

CORESO
A CENTRALIZED REGIONAL
SECURITY COORDINATION
INITIATIVE

Leading coordination for
enhanced reliability of supply

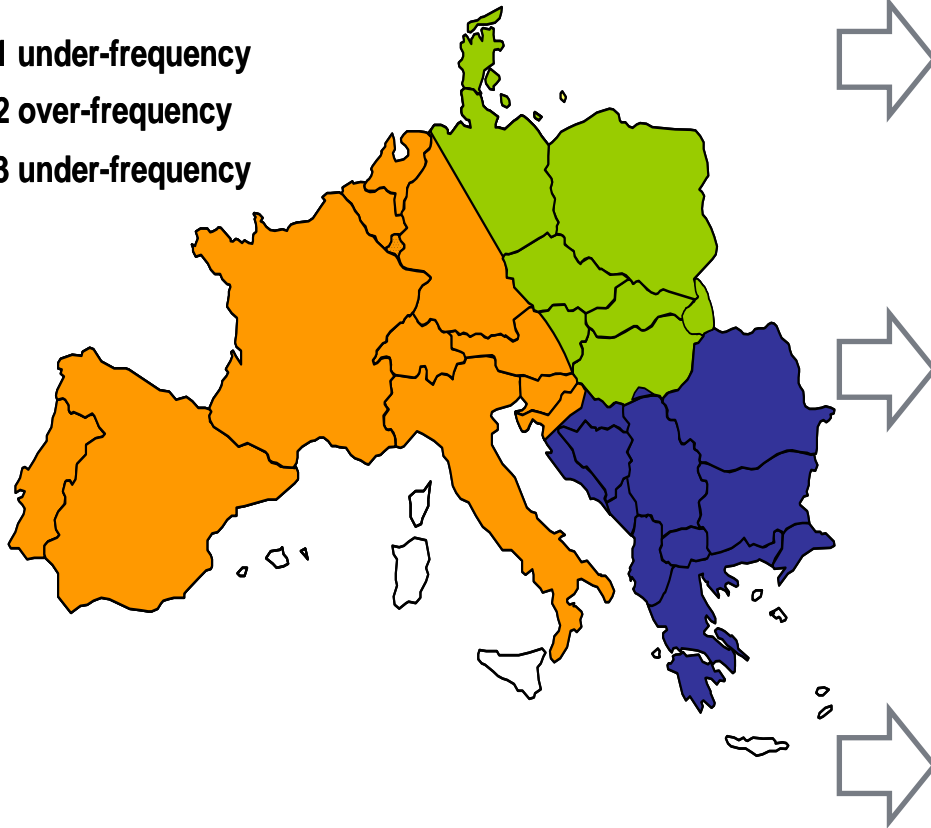


A bit of recent history...

(near) black out as triggering factor...

4 November 2006 : major incident on the European electrical grid

- Area 1 under-frequency
- Area 2 over-frequency
- Area 3 under-frequency



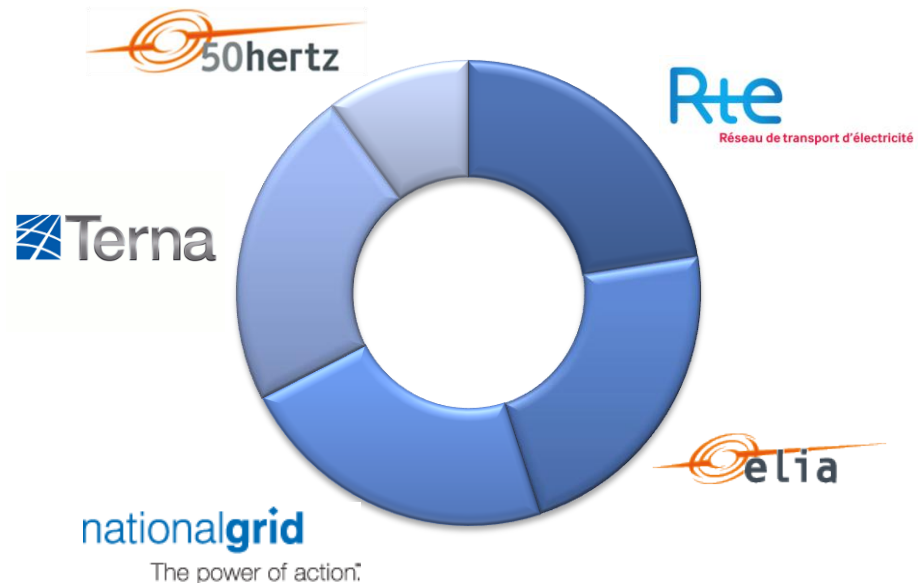
Cross zonal incident, starting in Germany: cascading line tripping with consequences in whole of continental Europe

*Uncertainties on cross border impacts:
only a national view is not sufficient anymore*

Need for an aggregated and shared view of the European electrical grid (coordination between TSOs)

Coreso: a centralized vision for operational coordination between TSOs

- Independent company (SA)
- Created in Dec 2008
- Operational since Feb 2009; 24/7 operations since June 2009
- 100% TSO (Transmission System Operator) owned
- Operational coordination services to TSOs



An additional operational coordination layer

Europe's « near black out »: 4th Nov 2006 :

Continental Europe's electricity transmission system splitted
within 10 sec!

2 key requirements in order to avoid such an incident:

- **Pro active coordination:** since not possible to be managed in real time → anticipation needed
- **Regional scope:** since uncertainties on cross border impacts → a national view is not sufficient anymore

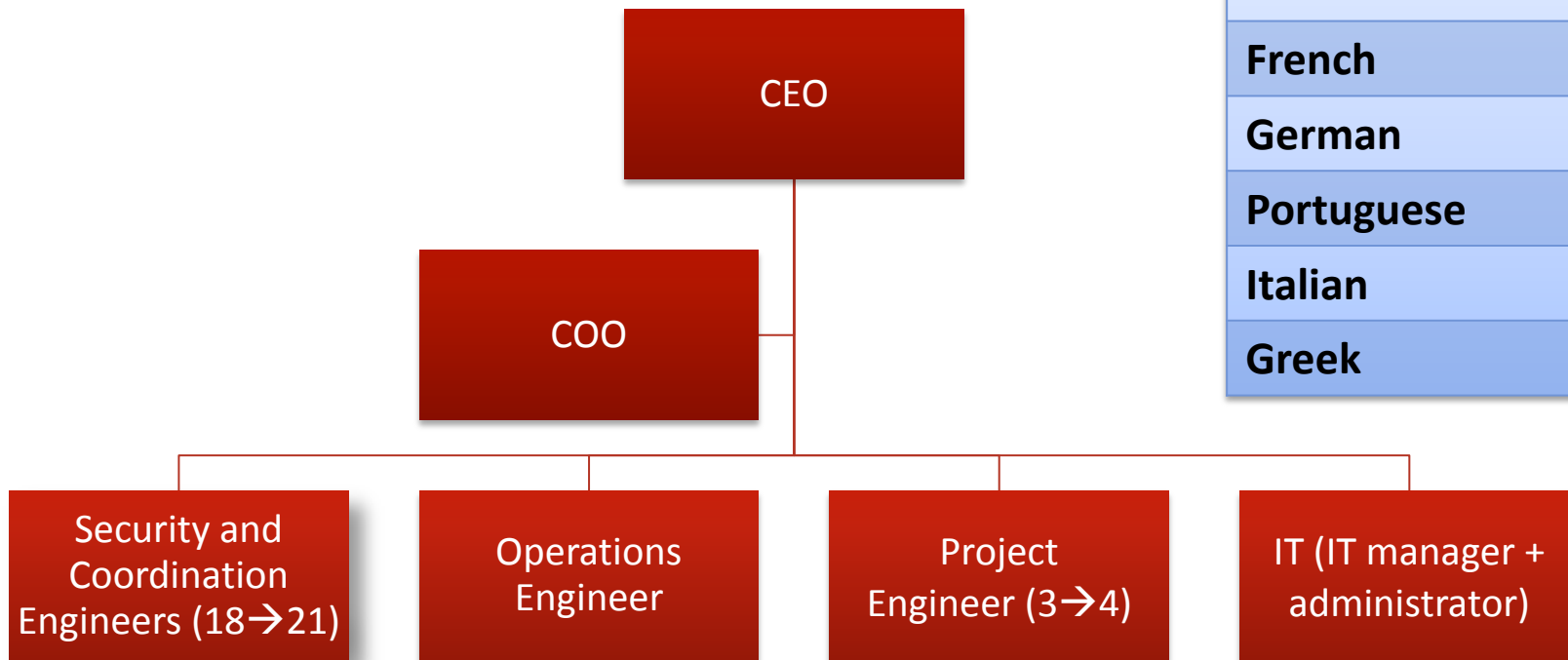
Recognized role for Regional Security Coordination Initiatives (« RSCIs »)

→ Pro active operational coordination at regional level

- Operational focus within a timeframe
from a few days before until close to real time

→ concept of **Regional Security Coordination Initiatives (RSCIs)**:
embedded in « **European Network Codes** » → structural role for
RSCI's such as Coreso

Coreso: a multicultural team of international experts

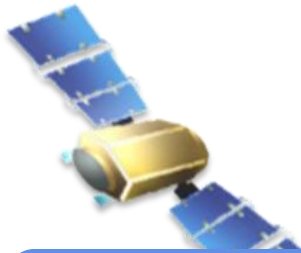


Belgian	6
Irish	1
French	9
German	3
Portuguese	1
Italian	3
Greek	1

24/7 shifts

Subcontracted: HR, Legal, Finance, Secretariat

Coreso: a service provider to TSO's



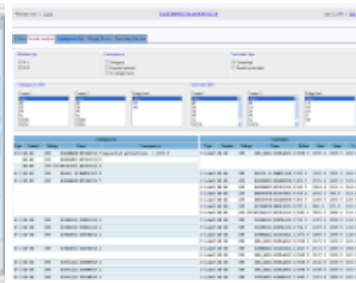
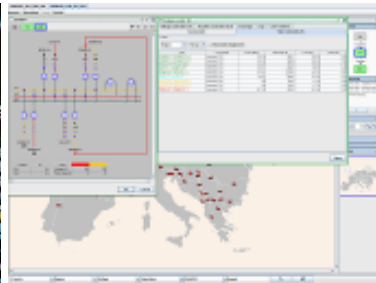
Pro-active
operational
monitoring (Data)



Analysis
(Experts & Tools)



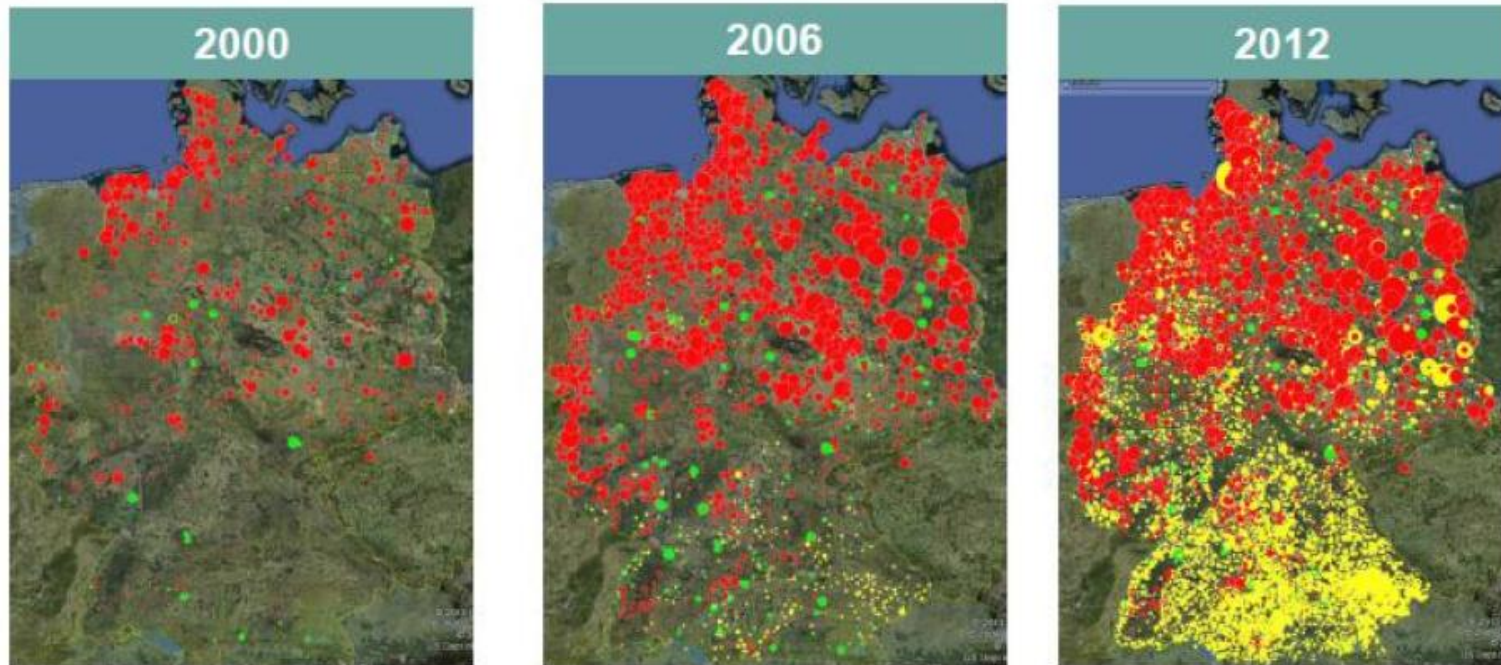
Coordination
(Experts & Tools)



The key driver for more
operational coordination:

(and for all current evolutions in the electricity
sector!)

The renewable energy revolution



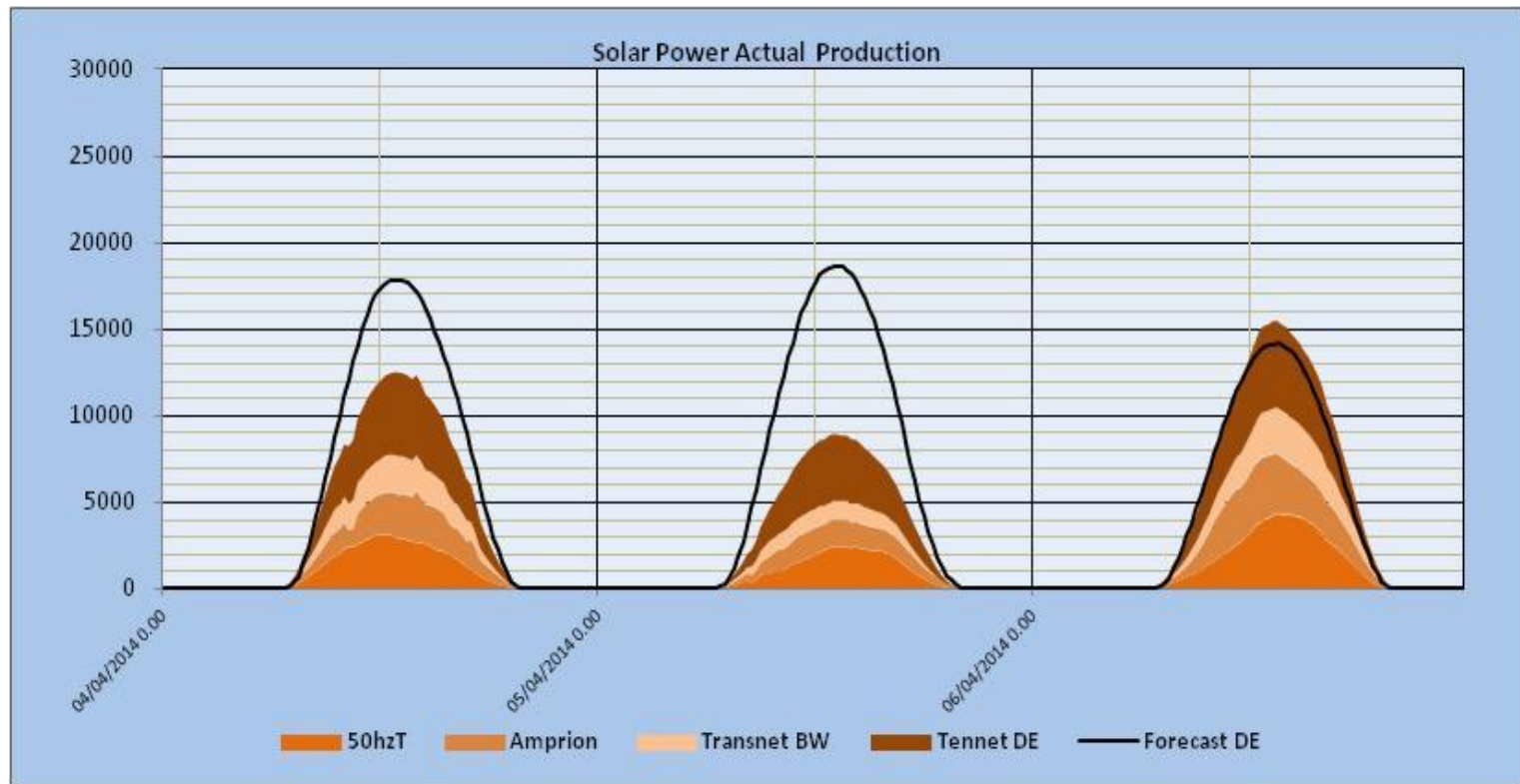
- Wind
- Photovoltaic
- Biomass

Geographical RES spread (DE)

Source: 50Hertz, Amprion, Tennet, Transnet BW, Google Earth

More and more uncertainties...

- April 5th , 2014 - Due to unexpected misty weather conditions: 9800 MW shortage on German Solar infeed.

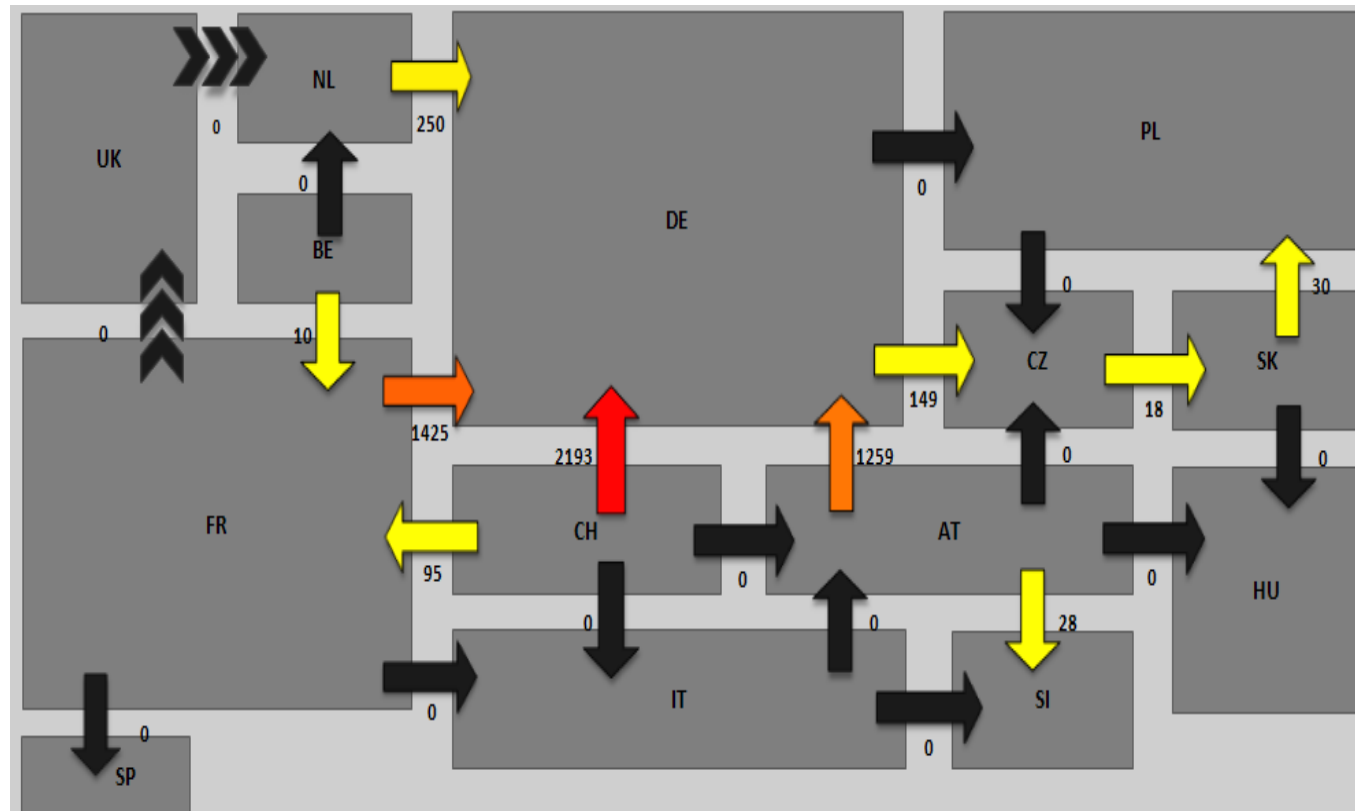


... with European wide impact

→ Partial compensation by intraday imports from all over Europe.

Note: HVDC cables with Scandinavia, not shown below, were also used for extra import

Commercial exchange intraday variations compared to D-1 forecast for the 5th of April 2014 at 14:30



Data is key...

From Individual Grid Models (delivered by all TSOs) to a European Common Grid Model

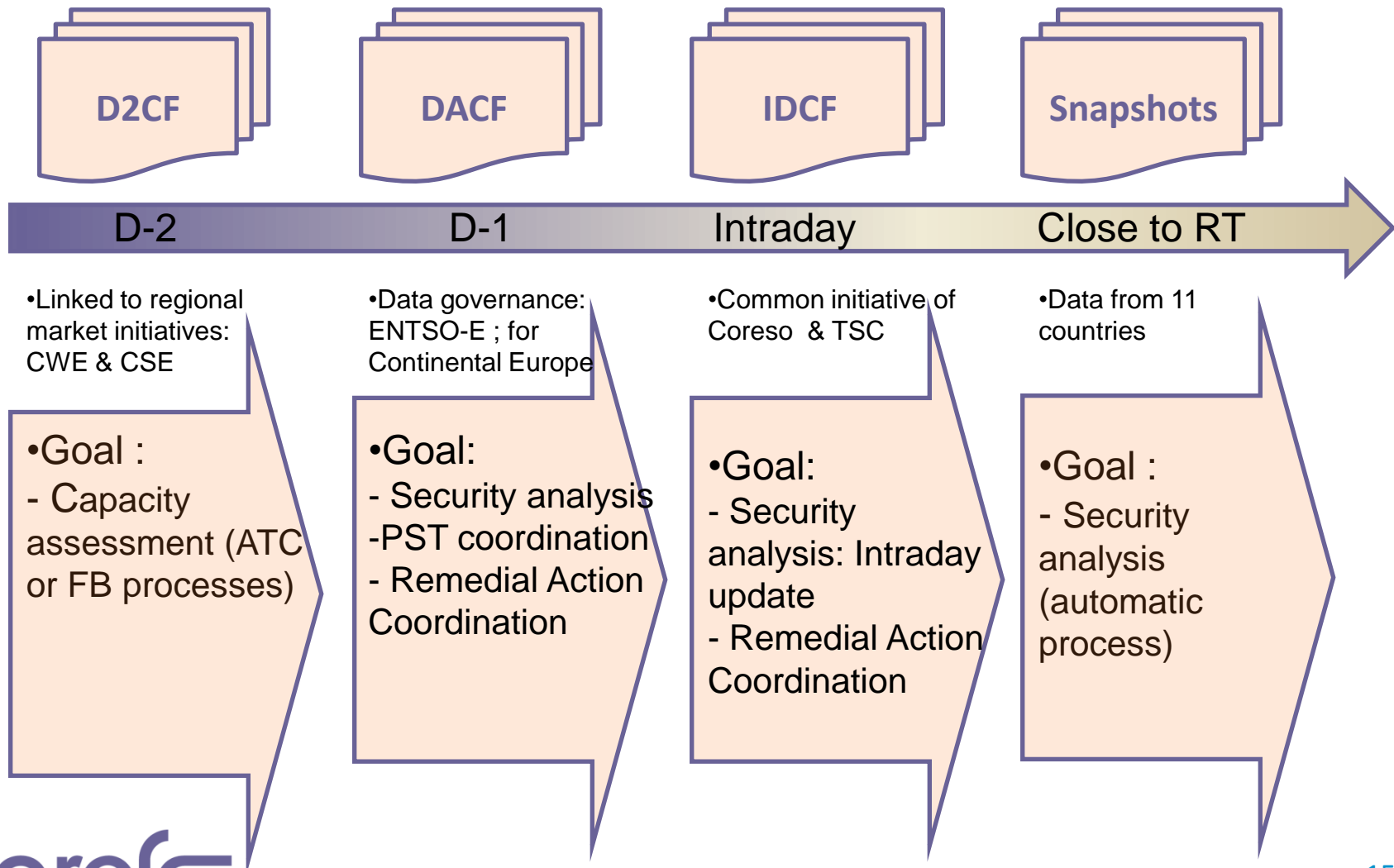
Key Data : Individual Grid Models

- All TSOs deliver in an harmonized way their best estimate for their electrical zone, including:
 - Characteristics of grid elements
 - Topology (including outages)
 - Load forecast
 - Generation schedule
 - Renewable forecast (wind, solar)
 - Exchange programs

... for several timeframes (D-2, D-1, Intraday)

These data are merged by Coreso (→ European Common Grid Model) and are the basis for the coordination services (security analysis, capacity calculation, ...)

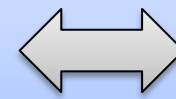
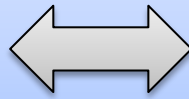
Link between data and coordination activities



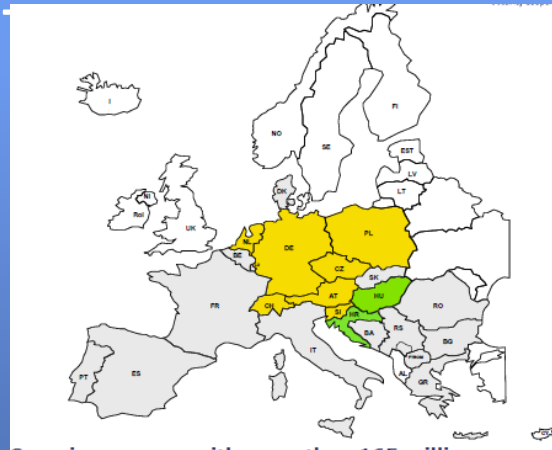
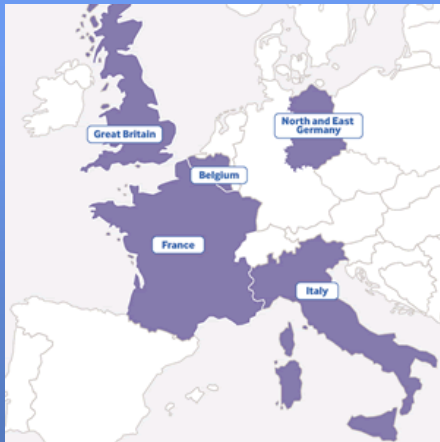
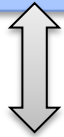
Towards pan-european operational coordination

A regional coordination layer for Europe

Regional Security Coordination Initiatives



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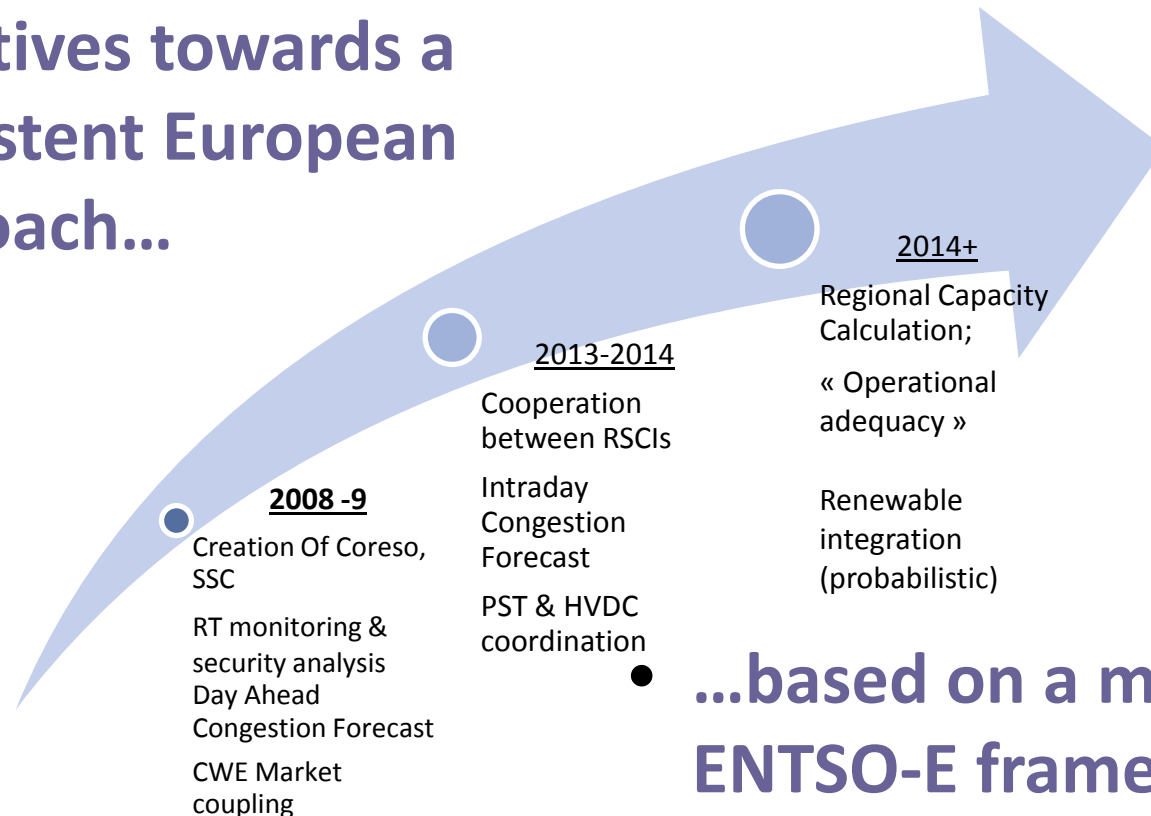


The 5 operational coordination functions (ENTSO-E approved)

1. **European data model delivery** (*Individual Grid Models from TSOs → Common Grid Model*)
2. **security analysis** (*focus: flows*)
3. **regional capacity calculation** (*input for day ahead markets*),
4. **short term adequacy** (*short term match generation-load; availability of MW's; link with balancing*)
5. **outage planning coordination** (*optimized use of assets, incl PST (Phase Shifter Transfo) and HVDC coordination*)

ENTSO-E implementation plan

- from bottom up initiatives towards a consistent European approach...



• ...based on a mandatory ENTSO-E framework (harmonized data + RSCI coordination functions)

Besides the short term operational coordination...

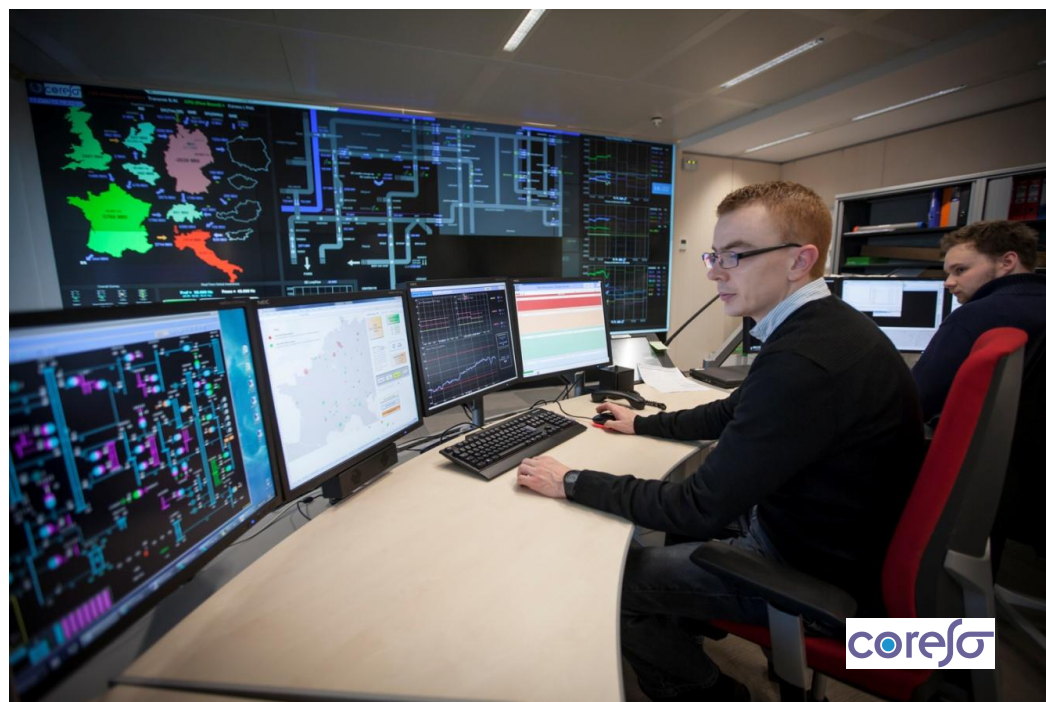
Two more focus points to make
it work:

A strongly interconnected network is a no regret investment for Europe

Interconnection capacity must on average double by 2030



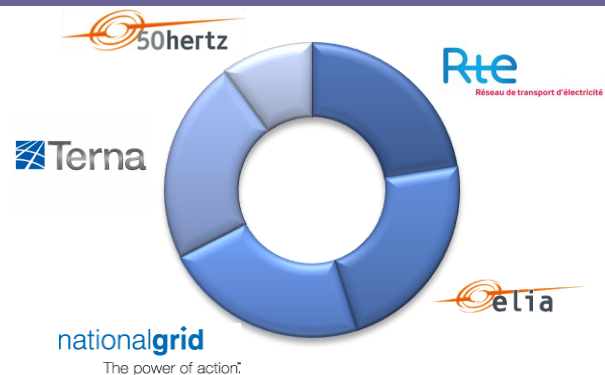
Thank you for your attention!



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ANNEX

Our Mission

The mission of Coreso is to assist TSOs pro actively to ensure Security of Supply on a European regional basis.

Being a centralized RSCI, the highest added value and so the operational focus is from a few days before until close to real time.

Coreso develops and performs operational coordination services in cooperation with TSOs and RSCIs; the operational responsibilities remain at TSO level.

Based on its regional expertise, Coreso supports the TSO community in identifying and undertaking actions and initiatives on medium and longer term to ensure Security of Supply.

By its centralized model with rotational staffing from TSOs, Coreso spreads the culture and practice of international cooperation amongst the TSOs.