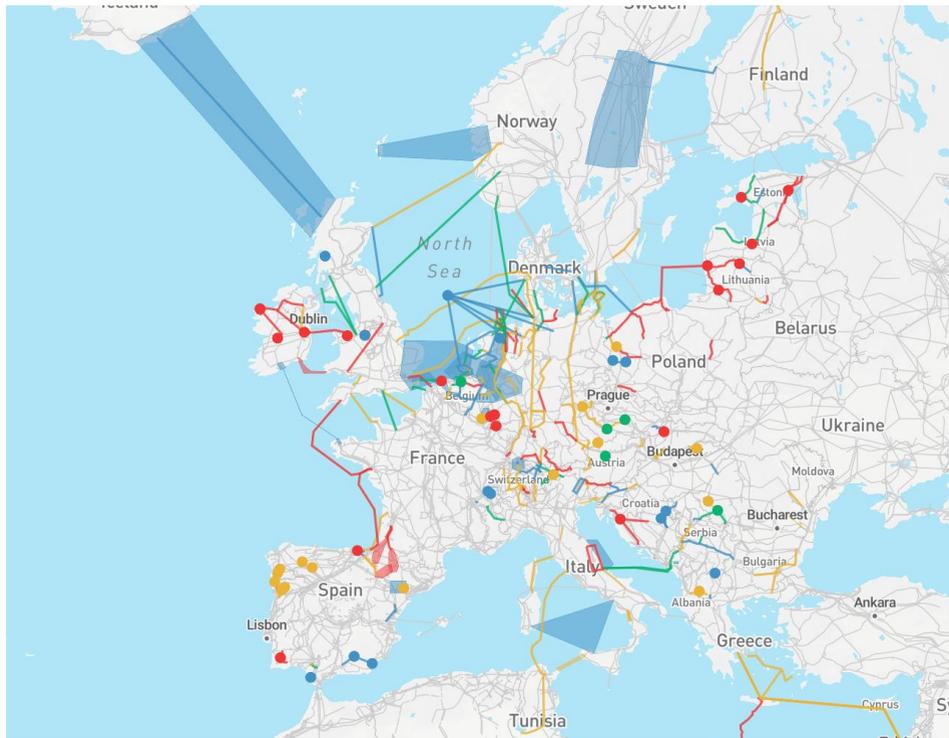
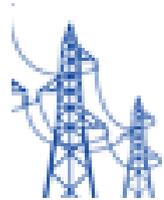
Wasting more than 150 TWh of clean electricity and increasing risks to security of supply.



Investing in *#infrastructure* is crucial for Europe. *#EnergyUnion*

Investing in Power Networks

Investing in Power Networks will increase cross border trade and will support the twofold increase of renewable sources all over Europe, also requiring internal grid reinforcements.

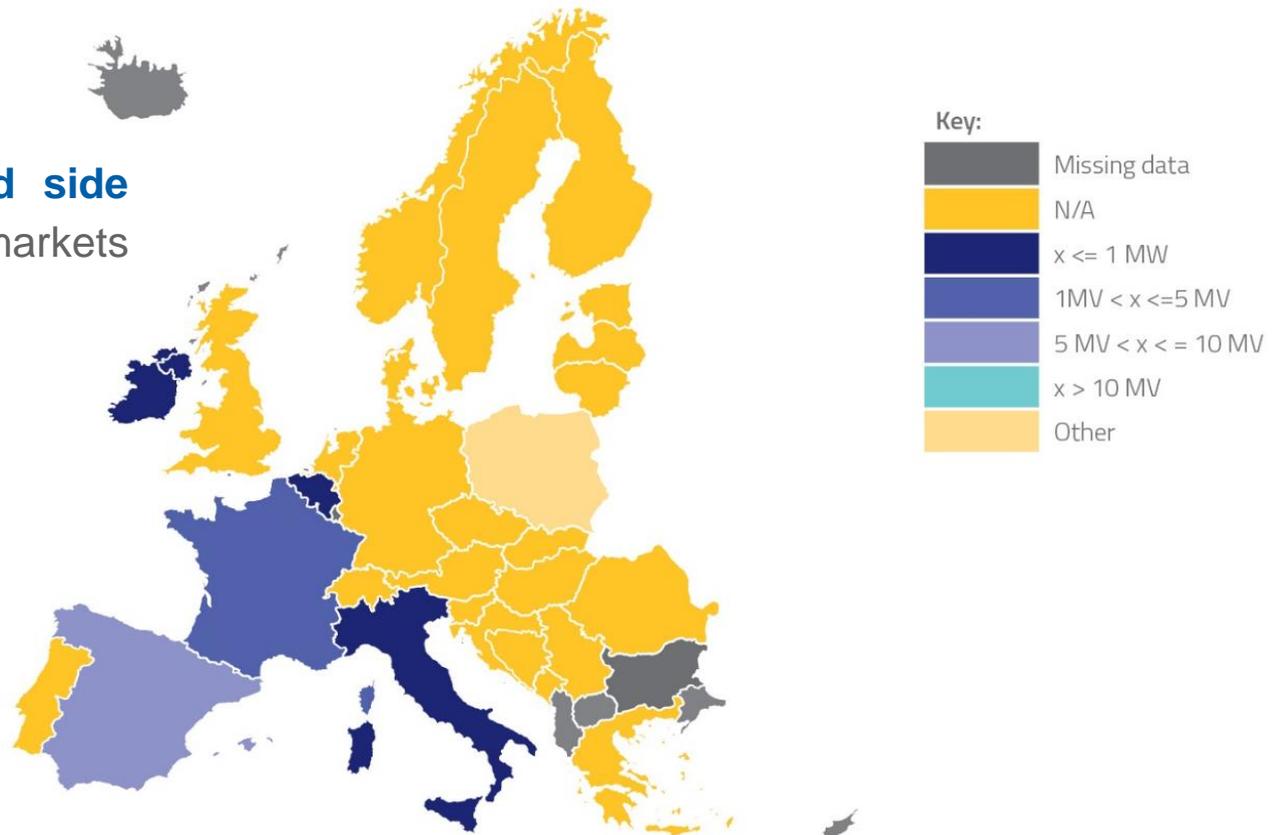


Customer participation in balancing markets



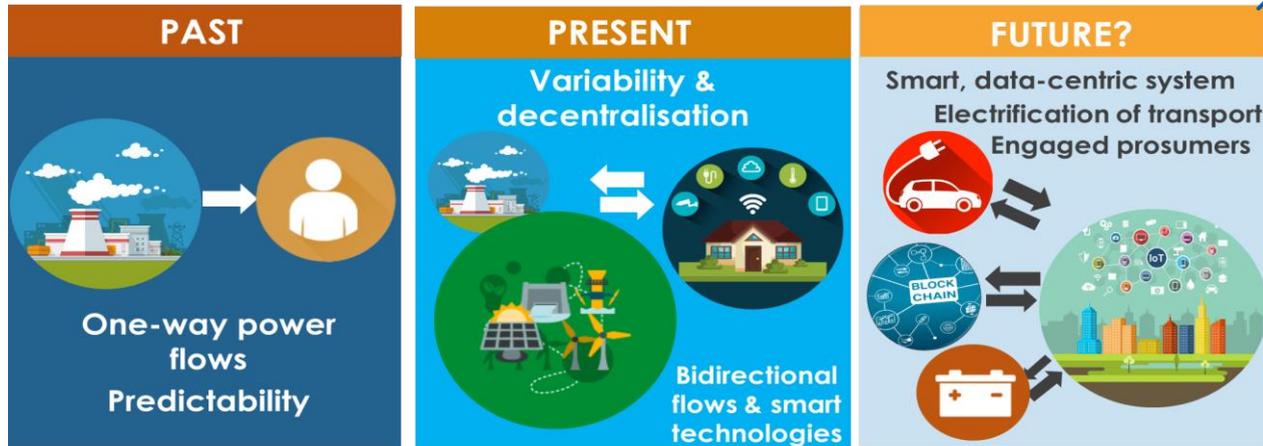
The increasing need of flexibility services, coupled with a wider distributed generation and a new prosumer role leads TSOs to adopt a new smart approach, introducing innovative solutions for the grid, such as demand response, storage and digital tools. This enables TSOs to become more agile while, at the same time, carefully addressing the challenges of data processing.

The volume of **demand side response** in balancing markets **increases year by year**





Open and transparent data availability is key to enabling the digital grid.



*Decarbonization
Decentralization*

are enabled by

Digitization

requires

**Interconnectivity
Interoperability**

increases

**Observability
Cyber Security risk
new parameter for
security of supply**

