# European grid : what is at stake ?

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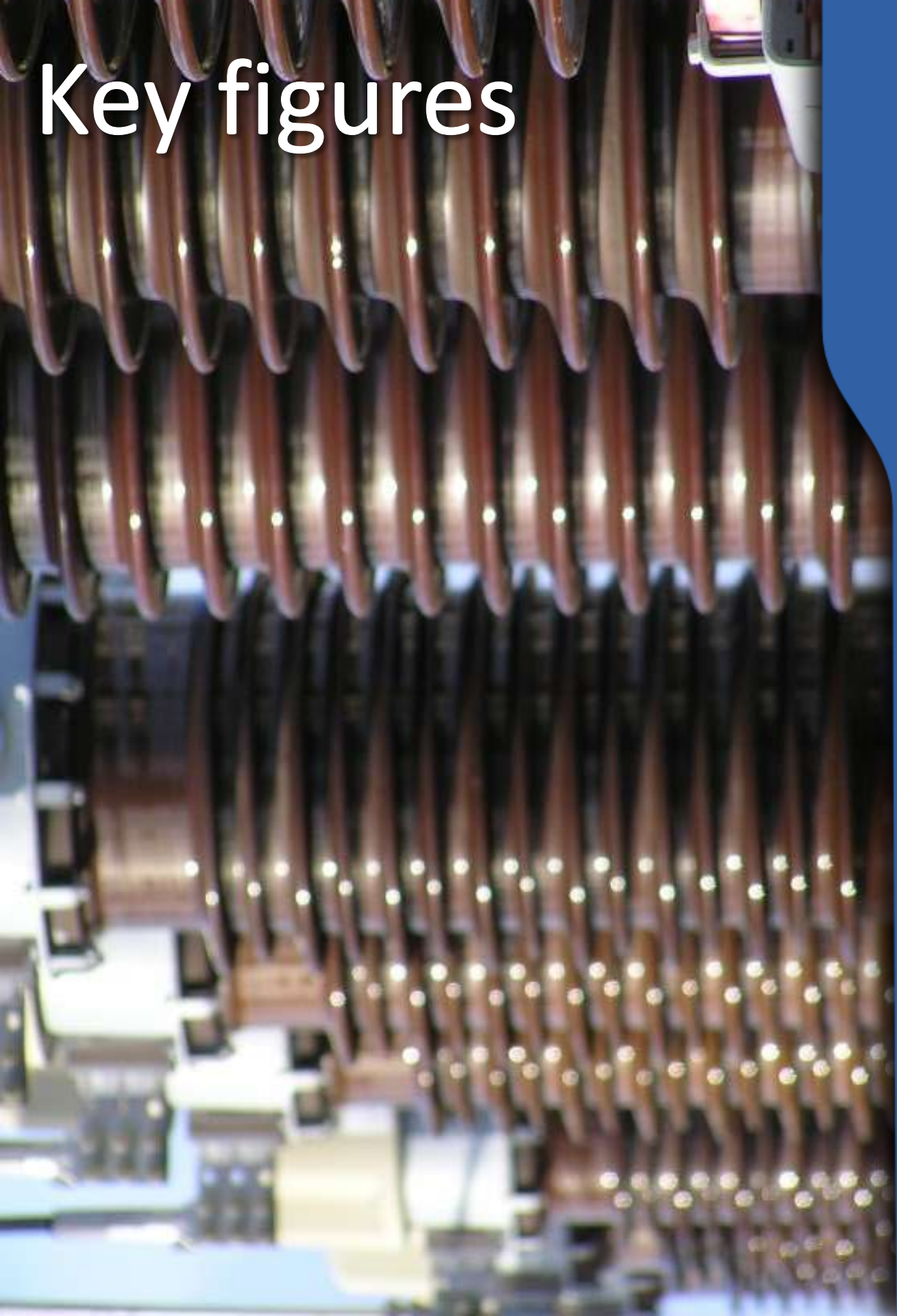
Eirgrid Customer conference

October 31st, Belfast

Réseau de transport d'électricité

# Key figures



# French power system : key-figures

**RTE owns and operates the largest electricity grid in Europe:**

- 100 000 km of EHV and HV lines
- 2 600 substations
- Peak load served > 100 GW (60+ million inhab.)
- Energy served : approx. 500 TWh
- 48 cross-border lines
- 8 500 staff

**Financial figures 2012**

Turnover: 4 529 million €

Annual investment: 1 357 million €

**Missions**

- Grid development
- Asset management
- Electricity flows management
- Grid Access management
- Market rules

# European power system : key-figures

**34 interconnected countries**

- Security of supply and reliability
- Economic optimization (IEM)
- Sustainability

**41 Transmission System Operators**

**1 European association:** entsoe

**Several synchronous areas**

- Installed capacity ~ 880 GW
- Annual consumption ~ 3 300 TWh
- Annual exchanges ~ 380 TWh
- 300 000 km of lines
- ~ 530 millions inhabitants

# Main stakes

# A changing world

Integrate renewable sources of energy (wind, photovoltaic…) and implement diverse national ‘energy transition’ policies.

Taking account new kinds of consumption (electrical vehicles...)

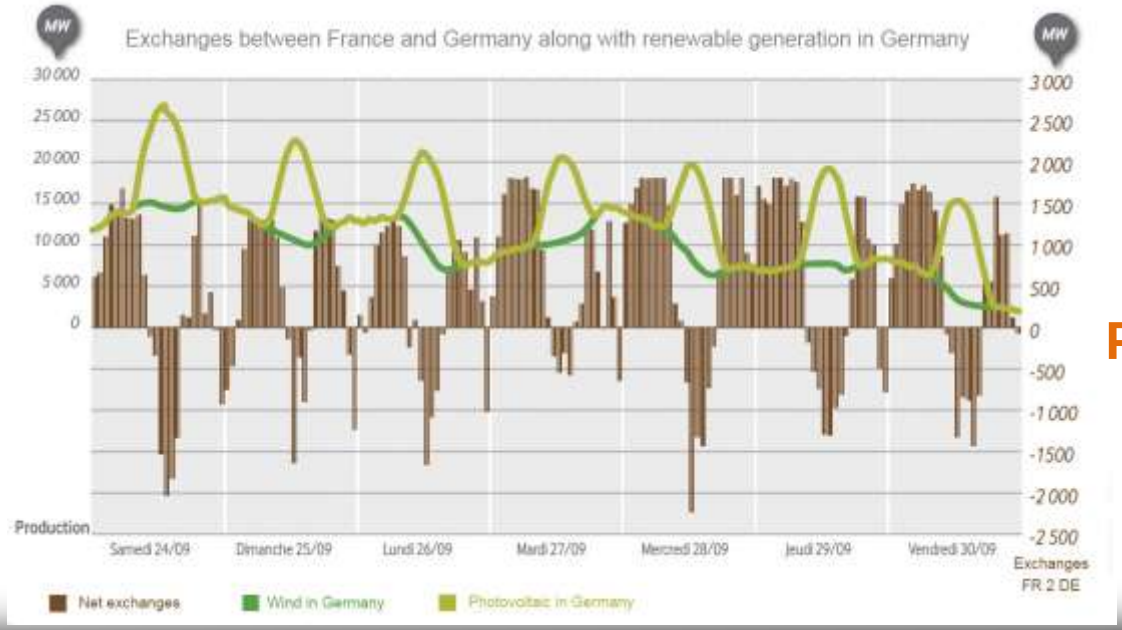
Address grid public acceptance and new demands from society (EMF 50 Hz, environment).

With of course the background: Continue to operate power system efficiently, on technical and economical aspects

# Energiewende, Energy transition, Transición energética Transition énergétique, Transizione energetica

TSO are key partners for the success of “energy transitions” policies

- wind, solar, biomass, tidal or waves energy
- shutdown or capping of nuclear (Germany, Switzerland, France?)



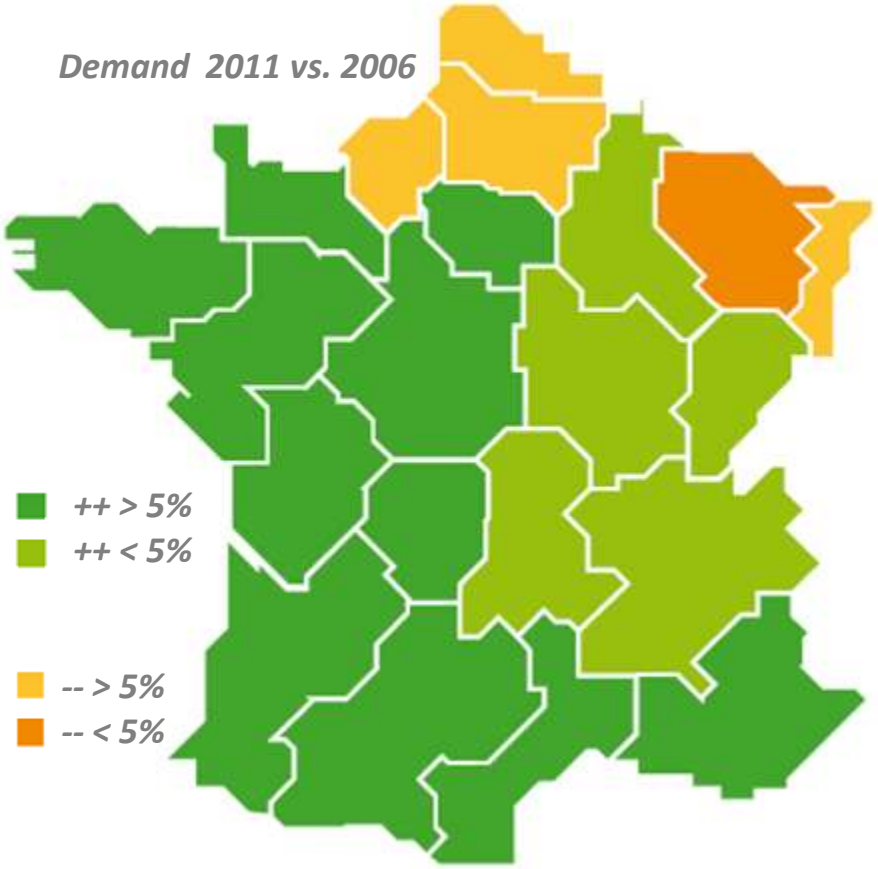

**Need for timely new infrastructures and balancing capabilities**

**Presently, more than 150 GW of RES installed capacity in Europe**

# A changing load pattern

In western continental Europe :

- Economic crisis causes industrial facilities to shutdown
- Residential load is almost steady
- Transfer of traditional uses from oil towards electricity (e.g. heat pumps, PHEV…)




**POWER / ENERGY**

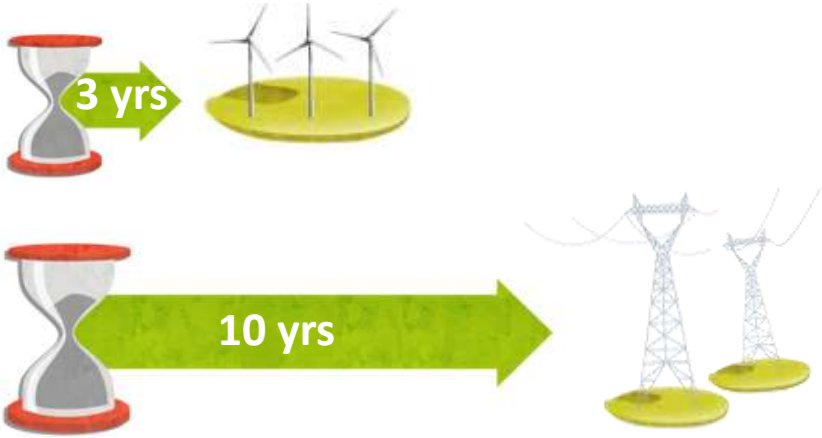
**In France, peak power is growing twice faster than energy**

# Public acceptance | Permitting

New infrastructures get opposition from a larger part of citizens.

Concrete outcomes observed with new RTE 163km 400 kV OHL: demonstrations in Normandy, complex requests leading to a zigzagging course.

National laws are not always in line with TSO needs to face new challenges.



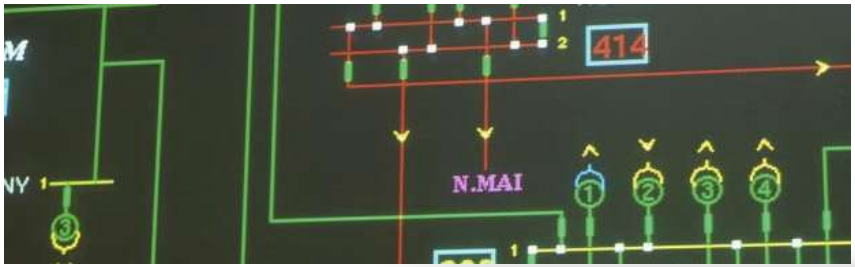
Finding solutions

# The “three layers” paradigm

**3.** Governance layer

**2.** Market layer (virtual layer)

**1.** Physical layer infrastructure & system operation



# Optimize infrastructures

Enhance maintenance

Reinforce grid infrastructures

1.

# French TYDNP

**Extensive use of innovative solutions:**

- 800 to 1 000 km new underground and submarine HVDC links
- 1 000 to 2 000 km reinforcements of the existing AC 400kV lines (low sag / high temperature conductors, 1to2 circuits…)
- No 400 kV AC underground planned at the moment

**1.4 billion € /year** **+ 8 GW intercos**

# Innovative infrastructures

## Overheadline Arras-Lille

New tower concept

New mechanical concept

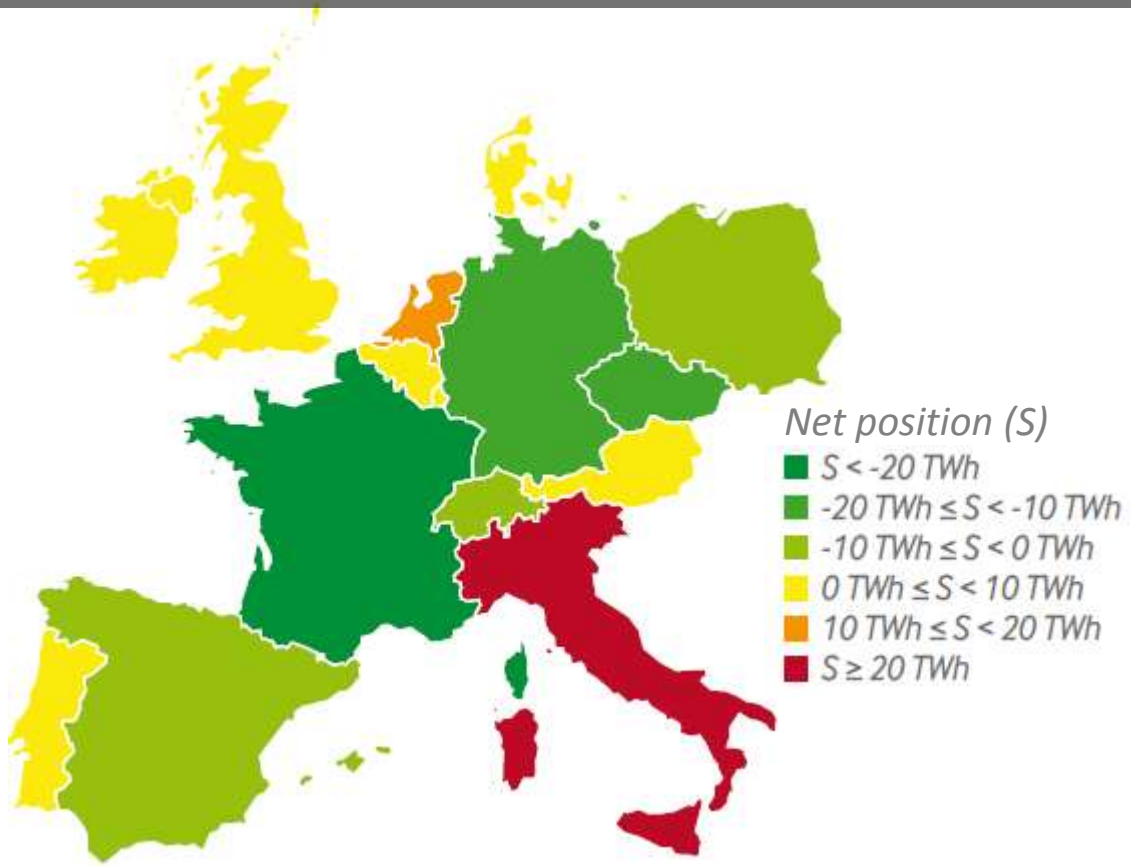
Vote of stakeholders

*Also: 400 kV AC OHL turned into HVDC OHL (Germany)…*

*…and HVDC undersea internal link (SE to SW France, GB)*

1.

# Need for more interconnections



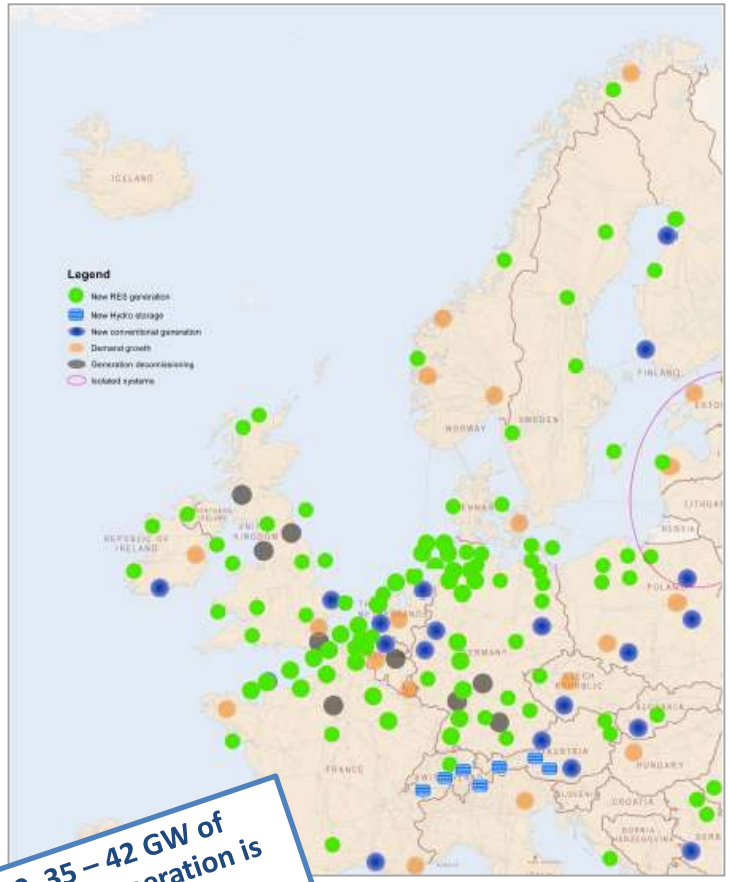

Well-known historical reasons

- Increase security of supply on short term
- Operational reserves sharing on mid term
- Savings on generation fleet on long term

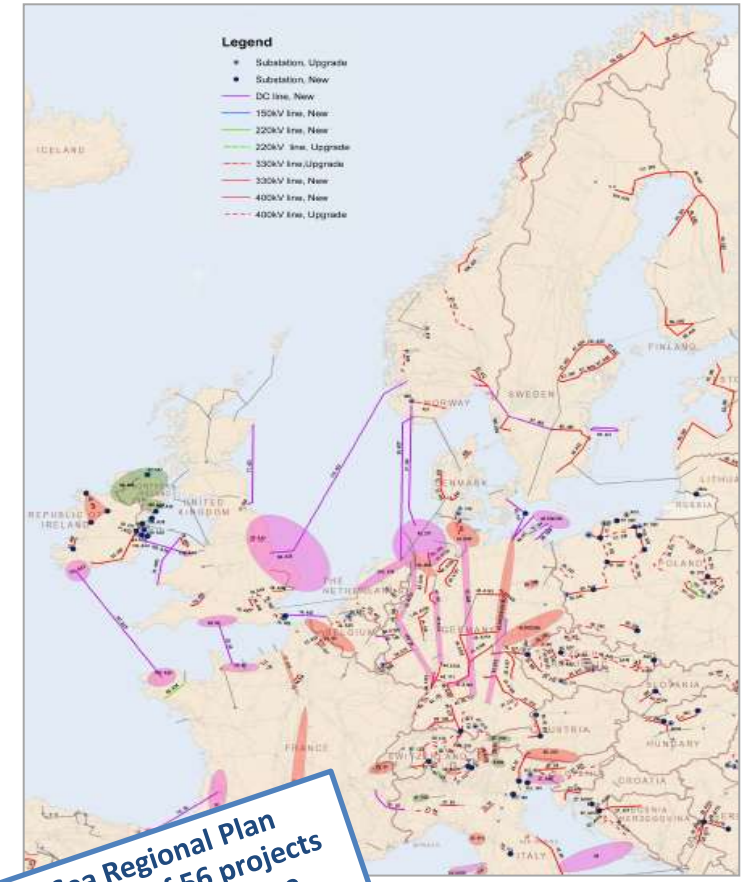
*… are still true, but must be included now in new market rules.*

A key to social welfare optimization through the IEM

# TYDNP | Focus on the North Sea region




By 2020, 35 – 42 GW of offshore wind generation is expected in the region




North Sea Regional Plan includes details of 56 projects of European Significance

# Celtic Interconnector

Target date 2025 / 700 MW / 600 km

Memorandum of Understanding 2013 27th May / In PCI list

Improve Ireland and North-West France security of supply and price profiles

Would benefit from the varying wind resources of Ireland and the continent (France at the crossroad of different European wind regimes)

Opportunities for large Irish RES potential development and exports

1.

# Others key ongoing French interconnection projects

**[FR-UK]** / ElecLink : 1000 MW / 50 km / 320 kV

**[FR-UK]** / IFA 2 : 1000 MW / 250 km / ~ 2020

**[FR-UK]** / France-Alderney-Britain / ≥1000 MW / 225 km

**[FR-IT]** / Savoy-Piedmont (Northern Alps) / 2x600 MW / 190 km / VSC / 2019

**[FR-ES]** / Bay of Biscay / 2 x 1000 MW / 360 km

# France-Spain interconnector

**[FR-ES]** / 2 x 1000 MW / 65 km / VSC / 2015 / 750 M€ investment

1.

# New challenges in daily power system operation

More TSO cooperation in daily operation

More balancing resources

More TSO/DSO cooperation

1.

# Re-engineer the market layer

The current "Energy Only" market design implemented in Scandinavia and Central-West Europe has delivered

Designed in the late 90s, with overcapacity and no RES subsidies, it is now obsolete

2.

# Main future market challenges

Shrink the gap between market and physics

Provide price signals for long term investments

Need for flexibility (Demand Response)

Market vs. subsidies

# Let current crisis be a lesson

Current crisis on balancing in continental Europe: over-capacities in energy but under-capacities in power. A lesson for market governance.

Market design has to address fundamentals of power systems. It has to be adapted when physics change (e.g. wind and solar), but also with the economic environment (subsidies, crisis).

# European market design: agenda of the EU Commission

**Adoption of the first network codes : « top-down » approach**

**Package on public intervention in the internal electricity market**

- Capacity mechanisms
- RES integration in the market
- Demand response

Non-binding

DG ENER
Nov. 2013 ?

**Guidelines on environmental and energy state aid**

- Capacity mechanisms + RES

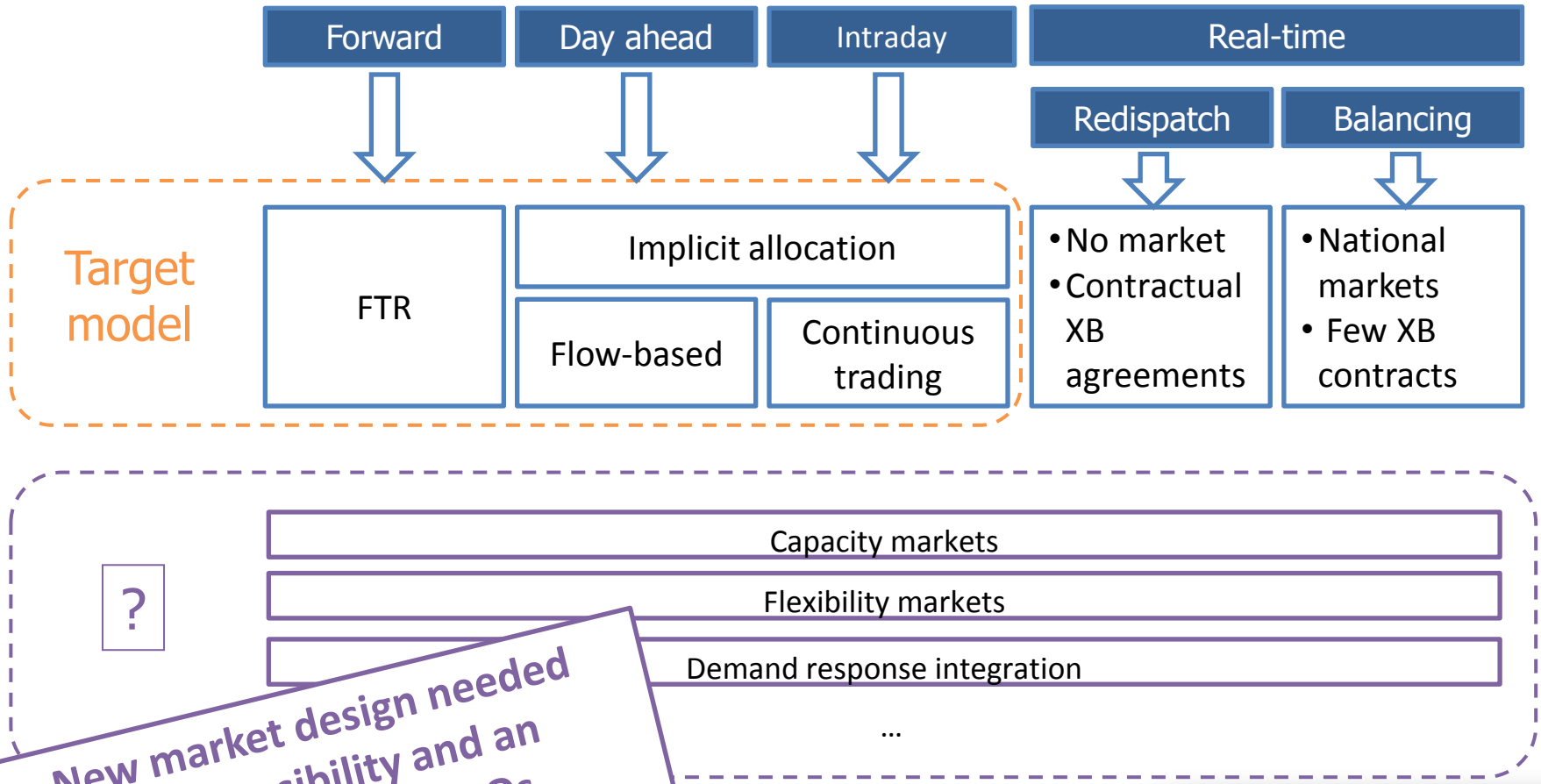
Binding

DG COMP
Early 2014

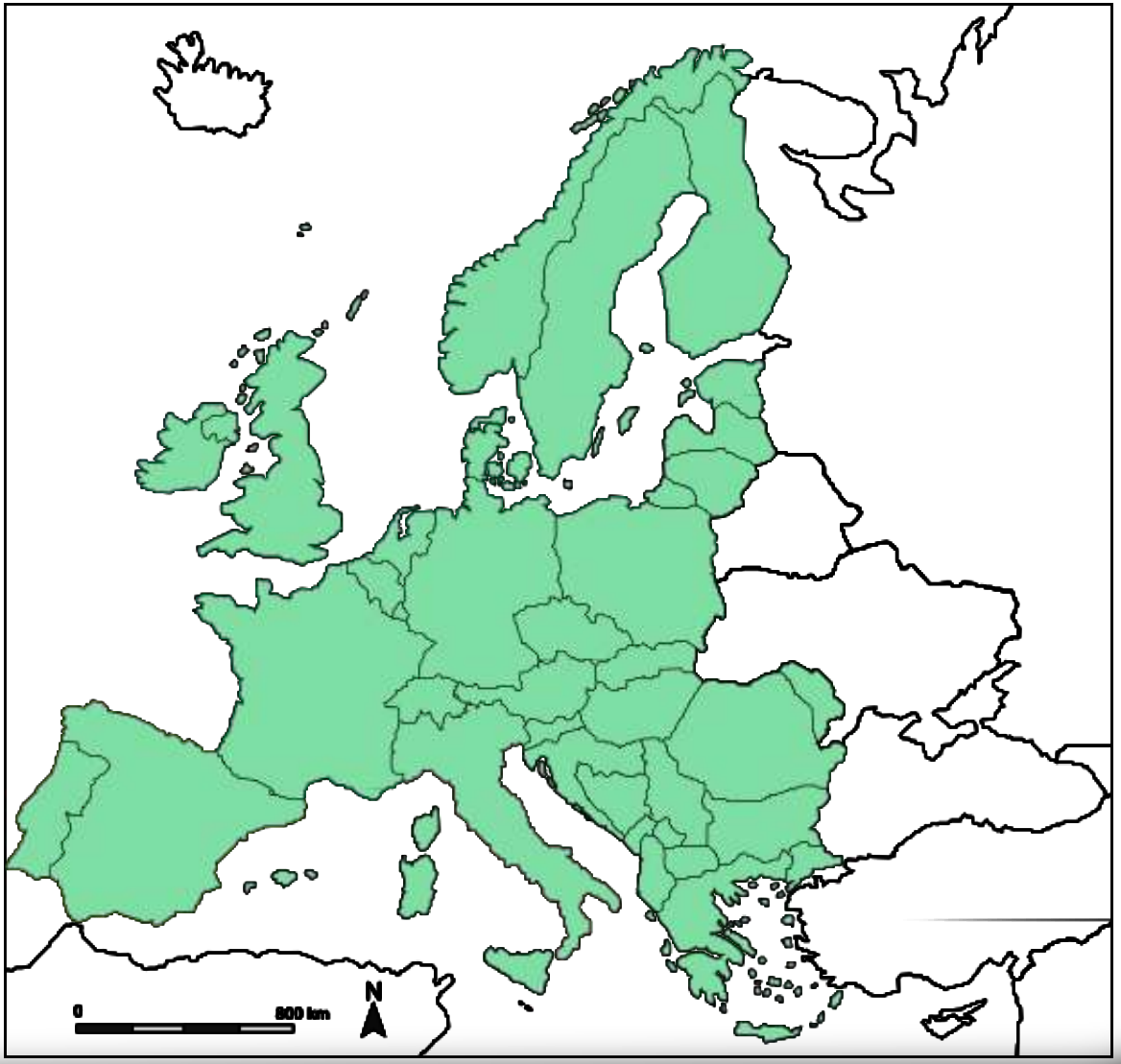
**Definition of 2030 framework for energy and climate policies**

**Completing the target model is definitely a priority for DG ENER in 2014**

# What are we aiming at?



# Market coupling chronology




1993 | Nordic MC

2006 | Trilateral MC

2007 | SEM

2007 | Iberia MC

2009 | Partial MC DE-Nordic

2010 | CWE-Nordic MC

2011 | IT-SL MC

2012 | HG-CZ-SL MC

2013 | CWE-NWE MC

~2014| SEM-NEW MC

? | European MC

# Focus on NWE market coupling

**13 TSOs :**

- RTE
- Elia
- Creos
- TenneT BV
- Amprion, TenneT GmBH, Transnet BW, 50Hertz Transmission

CWE TSOs

- Svenska Krafnät
- Energinet.dk
- Fingrid
- Statnett
- NGIC / (BritNed)

Nordic TSOs

**3 PXs:**

- APX-BELPEX
- EPEX SPOT
- NordPool Spot

# Governance

3.

# Reconsider the governance layer

Many institutions: EC, ACER, NRAs, ENTSOs :
a very complex European governance.

High level directives (20/20/20), but no actual energy policy for Europe.

The governance layer is not addressing temporality :
flexible governance is needed, plus anticipation !

Your TSOs are anyway in charge at the last second…

3.

# THANKS FOR YOUR ATTENTION!

www.rte-france.com

www.entsoe.eu

Eirgrid Customer conference

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