

# Coping with Intermittency - The Network Challenge

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Supreme Court of Justice  
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# Energy Transition: the flexibility challenge is real

- 62%** Of the **generating capacity from variable RES** in Global Climate Action 2040
- 756** **Additional GW of wind and PV** to be connected in Global Climate Action 2040
- 42%** **Higher installed variable RES capacity compared to peak demand**
- 12** Countries with wind and solar outputs likely **higher than 80% demand** already in 2025



- 1** Distributed generation impacts the whole grid and power system
- 2** Enhancing and valuing the flexibility potential is fundamental
- 3** Cross-border flows take advantage of the variety of generation mix and patterns
- 4** Challenge for TSOs: access to the balancing services needed to maintain the security of the system in a cost efficient manner

# How to cope with variability? – the ENTSO-E solutions

Can the current flexibility tools deliver under the new conditions?

A multi dimensional response is needed,  
taking into account different time frames

Long term grid  
planning

Network codes

DSO/TSO  
cooperation

Digitalisation

# ENTSO-E Network code benefits



## *Sustainability*

- **260 GW** of RES connected
- **25 GW** in 2016
- **>10 GW** of EU demand side response



## *Competitiveness & Social Welfare*

- **23 states** and **85%** of European consumption market coupled

# Network codes



## *Security of supply*

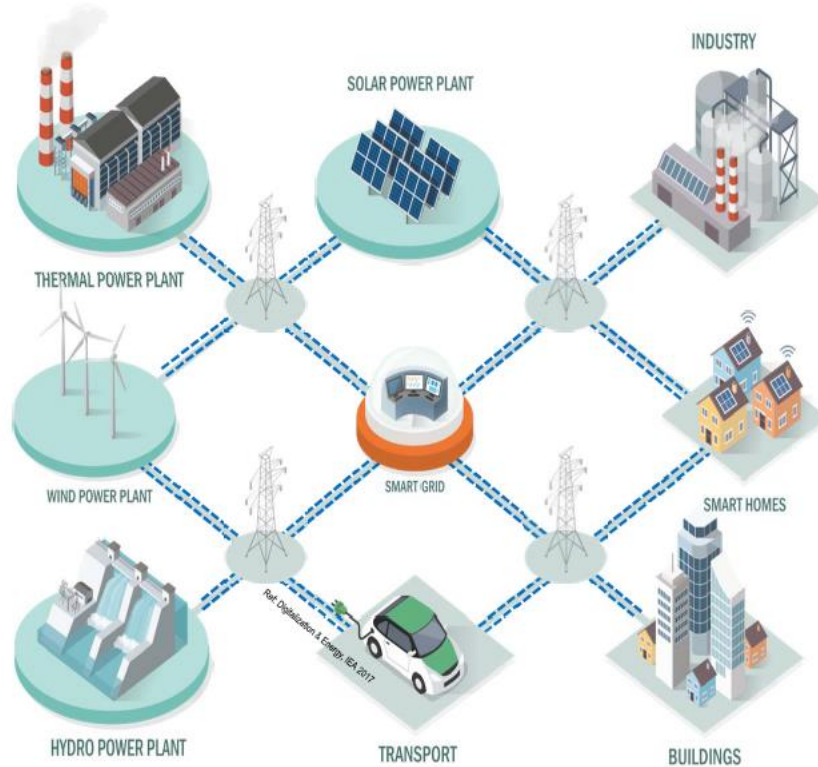
- **NO** multi-state interruptions recent years
- **Up to 300** coordinated tasks/day in a RSC
- **Hundreds** trained employees in RSCs programs and offices

# Measures to reduce RES integration cost (EBGL and CEP)

Make appropriate changes to relevant market mechanisms.  
These areas are:

1. Development of RES as a provider of Balancing Services
2. Adaptation of the market conditions to take into account the balancing needs brought about by RES and to take into account their constraints
3. Development of cross border balancing markets
4. Balancing Responsibility for RES

# Technology disruption brings new solutions



Energy/Electricity

Grid/System

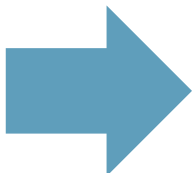
Consumer

ICT

Digital technologies enable a multi-directional and highly integrated energy system

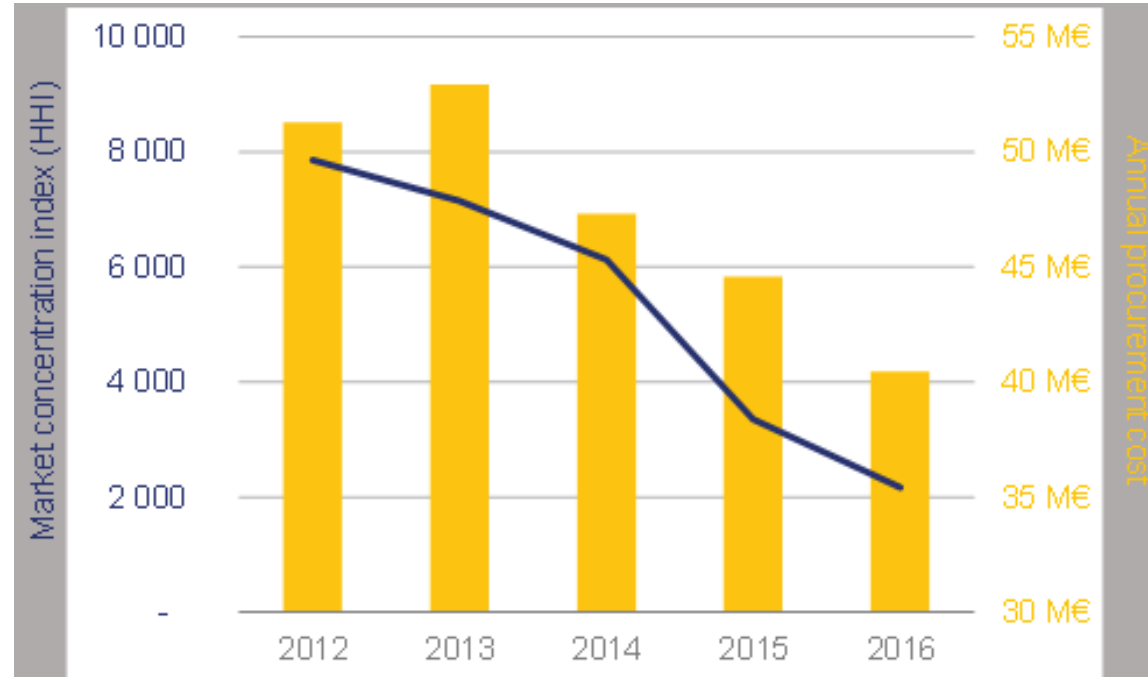
➔ Connect the dots and enhance flexibility services

# Bringing together flexibility providers and flexibility users



# DSR in balancing markets

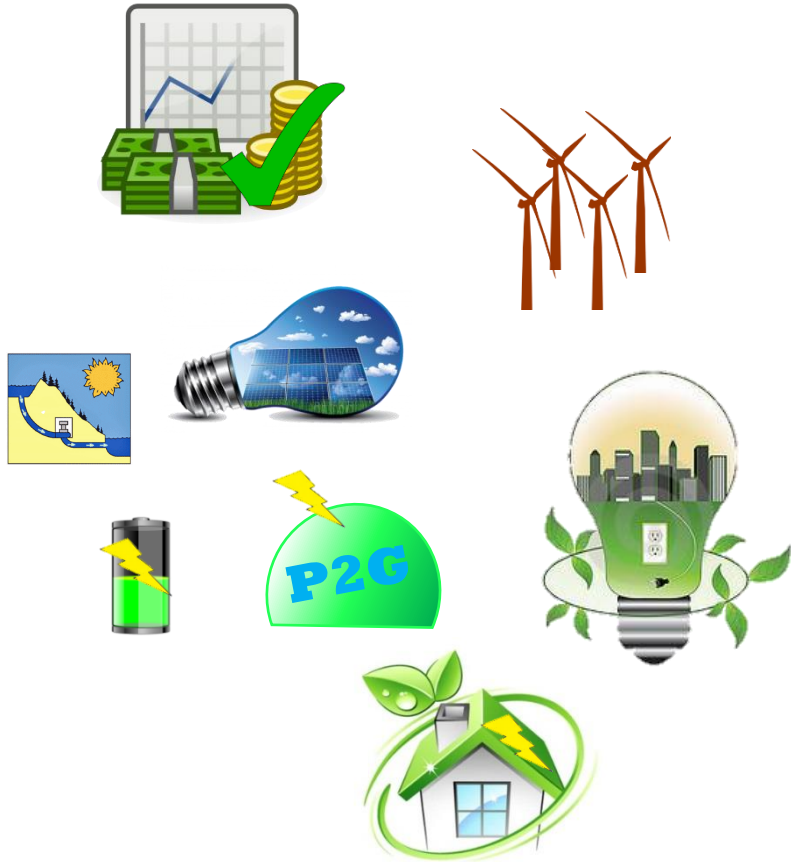
## Reduction of Balancing costs driven by increased participation (France)



*In France, distributed flexibility resources provided 32 % of the contracted manual balancing capacity in 2016. This participation started in 2012 is identified as a main factor of a 20 % decrease in the manual balancing capacity procurement costs.*



# TYNDP: Building Future Power System vision



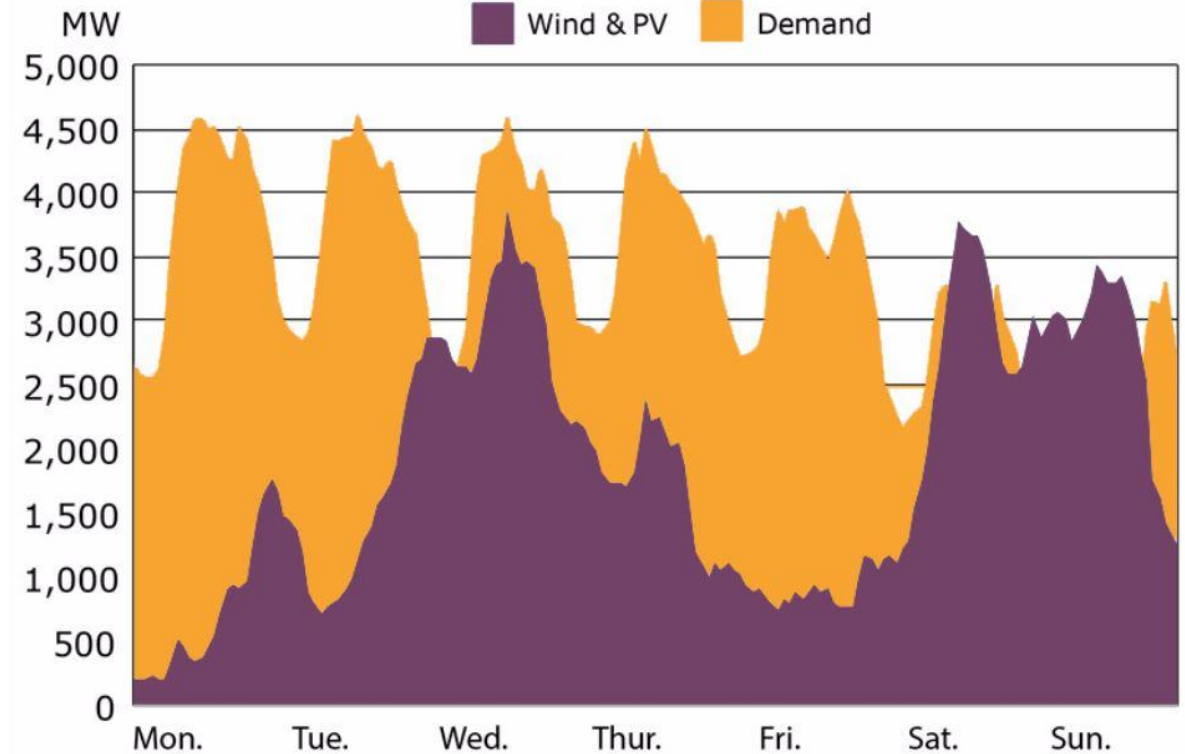
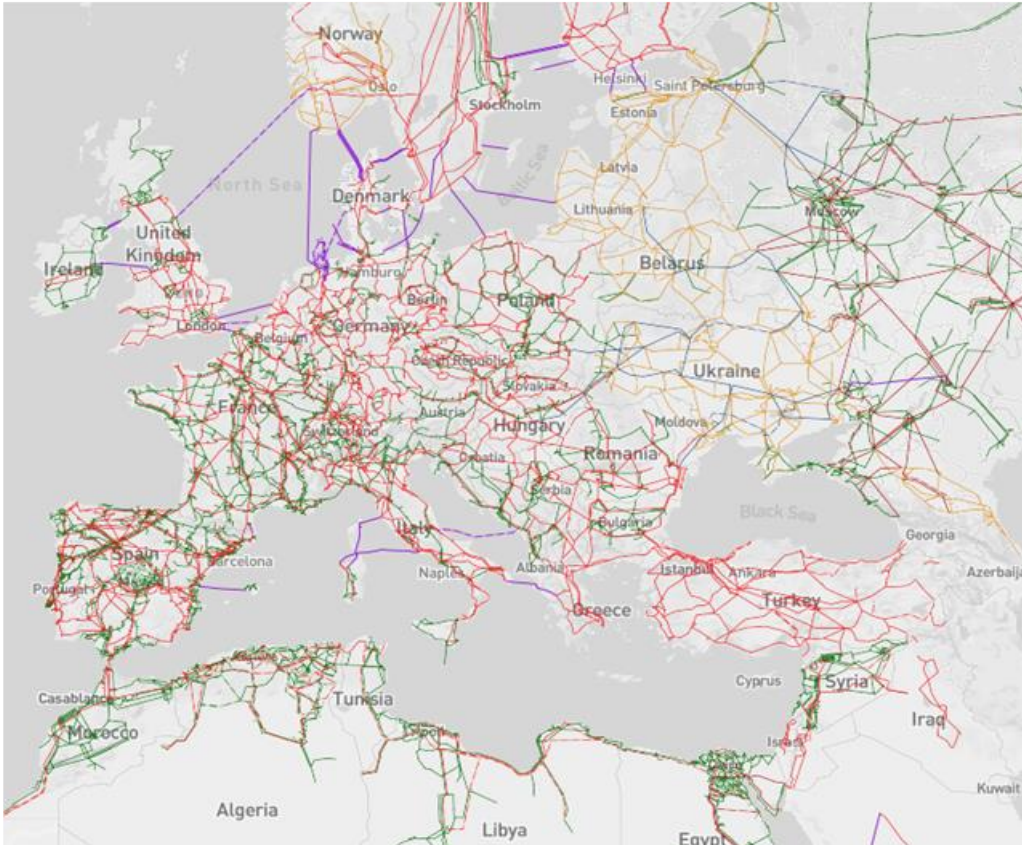
- New planning scenarios including one on **Global Climate Action**
- All meeting or exceeding EU targets. All **cocreated** with stakeholders
- **All data** sets available
- **More transparency** initiatives to come next year

# Growing complexity into Grid Situational Awareness & Flexibility Management

Large Scale Interconnections



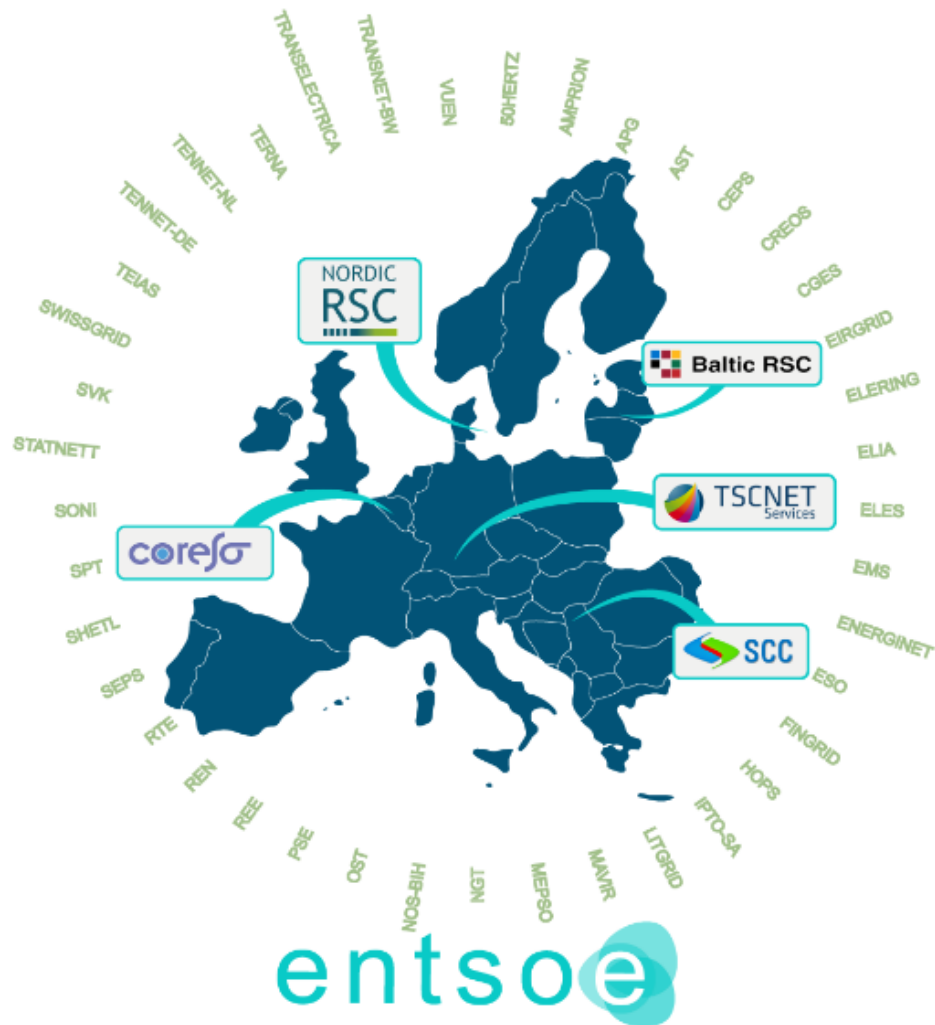
Distributed Energy Resources Integration



September 2016 in Denmark, one week  
(source Energinet.dk)

# Strive for Optimum Regional Security Cooperation

TSO



Policy/Regulation

**POWER REGIONS FOR THE ENERGY UNION:  
REGIONAL ENERGY FORUMS AS THE WAY AHEAD**

HOW TO INTEGRATE A SUBSTANTIAL AMOUNT OF RENEWABLES,  
MAINTAIN SECURITY OF SUPPLY AND FOSTER EFFICIENT MARKETS?

POLICY PAPER OCTOBER 2017



ENTSO-E considers regional cooperation on policy issues to be crucial for further advancing the single market for electricity.<sup>1)</sup> Governments, regulators and market participants need to work together efficiently on the national, and European levels, to develop and implement these structures

# THANK YOU FOR YOUR ATTENTION



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