

# Improving predictability and transparency on the use of energy infrastructure

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Reliable Sustainable Connected

# Introduction: the 2030 challenge for Europe's power system



Decarbonising Europe's power system will require integrating unprecedented levels of renewable energy into the system

Europe's electricity system will be at the forefront of delivering the EU's 2030 energy and climate objectives and meeting the goals of the Energy Union strategy

THIS WILL REQUIRE NEW...

## HARDWARE

Upgrading existing transmission lines and building new ones

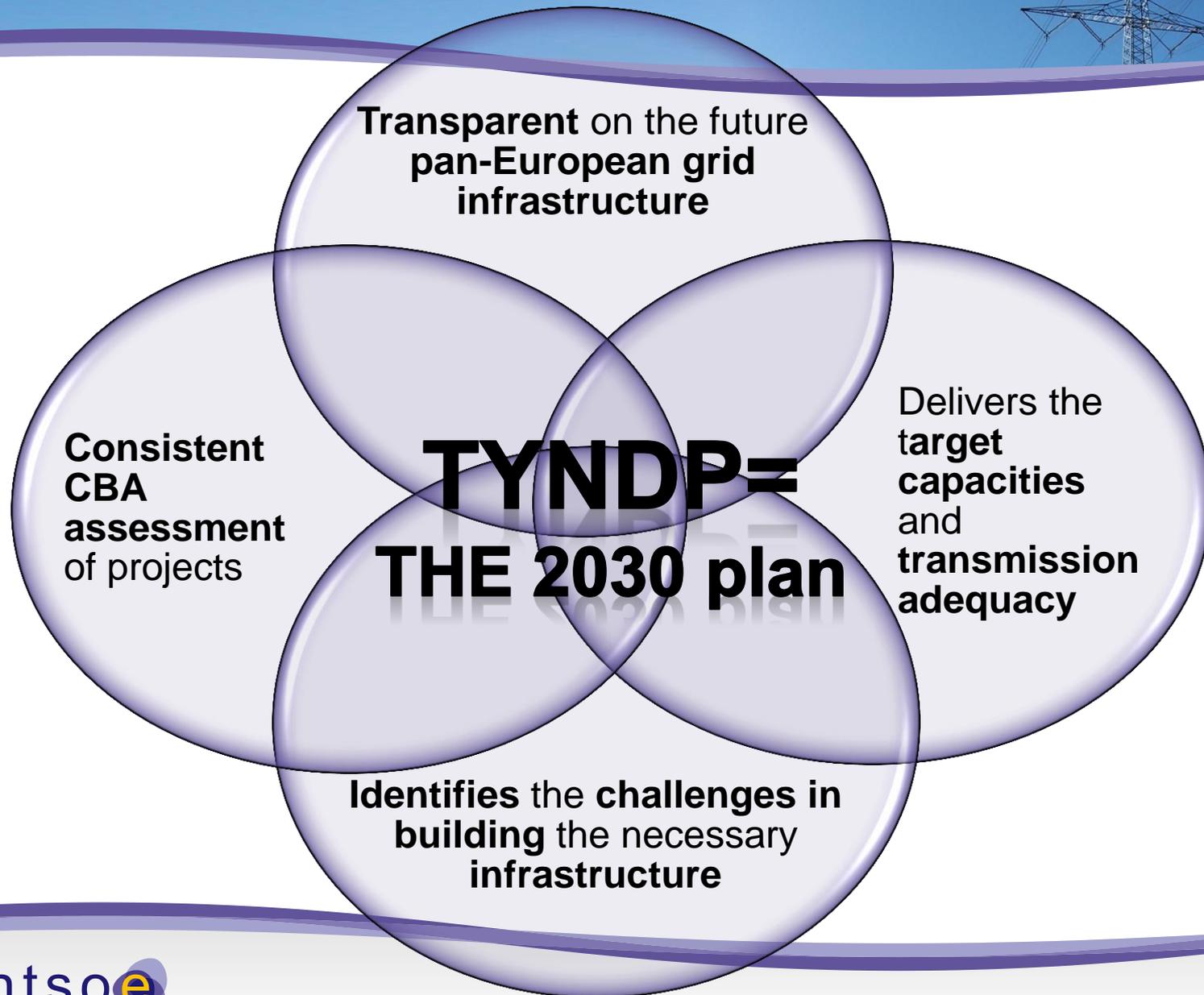
## SOFTWARE

Harmonised rules and regulations through Network Codes and a fit-for-purpose market design

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1. TYNDP 2014
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# TYNDP- key tool in reaching the energy policy goals



# TYNDP 2014 the sole base for the PCI 2015 list



**NDPs:**  
Projects of  
national  
relevance

**Regional  
reports:** Projects  
of regional  
relevance

**TYNDP report:**  
Projects of pan-  
European  
relevance

**PCIs:**  
**Projects of  
Common Interest**  
(defined in 2013  
Infrastructure  
Regulation)

**TYNDP  
2014  
package**

120 projects of pan-  
European relevance



Incorporating 22 third  
party projects



17 PCI projects assessed:  
• 8 transmission  
projects  
• 9 storage projects

# Framing uncertainty to build the right infrastructure

- Economic and financial conditions

- Energy policies

- R&D schemes

- CO<sub>2</sub> prices

- Energy prices

NATIONAL

NATIONAL

VISION 3:  
"GREEN  
TRANSITION"

VISION 4:  
"GREEN  
REVOLUTION"

- Economic and financial conditions

- Energy policies

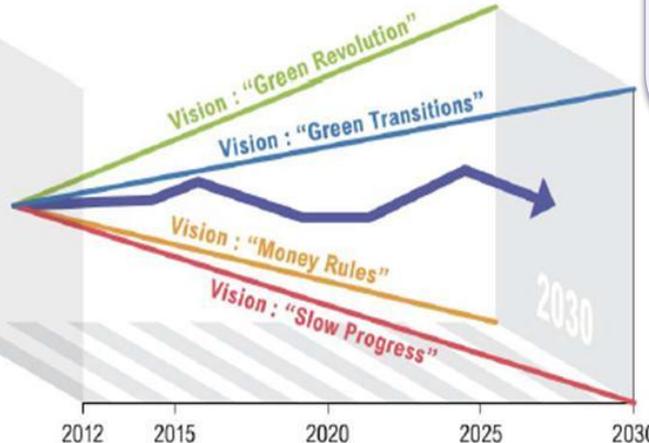
- R&D schemes

- CO<sub>2</sub> prices

- Energy prices

EUROPEAN

EUROPEAN



VISION 1:  
"SLOW  
PROGRESS"

VISION 2:  
"MONEY  
RULES"

- Economic and financial conditions

- Energy policies

- R&D schemes

- CO<sub>2</sub> prices

- Energy prices

EUROPEAN

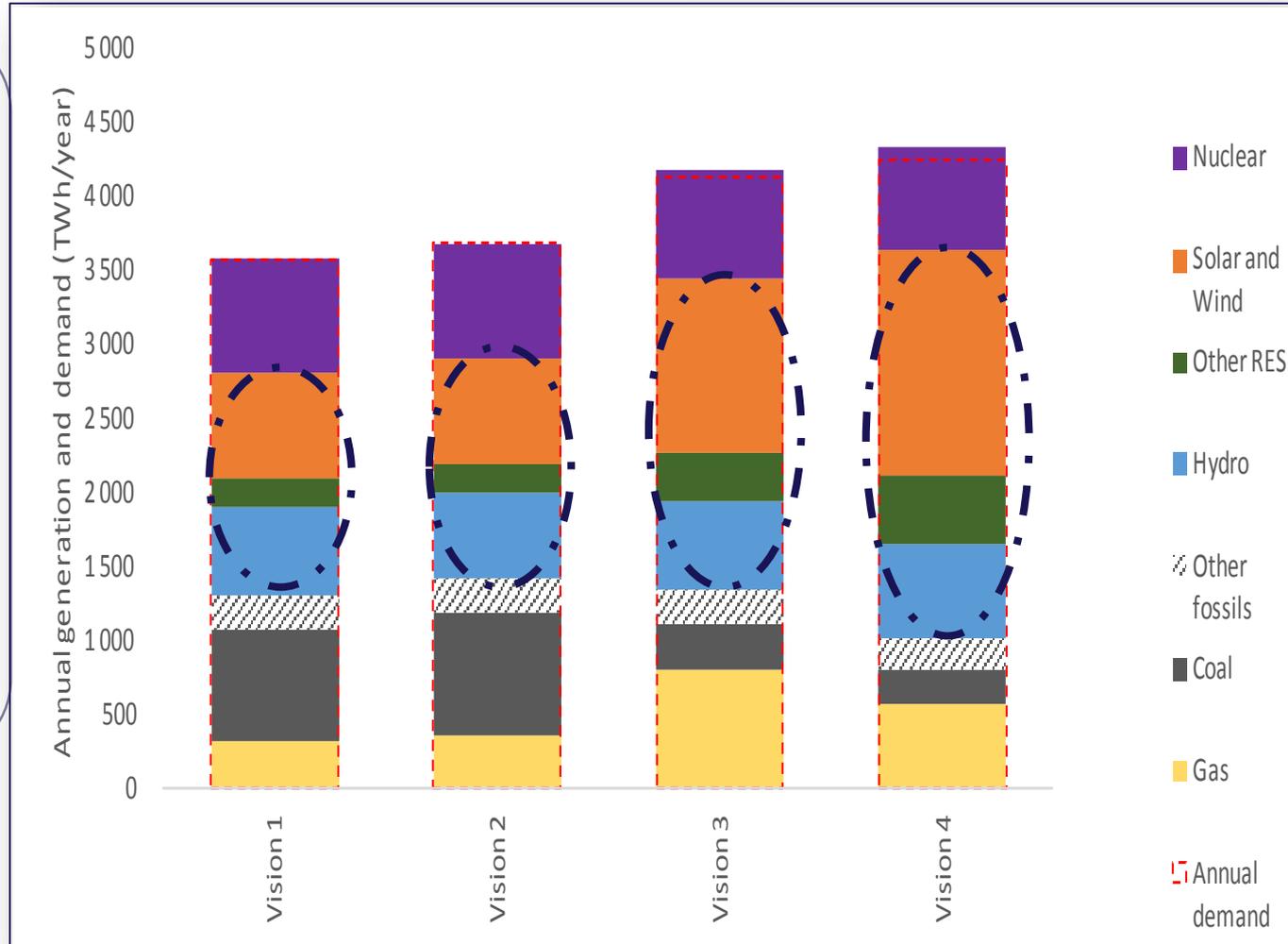
EUROPEAN

# Renewable energy goals driving European grid development

**From 197 GW up to 876 GW of installed renewable capacity in 2030**

**Up to 60% of total energy consumption in 2030 covered by renewables**

**80% of the pan-EU projects contribute to renewables integration**



# What to expect from the TYNDP 2014



...a comprehensive document suite that includes

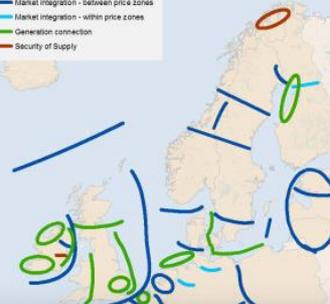
- Ten-Year Network Development Plan
- Scenario Outlook and Adequacy Report
- 6 Regional Investment Plans

## Main concerns

- RES integration
- Market integration
- Security of supply

## Bottlenecks

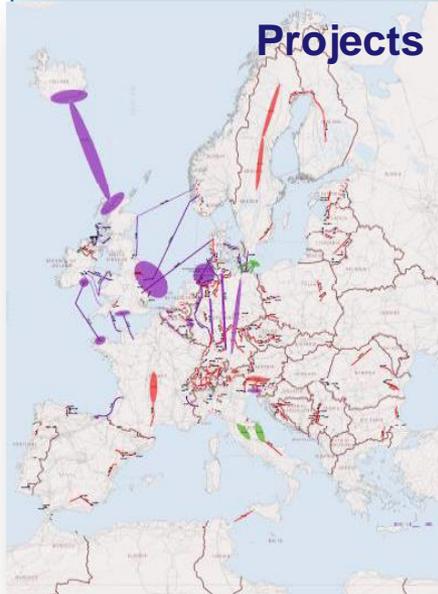
Legend  
— Market integration - between price zones  
— Market integration - within price zones  
— Generation connection  
— Security of Supply



## Marginal cost difference



## Projects

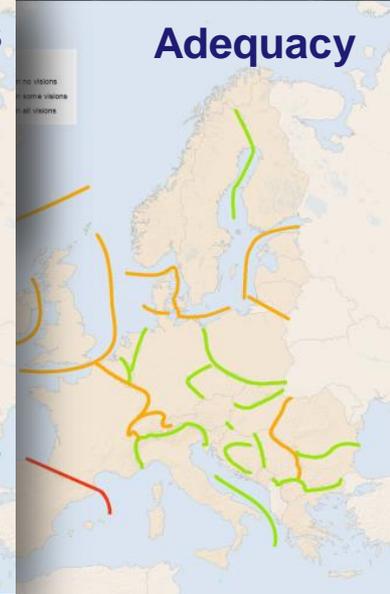


## Target capacities

Legend  
— <1000 MW  
— 1000 - 2500 MW  
— 2500 - 4000 MW  
— 4000 - 7000 MW  
— 7000 - 10000 MW  
— >10000 MW



## Adequacy



# TYNDP 2014 main findings



**Up to €150 billion for projects of pan-EU significance by 2030  
(1-1.5 €/MWh, about 1% of bill)**



**Reduction of 2 to 5 €/MWh for bulk power prices by 2030**

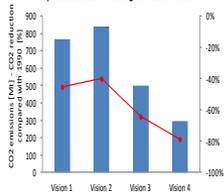


**Up to 50,000 km of new or refurbished grid investments  
(23.000km new overhead lines)**



**Optimised land use: the crossed urbanised areas account for less than 4% of the total km of lines**

CO2 emissions (TWh), CO2 reduction in comparison with 1990 through the 2030 Visions

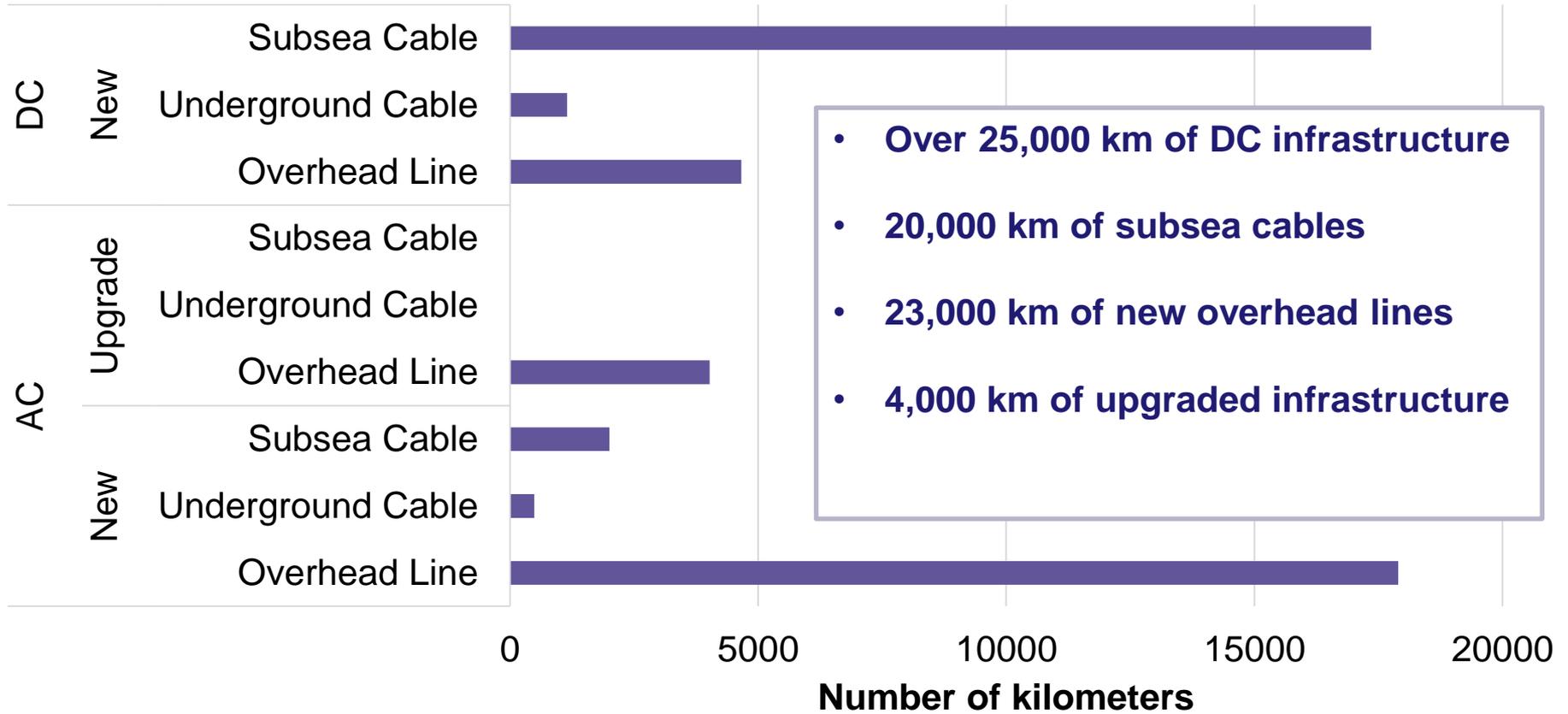


**Mitigation of 20% of CO2 emissions for the European power sector**



**Accommodating up to 60% RES of total consumption in 2030**

# Up to 50,000 km of lines to be built by 2030



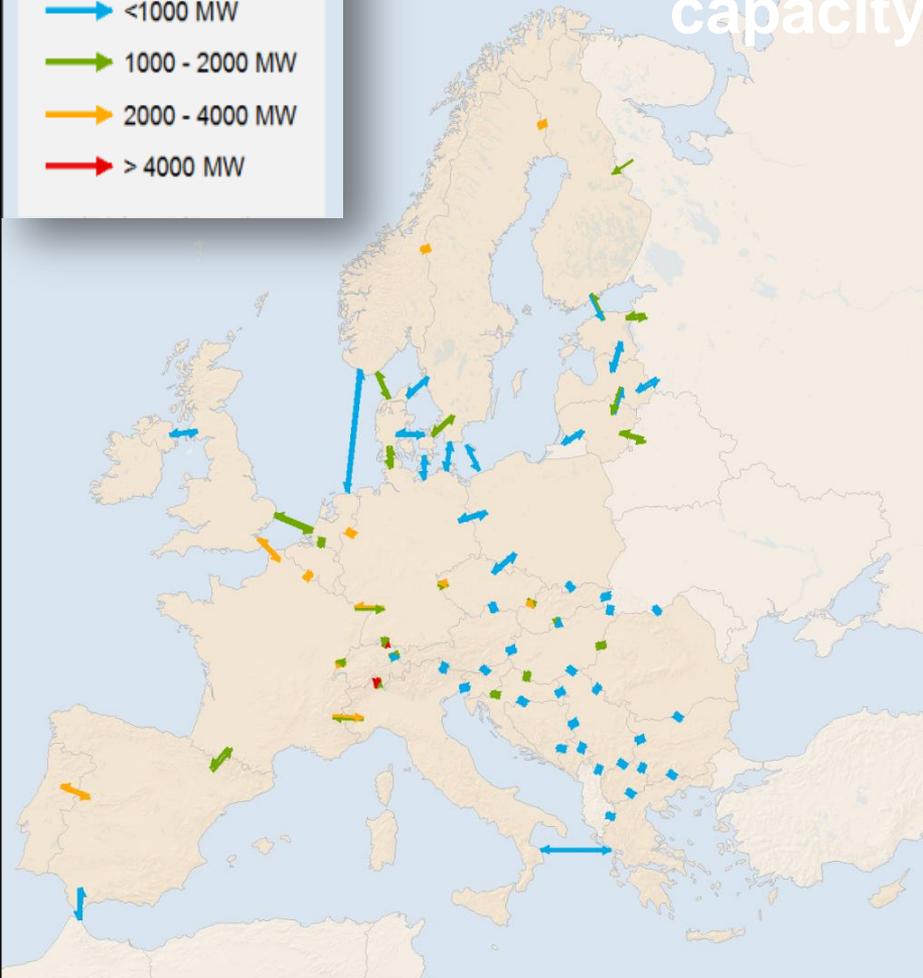
# Doubling the interconnection capacity by 2030



## Legend

- <1000 MW
- 1000 - 2000 MW
- 2000 - 4000 MW
- > 4000 MW

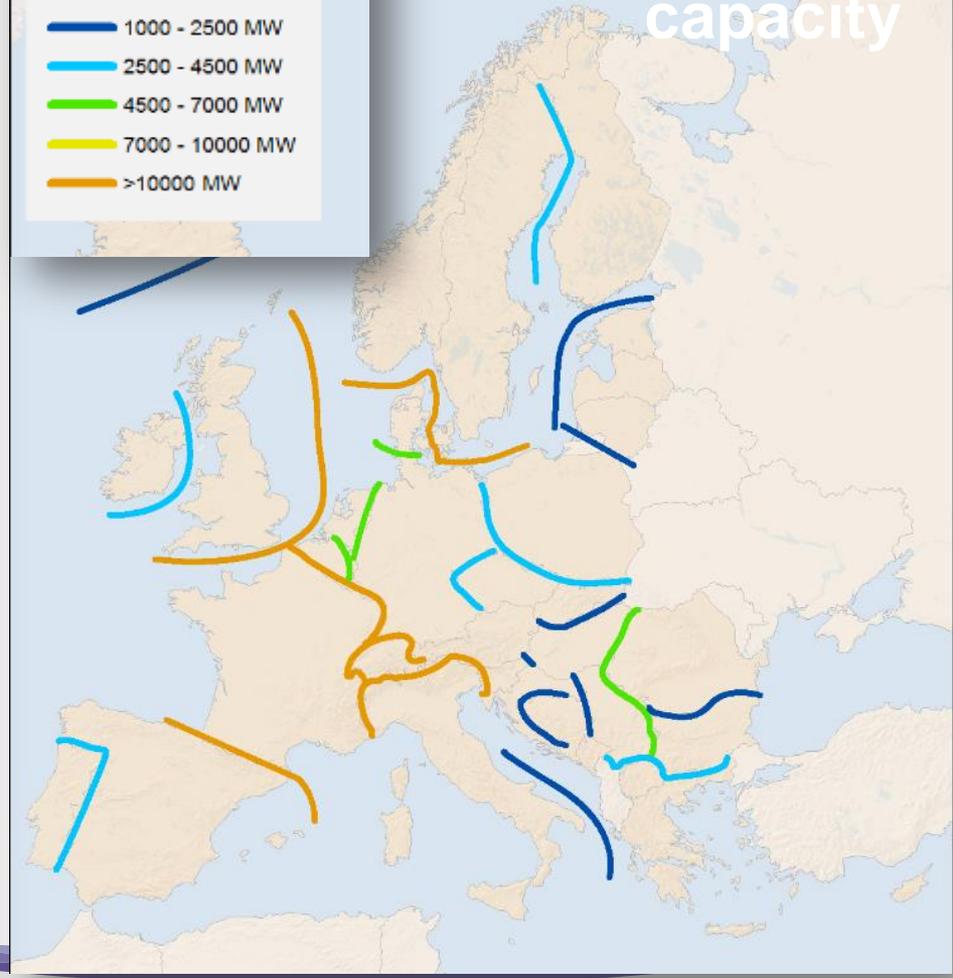
## Current transfer capacity



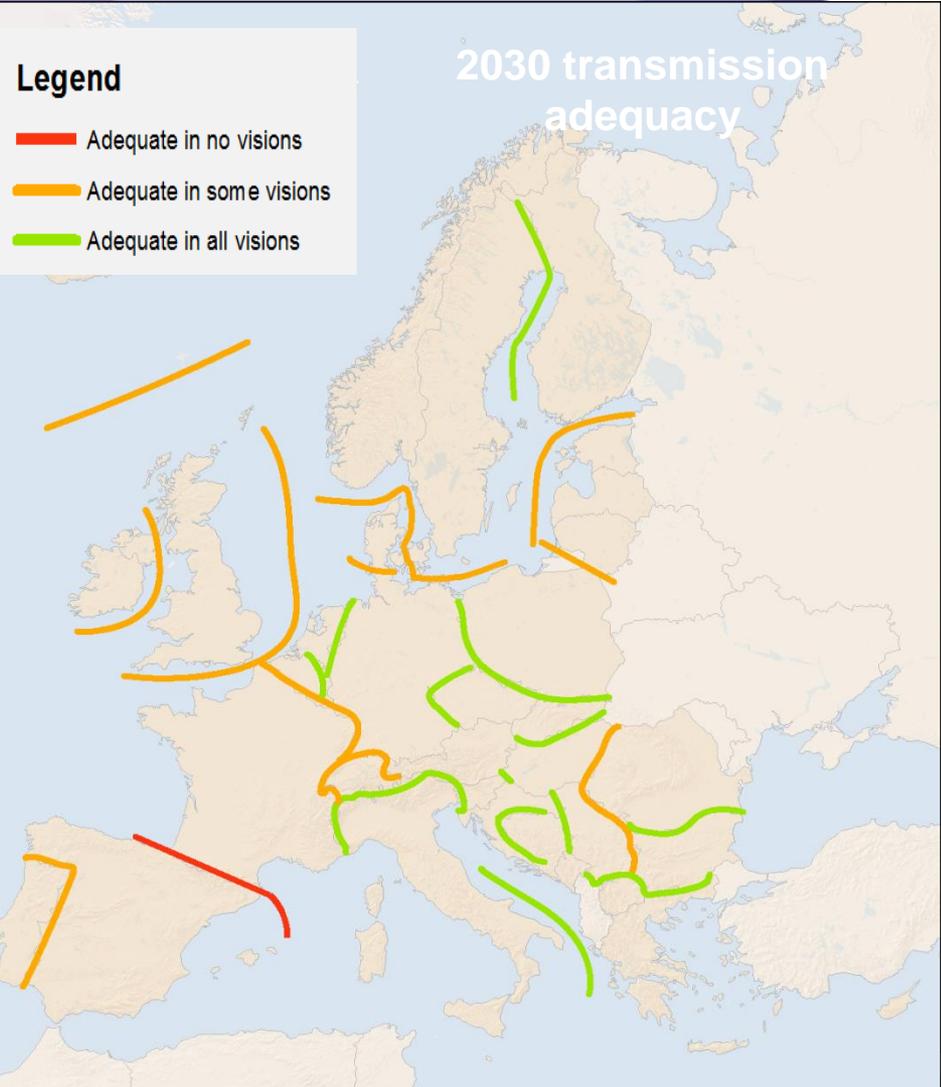
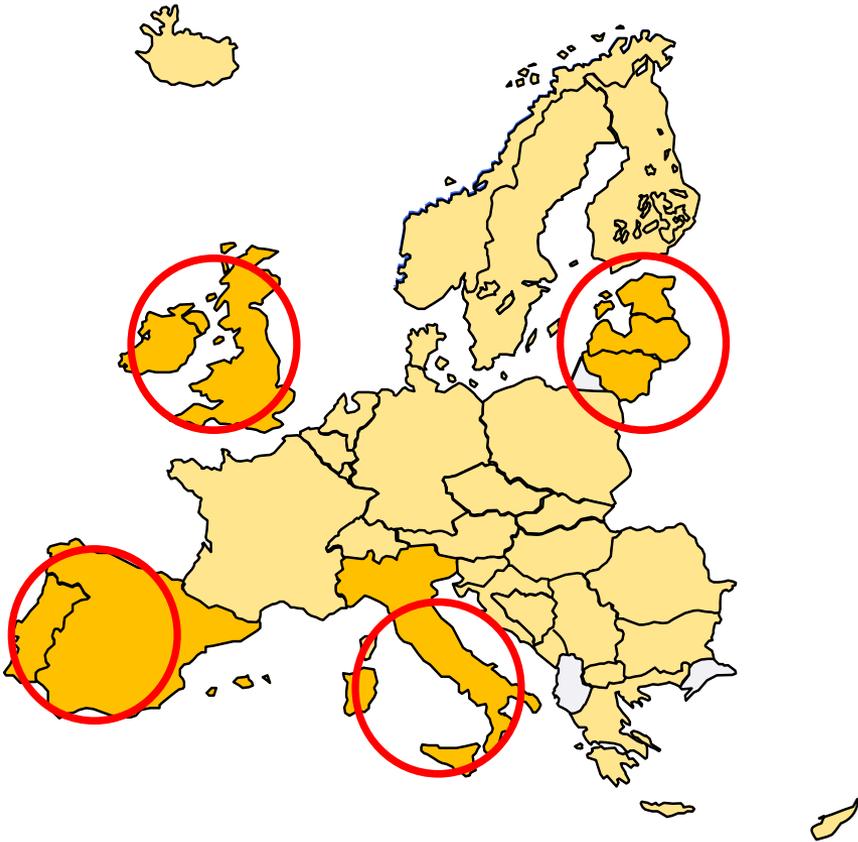
## Legend

- <1000 MW
- 1000 - 2500 MW
- 2500 - 4500 MW
- 4500 - 7000 MW
- 7000 - 10000 MW
- >10000 MW

## 2030 target capacity



# Integrating the four “electric peninsulas”



# The challenges to implementing infrastructure on time

## Permit granting

- Procedures are lengthy and often cause commissioning delay
- 30% of investments delayed after 2 years

## Public acceptance

- More effort to bring citizens and interest groups on-board and increase understanding of Europe's energy needs

## Financing

- A stable regulation for long-term investments
- Tariffs must adapt to energy transition goals

# Summary

- **A clear plan for the 2030 power system**
  - developed with market participants and stakeholders
  - in line with European energy policy goals
  - fulfilling the legal mandate on ENTSO-E
  - built by hundreds of experts from the TSOs which cover 34 countries
- **A strongly improved methodology**
  - with 4 fully defined visions to reflect the large uncertainties
  - with cost-benefit analysis for *all* projects
- **To be further improved through stakeholder feedback**

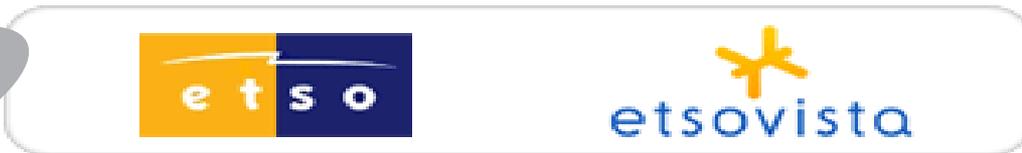
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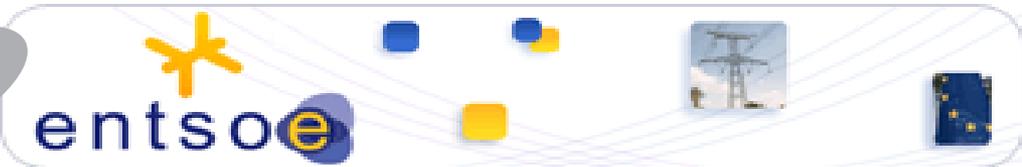
# TSOs commitment to transparency



2006



2009



**Pan-European initiatives established on a voluntary basis by TSOs**

2013

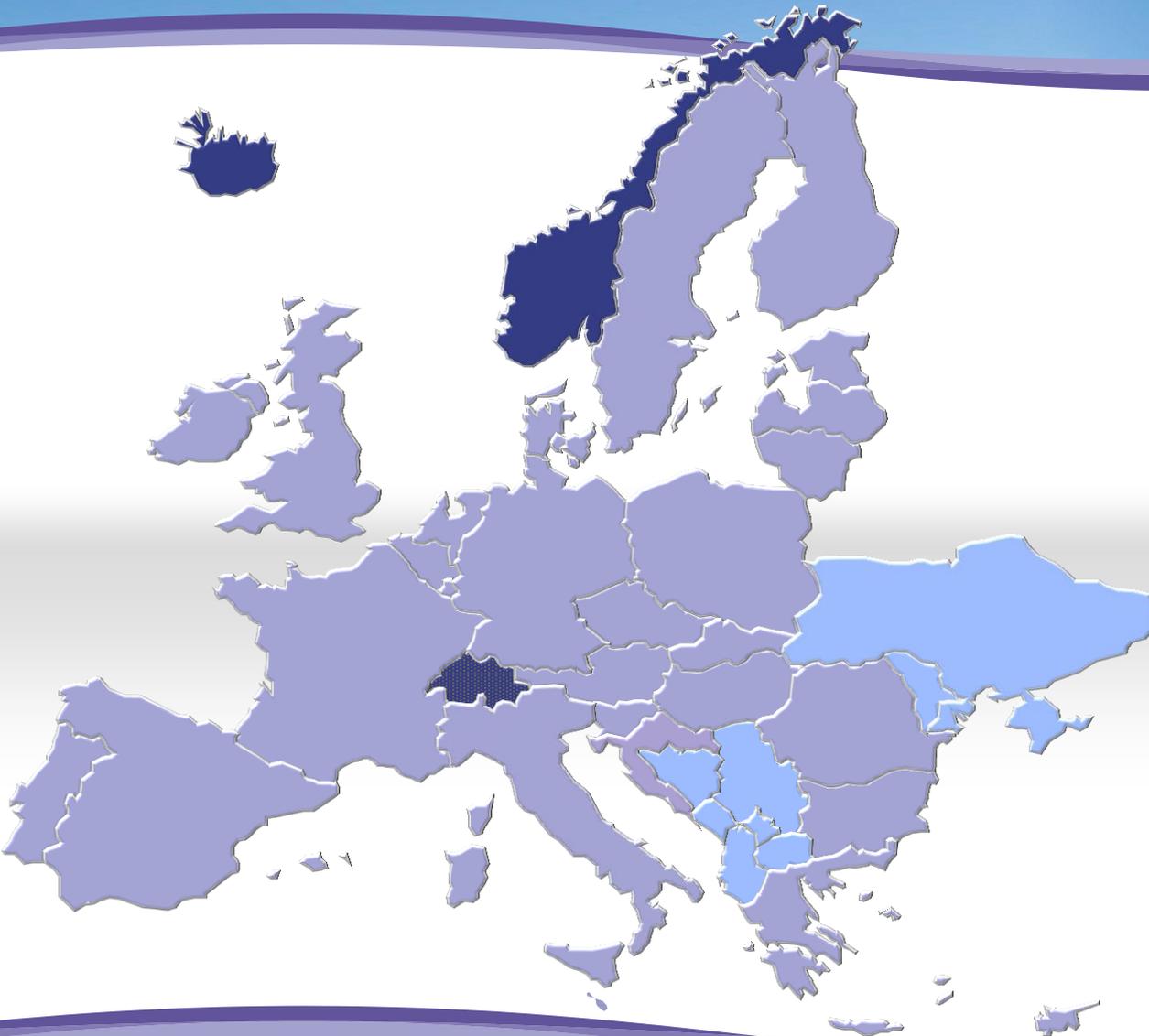
**Entry into force of new European Regulation on Transparency (543/2013)**

2014

**Development of the Electricity Market Central Information Platform (anticipated since 2011)**

**Publications become compulsory and publication requirements increase**

# Geographical application of EU Regulation 543/2013



**Transparency Regulation  
mandate for EU Member  
States**

**....and countries under  
the European Economic  
Area agreement**

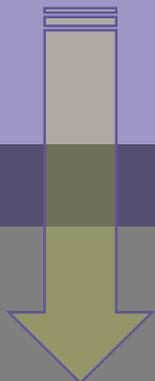
**....and adopted by the**



# Reg. 543/2013 – new publication requirements



entsoe.net

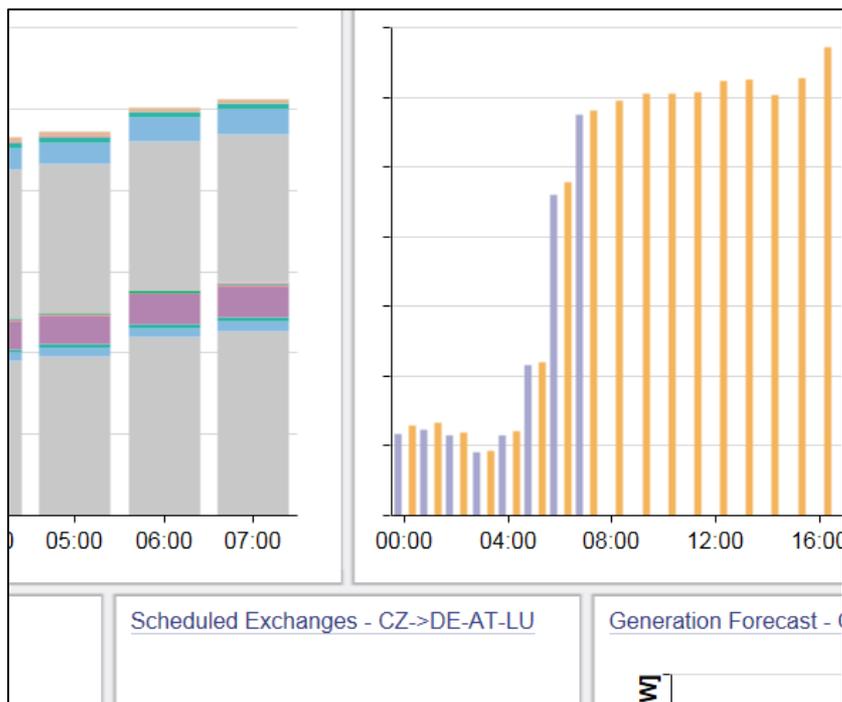


Central  
Information  
Transparency  
Platform

Load	Transmission	Generation	Outage	Balancing
Hourly act. vertical load; D-1 vertical load forecast;	Final commercial schedules & physical flows; D-1 NTC; W-1 NTC; M-1 NTC; Y-1 NTC; Explicit auctions: Offered capacity; Explicit auctions: results +congestion revenue; Implicit auctions: D-1 offered capacity; Implicit auctions: results		Planned outages in transmission; Actual outages in transmission;	Volumes of activated balancing reserves; Prices of activated balancing reserves; Imbalance prices; Estimated aggregated volumes of the imbalances;
<b>+/- THREEFOLD INCREMENT OF DATA</b>				
Actual total load per D-1 total load forecast W-1 total load forecast M-1 total load forecast; Y-1 total load forecast; Y-1 forecast margin; Actual availability of consumption units (including changes)	Report on developments; Changes in actual availability of interconnections; Yearly, monthly, weekly forecast cross-zonal capacity; Yearly, monthly, weekly offered cross-zonal capacity; D-1 forecast and offered cross-zonal capacity (NTC); D-1 forecast and offered cross-zonal capacity (FB); Intraday offered capacity (NTC and FB); Restrictions on DC links; Yearly report on critical network elements; Explicit allocation (requested and allocated capacity); Prices of explicit allocations; .... ....	Installed Generation Capacity aggregated; Installed capacity by Production Units (>100MW); D-1 aggregated generation; D-1 generation forecasts for wind and solar; Aggregated generation per type; Actual generation per unit; Actual wind and solar power generation; Pumped storage/reservoir stored energy (Aggregated filling rate of water reservoirs and hydro storage plants);	Planned outages in transmission; Actual outages in transmission; Planned unavailability of Consumption Units; Unplanned unavailability of Consumption units; Actual unavailability of a generation unit; Planned unavailability of a production unit; Unavailability of off-shore infrastructure;	Rules on balancing; Amount of balancing reserves; Prices of the reserved capacity; Accepted aggregated offers; Volumes of activated balancing reserves; Prices of activated balancing reserves; Imbalance prices; Total imbalance volume per Balancing time unit; Monthly financial balance; Aggregated volumes of offers for cross-border balancing activation; .... ....

# Transparency platform requirements

## Website-based platform, more than just a database...

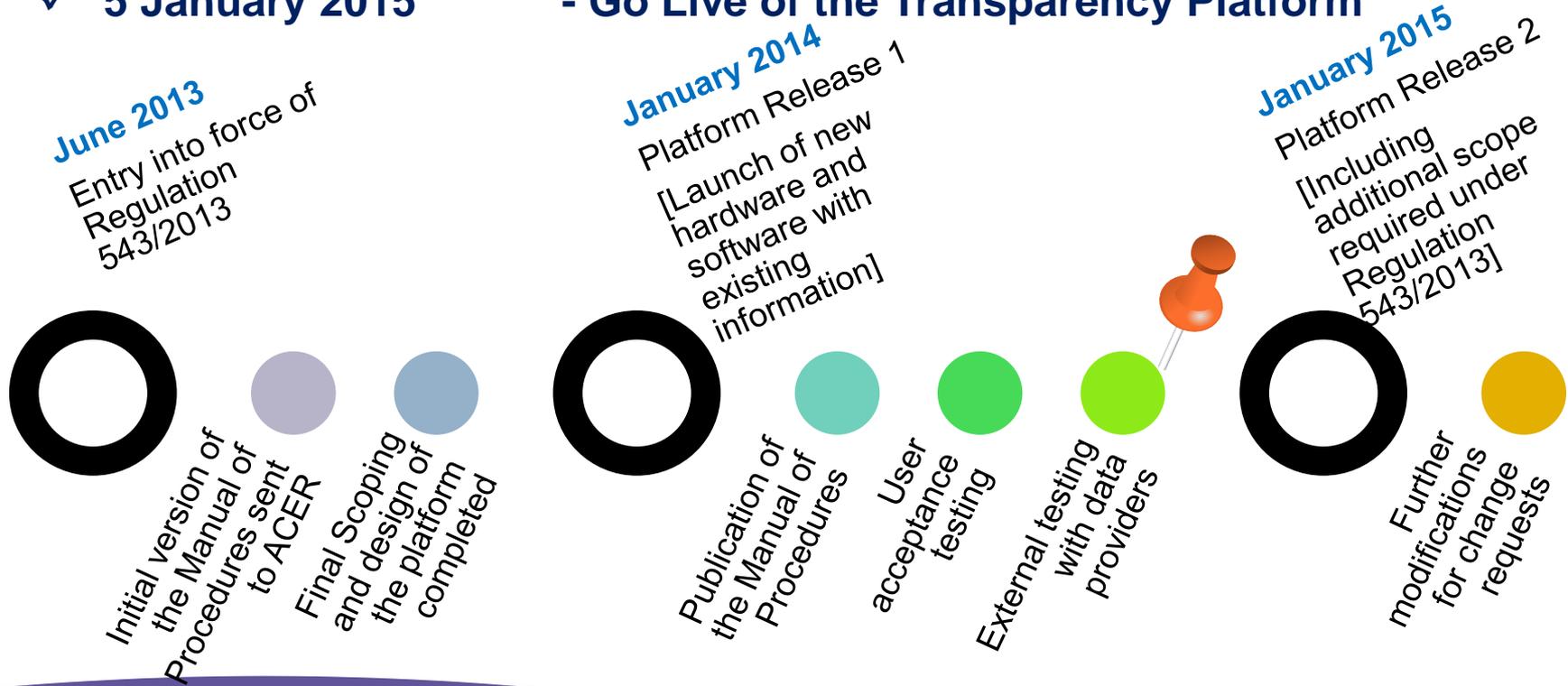


- ✓ Available 24/7, free of charge
- ✓ Easy to use and navigate, no training needed
- ✓ Availability of data: 5 years
- ✓ Data available for online consultation, file downloads or via machine-to-machine connection
- ✓ Manual of Procedures for data providers

# Transparency platform timeline

- ✓ January 2014
- ✓ May 2014
- ✓ September
- ✓ Sept – Dec 2014
- ✓ 5 January 2015

- Release 1 went live ([www.entsoe.net](http://www.entsoe.net))
- Manual of Procedures was published
- Release 2 UAT was completed
- Interoperability testing with data providers
- Go Live of the Transparency Platform



# Experience from Go-Live

- Successful launch on 5<sup>th</sup> of January 2015
- The ENTSO-E Transparency Platform is receiving more than 80,000 data files per day
- This converts to around 3 million published data values per day in timeframes ranging from 15 minutes to yearly, depending on the data category. The previous entsoe.net platform published 300,000 values a day.

- Official launch event of the TP on January 28
- 50 participants: press, industry, regulatory, EC
- Key stakeholders recognised the efforts of ENTSO-E to deliver the platform as mandated



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# Concluding remarks

- The evolution of the energy sector is relevant to most of the goals of EU policies: economic growth, sustainability, coverage of needs at affordable and competitive price
- Due to the inherent complexity and interactive nature of the sector there is no one single accepted path towards achieving these goals
- The electric system is impacted by changes in the generation portfolio. Managing these changes is politically, financially and technically challenging
- TSOs are responsible for system security: the market design must provide the means to carry out this task efficiently
- ENTSO-E delivered policy recommendations for short-, medium- and long-term
- NCs set the path for achieving the goals of the IEM and the future market design
- Increased transparency should enhance competition in Electricity Markets, will reinforce the benefits of Network Codes and enable more effective market monitoring

Thank you for your attention