Transmission Planning Activities in Europe – The role of ENTSO-E

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Yannis Kabouris
Hellenic Transmission System Operator
Convener of RG CSE - ENTSO-E

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Reliable Sustainable Connected

Context

- **Energy policy goals**

–Sustainability:

- More renewables and further from the loads
- More heating and mobility with electricity

–Competitiveness/market integration:

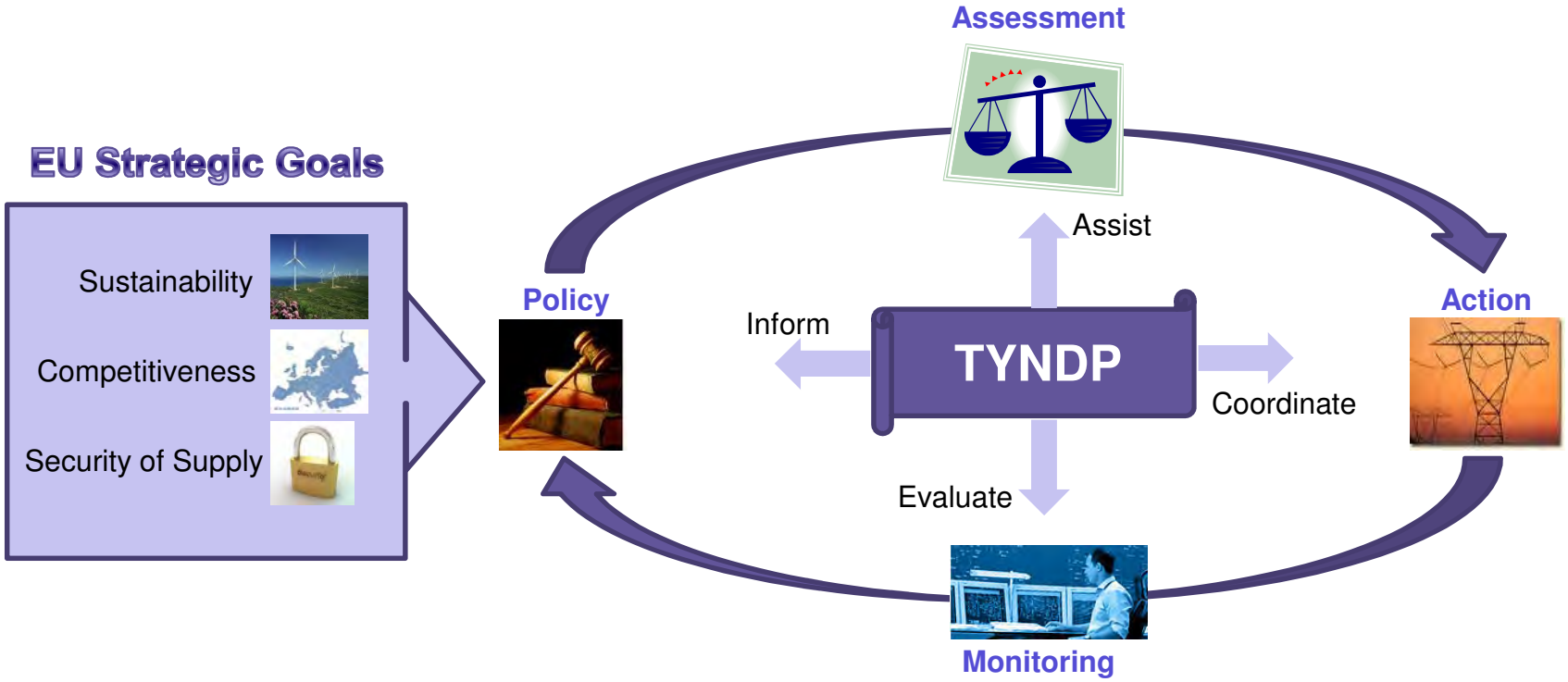
- More long-distance flows

–Security of supply:

- More optimal resources sharing

require more grid

Transmission Infrastructure in the centre



"*ENTSO-E shall adopt a non-binding Community-wide ten-year network development plan*"

- Transparency
- Decision making process
- Networks/scenarios/Generation outlook/resilience

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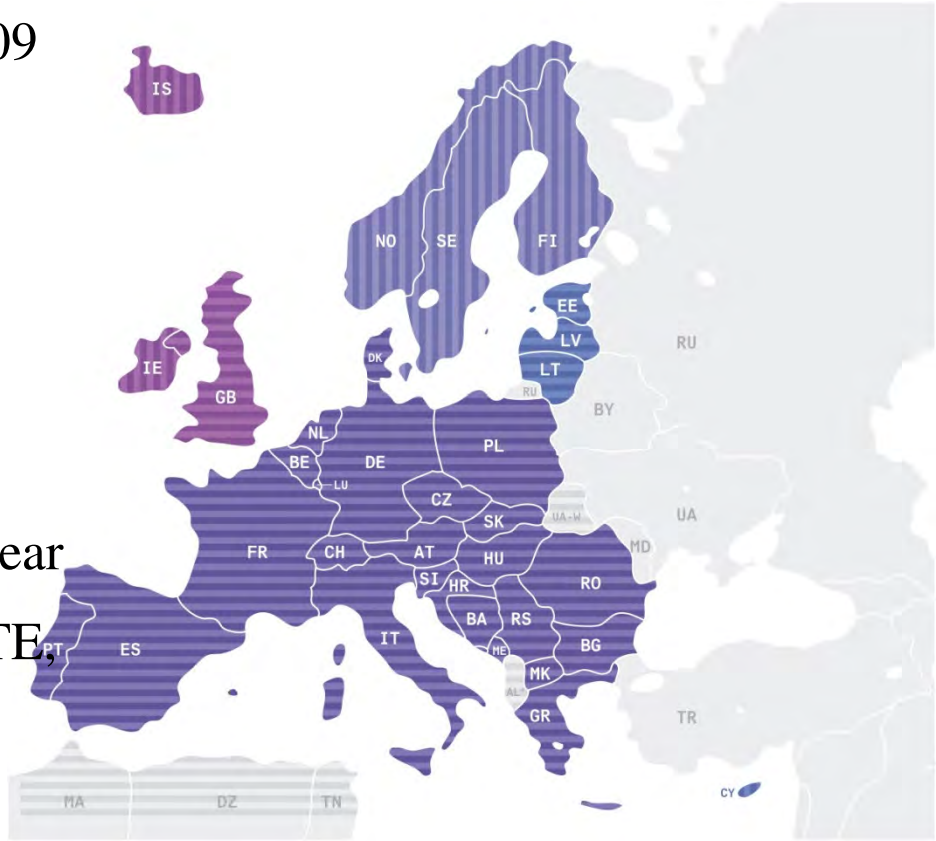
ENTSO-E: a trans-European network

- Established under the Regulation 714/2009
- Fully operational since **July 2009**
- Represents **42** TSOs from **34** countries
  - **525** million customers
  - **828** GW generation capacity
  - **305,000** Km of transmission lines
  - Total demand:**3,400** TWh/year
  - Electricity trade volume: **400** TWh/year
- Replaces former TSO organisations: UCTE, ETSO, NORDEL, UKTSOA, ATSOI, BALTSO



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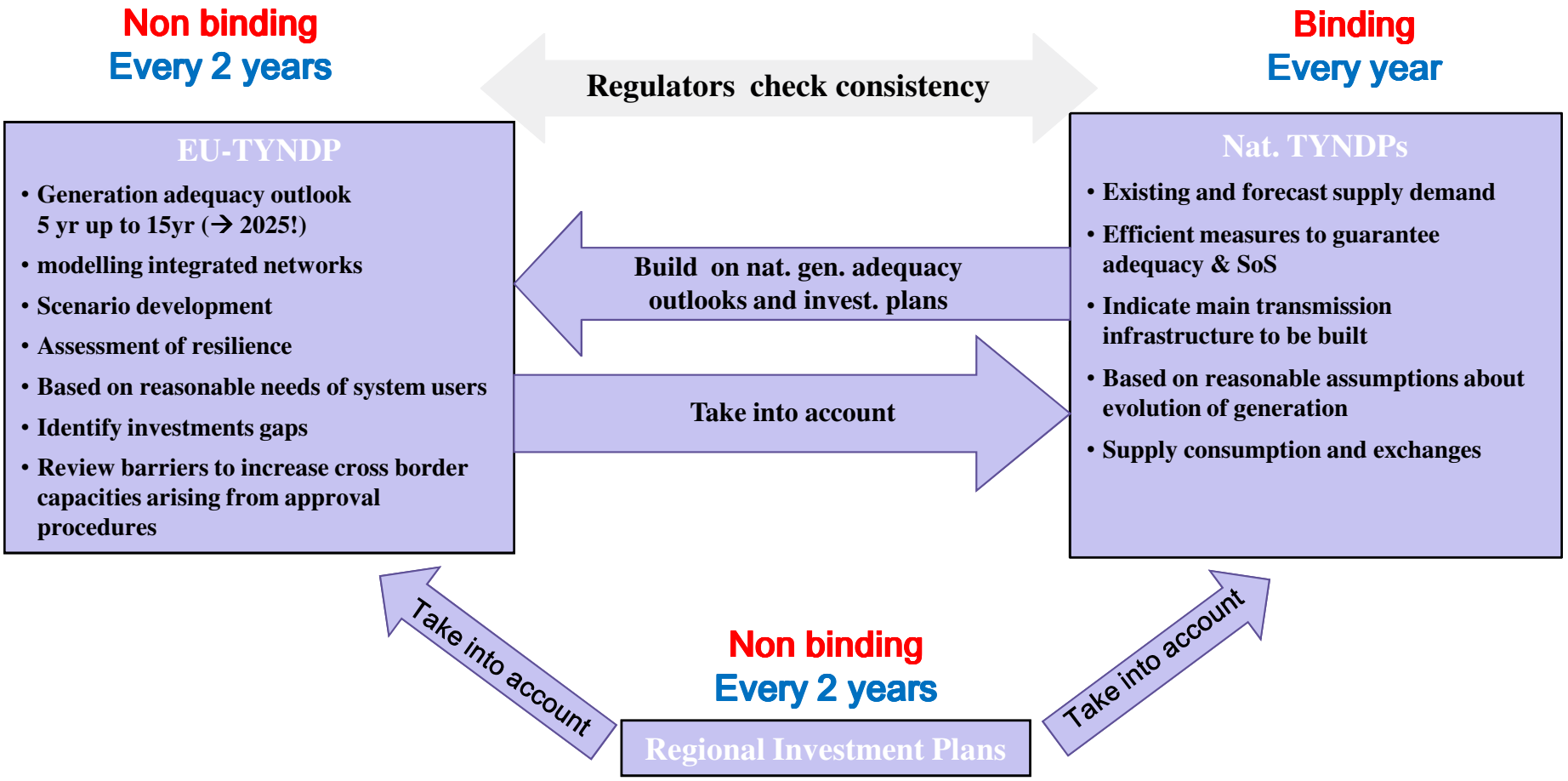
Regulation 714/2009 – tasks for ENTSO-E

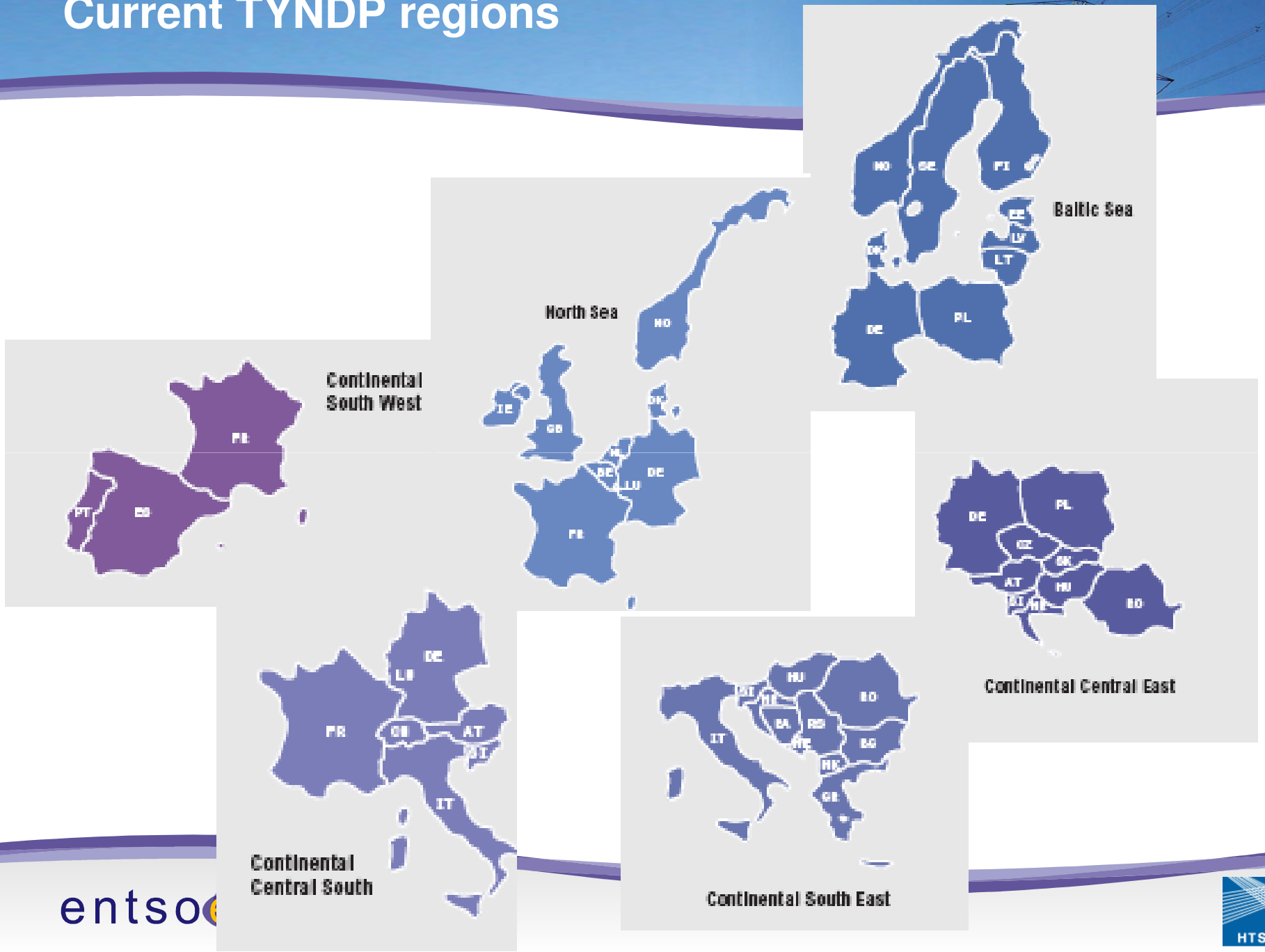
- **Article 4: European network of transmission system operators for electricity**
  - **Completion and functioning** of the internal market in electricity and cross-border trade
  - **Optimal management, coordinated operation and sound technical evolution** of the European electricity transmission network
- **Article 6: Establishment of network codes**
- **Article 8: Tasks of the ENTSO for Electricity**
  - **Network codes**
  - **Common network operation tools**
  - **Non-binding Community-wide 10-year network development plan**, including a European generation adequacy outlook, every two years
  - Work programme, annual report, **summer/winter outlooks, monitoring**
- **Full implementation until March 2011**

ENTSO-E operational much earlier because a fully developed IEM and the integration of RES demand urgent TSO action

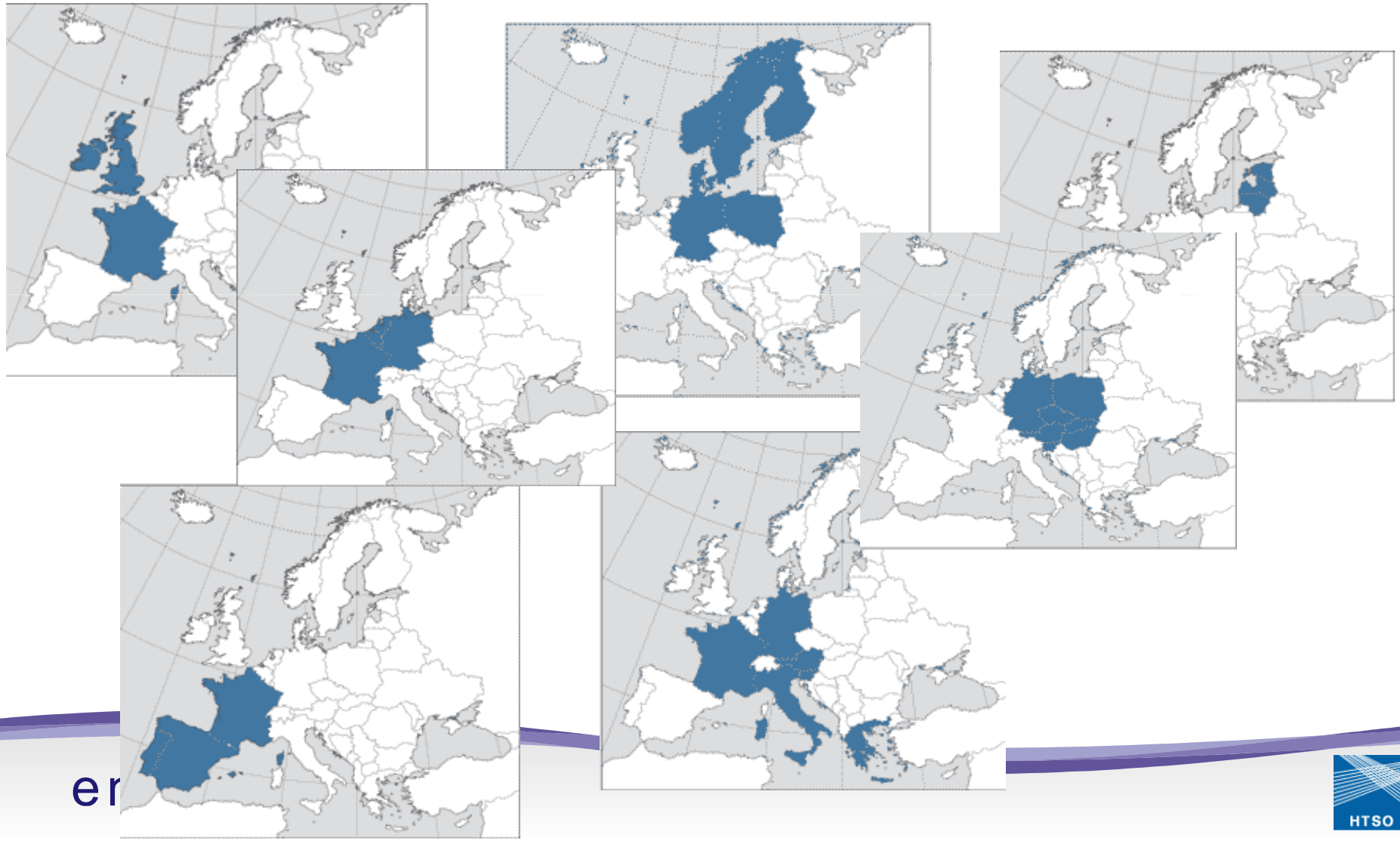
Context for the TYNDP



Current TYNDP regions



Current electricity regions
(Commission decision 2006/770/EC)



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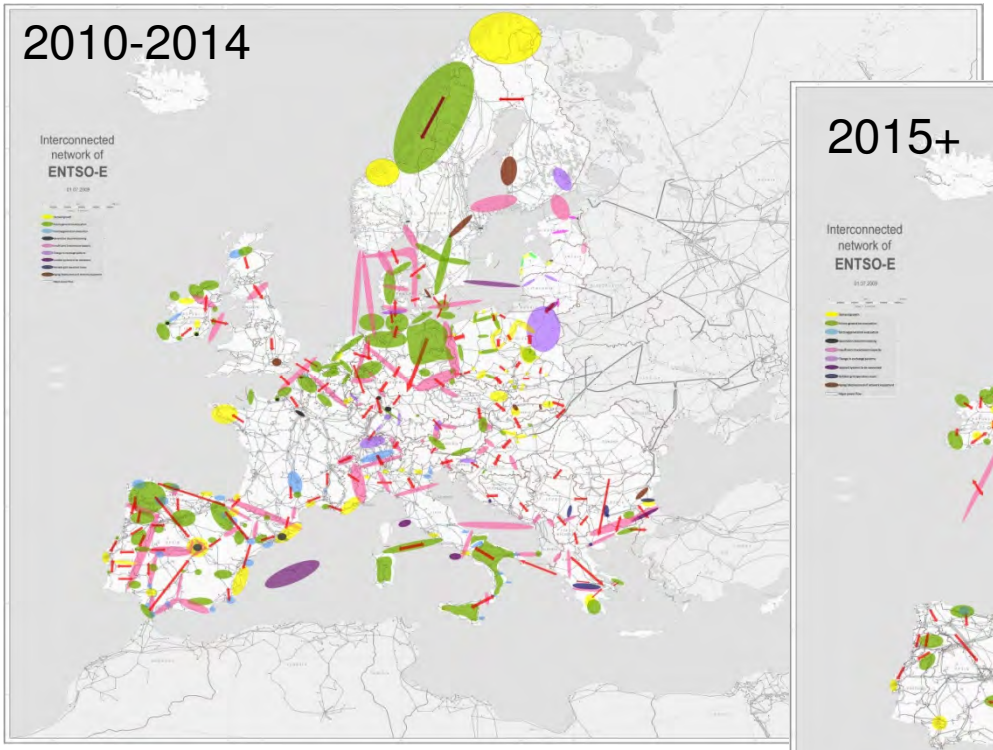
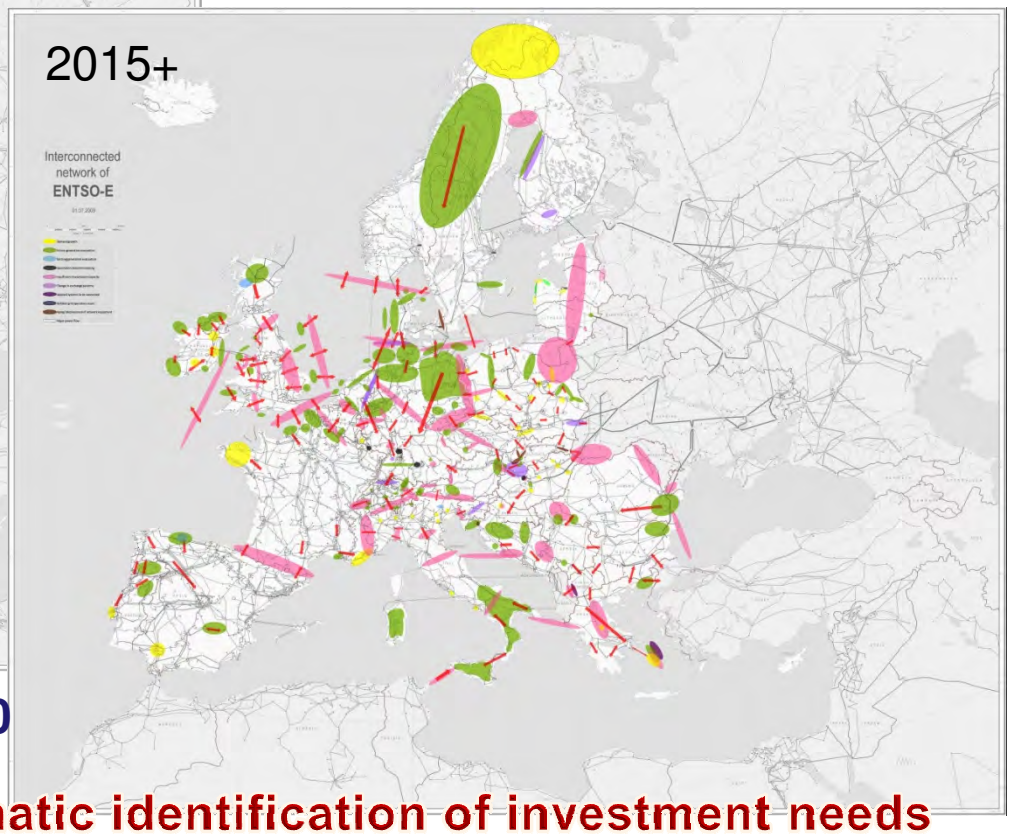
TYNDP delivers

Investment Needs based on calculations and experience from 42 TSOs





1st Pilot TYNDP issued on June 2010

→ A comprehensive and pragmatic identification of investment needs

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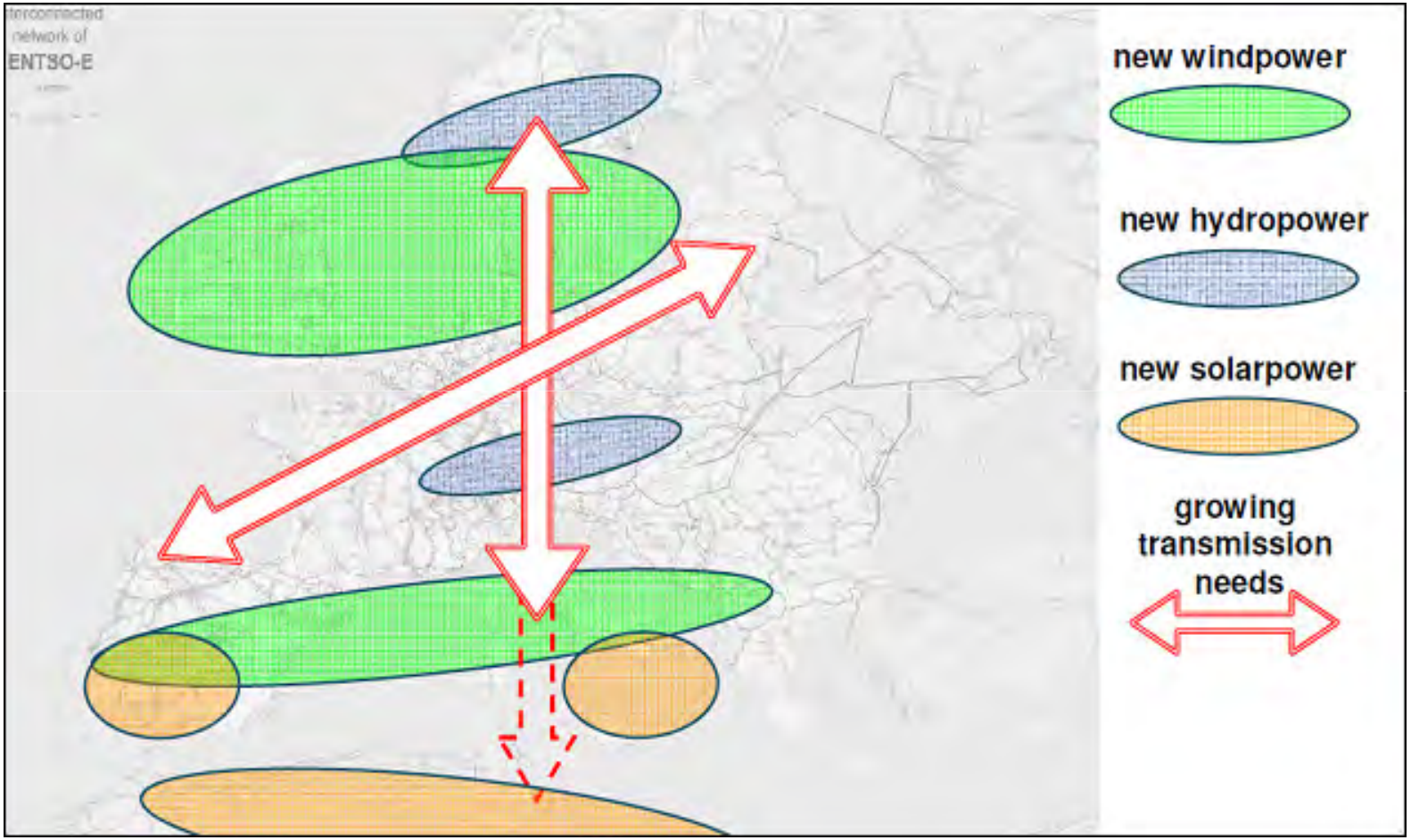
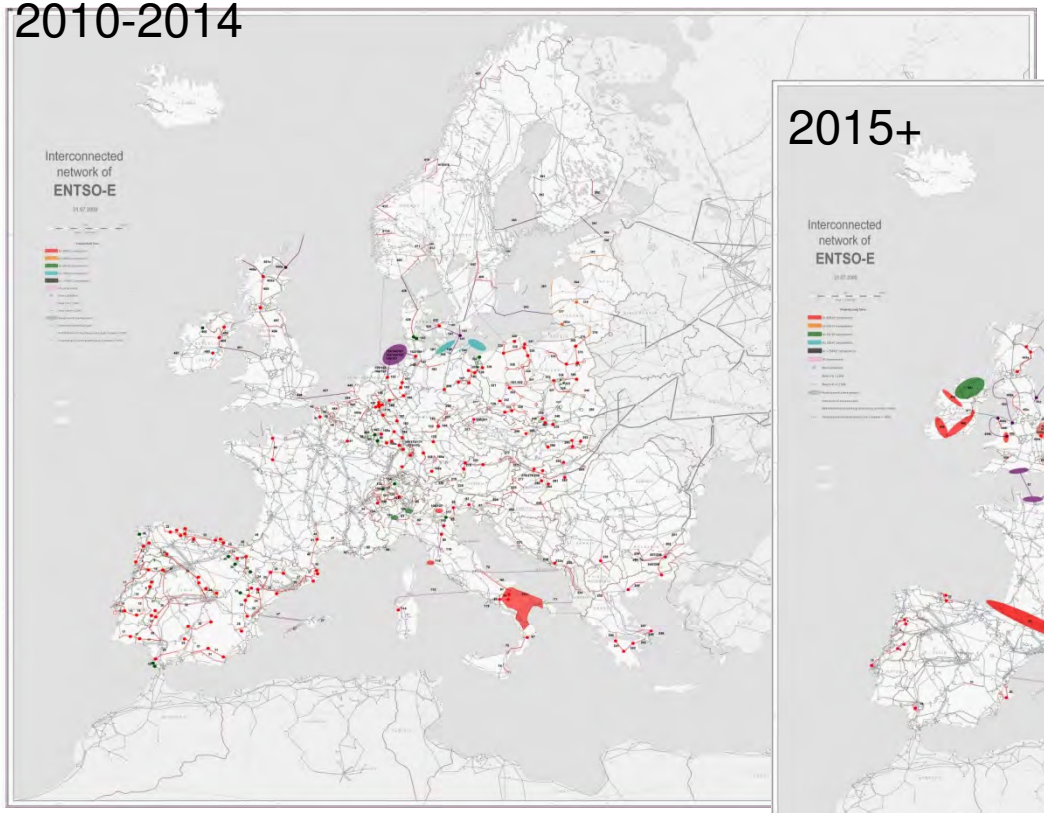
TYNDP delivers



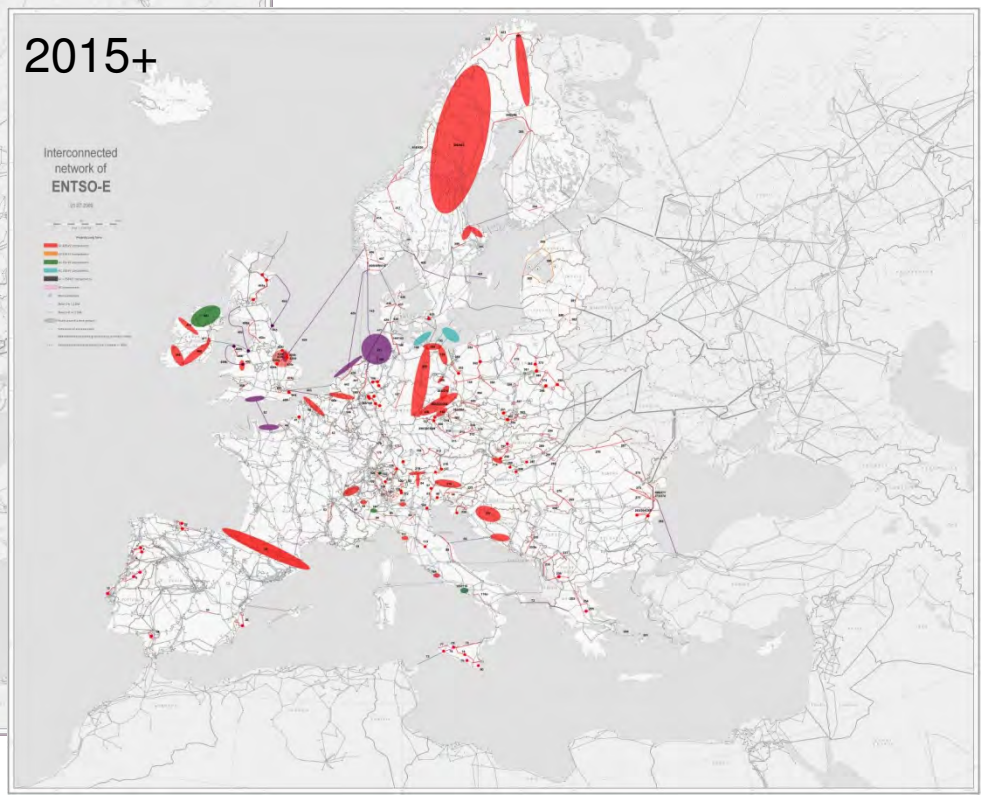
TYNDP delivers

Planned transmission projects

2010-2014



2015+

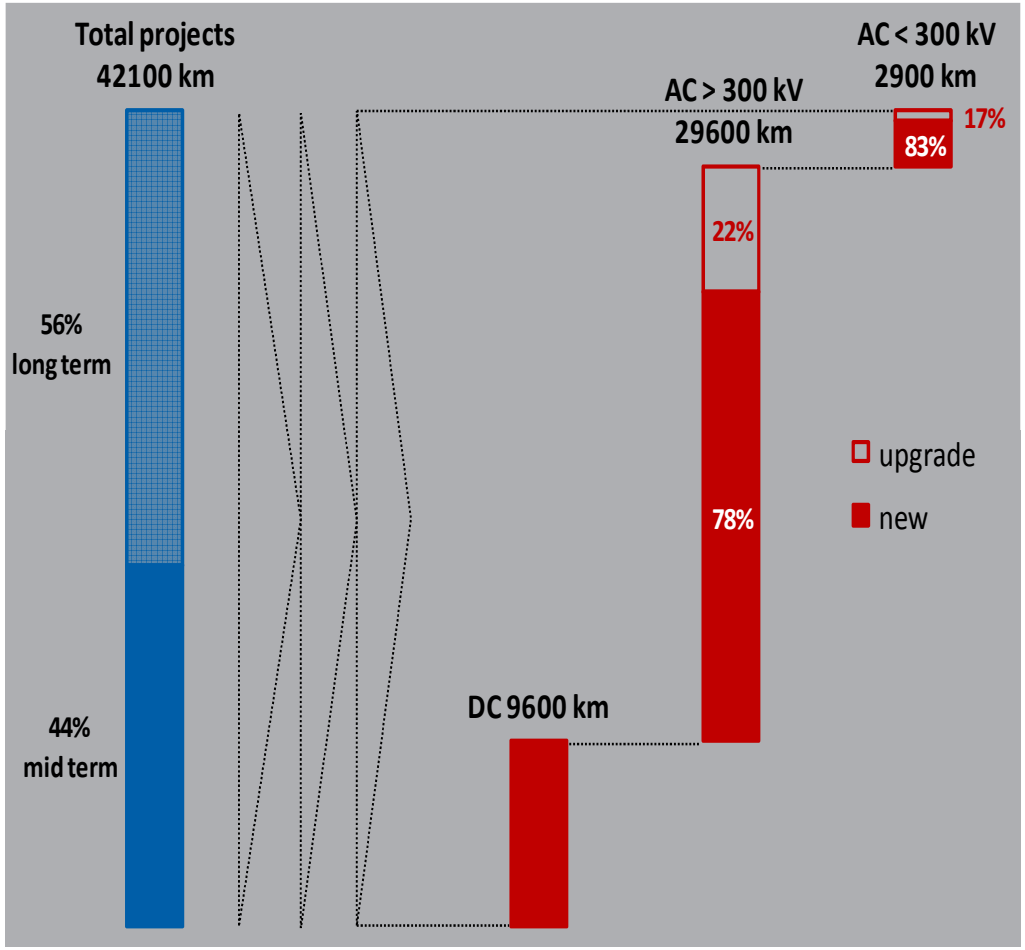


→ The most up-to-date collection of all planned transmission investments

TYNDP in figures

The TYNDP projects represent ~14% of existing lines

€ 23 to 28 billion for the first five years !



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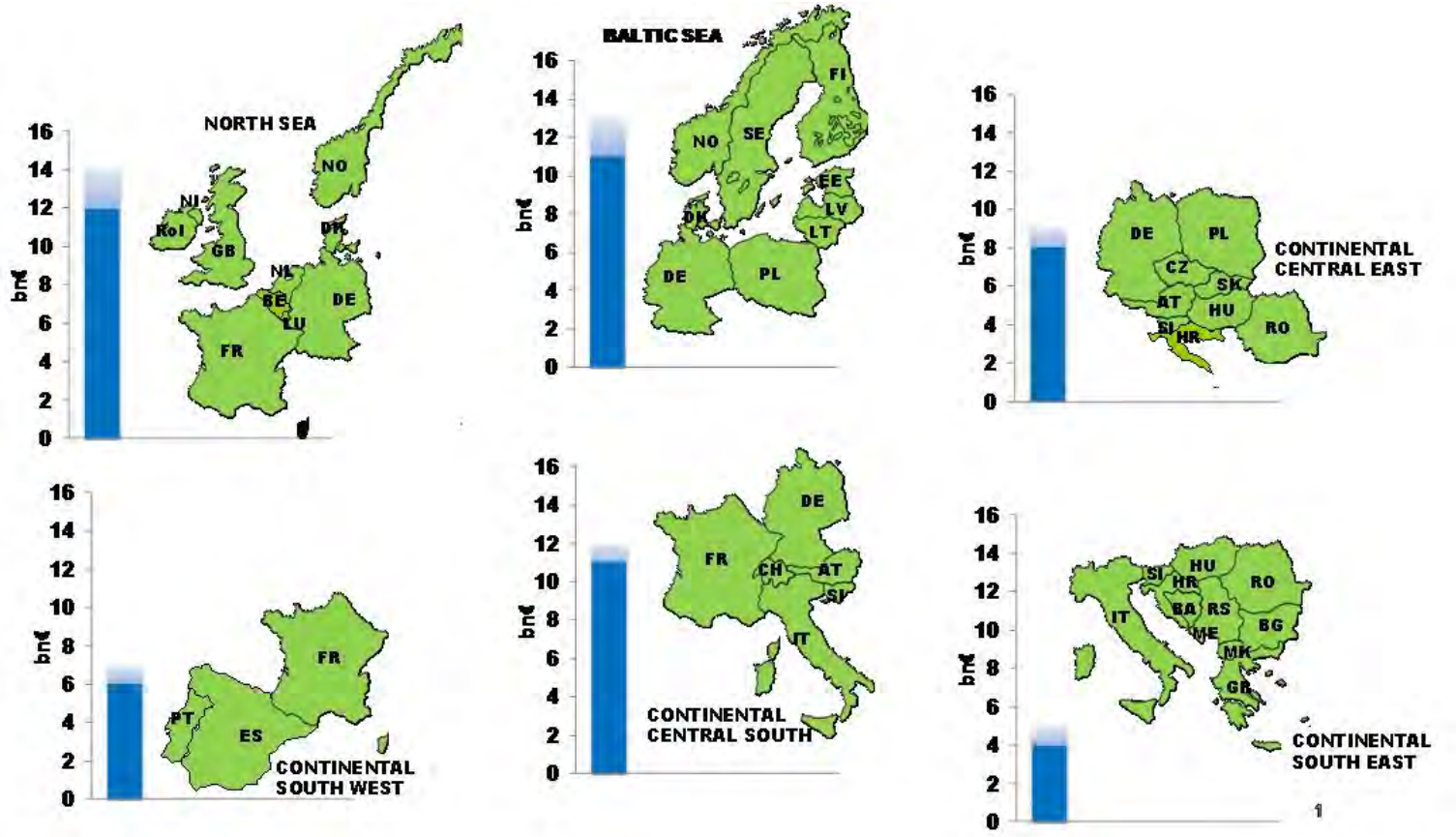
TYNDP in figures

Each market region is concerned



Grid development - challenges

- **Legal and Regulatory frameworks**
  - **accelerate/simplify permitting procedures while maintaining checks and balances**
  - **adequate financing given the major effort induced by RES**
- **Involve all relevant stakeholders into information channeling in order to alleviate uncertainties (generation location, policy implications)**
- **Social acceptance of transmission infrastructure**
- **Public consultations**

First TYNDP a Pilot, but process has already started

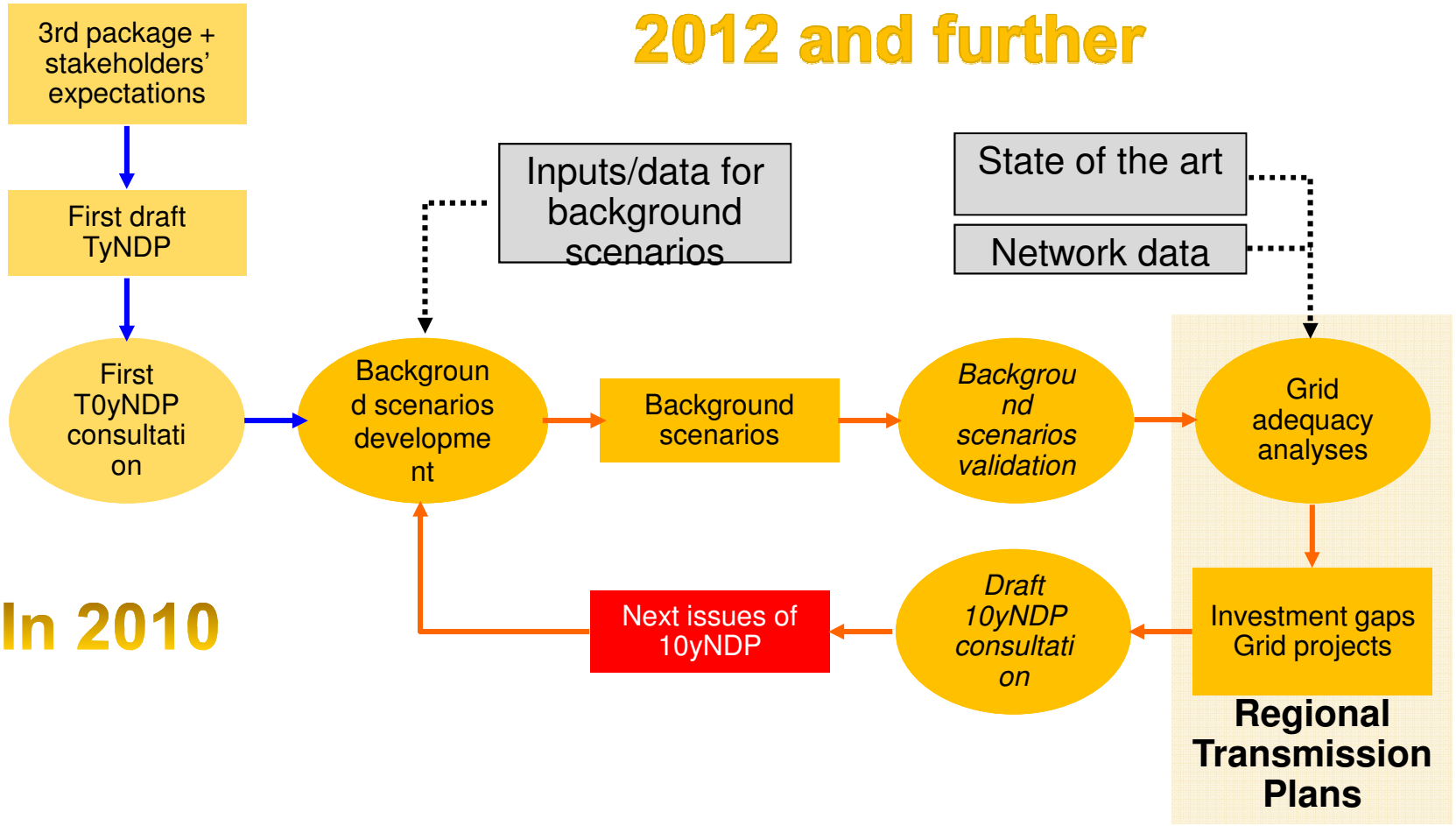
EC preparation of the Energy Infrastructure Package: ENTSO-E invited to provide additional input to *assist* the *assessment* of the Policy

- Compare TYNDP planning scenarios with publicly available scenarios related to the EU2020 targets.
  - **"What if" planning scenarios should converge today to 2020 scenarios.**
  - **More RES? Less Fossil? Where?**
- Propose measures to accelerate permitting procedures in Europe.
- Visualize main enhancements in NTCs
- **But, focus on forward-looking indicators for market integration.**

Goals for the next TYNDP in 2012

- **Run the complete 2-year cycle**
  - Consultations on scenarios and final report
  - Regional Transmission Plans + ENTSO-E TYNDP
- **Develop a third shared, top-down, long-run scenario**
  - NREAPs in June/10
  - A shared vision of the EU 2020 targets in the power sector in every country
- **Set a framework for all regional studies**
  - Use of dedicated shared ENTSO-E pan-European models
  - Modeling the market behavior
- **Scenario EU 2020 (main + obligatory)**
  - Constructed in collaboration with other bodies (EURELECTRIC, EWEA, EFET, EGREG, etc)

Methodology



Scenaria under investigation for 2020

BASE SCENARIO (3x20)

– **cutting energy consumption by 20% of projected 2020 levels - by improving energy efficiency**

- **Indication of the impact of efficiency measures on electricity demand**

– **increasing use of renewables (wind, solar, biomass, etc) to 20% of total energy consumption**

- **RES share in electricity consumption at 35-40%**

- **cutting greenhouse gases by at least 20% of 1990 levels**

- **Compatible with available NREAPs**

Comparison to a "Business As Usual" Scenario (B) and a "Nuclear phase out" scenario

RES share in electricity consumption at ENTSO-E/ EU level

	scenario B	EU2020 scenario
	2020	
ENTSO-E LEVEL		
Consumption data [GWh]	3657030	3586343
TOTAL renewable energy generation [GWh]	1301362	1427176
RES share in electricity consumption	36%	40%
EU 27 LEVEL (without Malta)		
Consumption data [GWh]	3314394	3246257
TOTAL renewable energy generation [GWh]	1031134	1159844
RES share in electricity consumption	31%	36%

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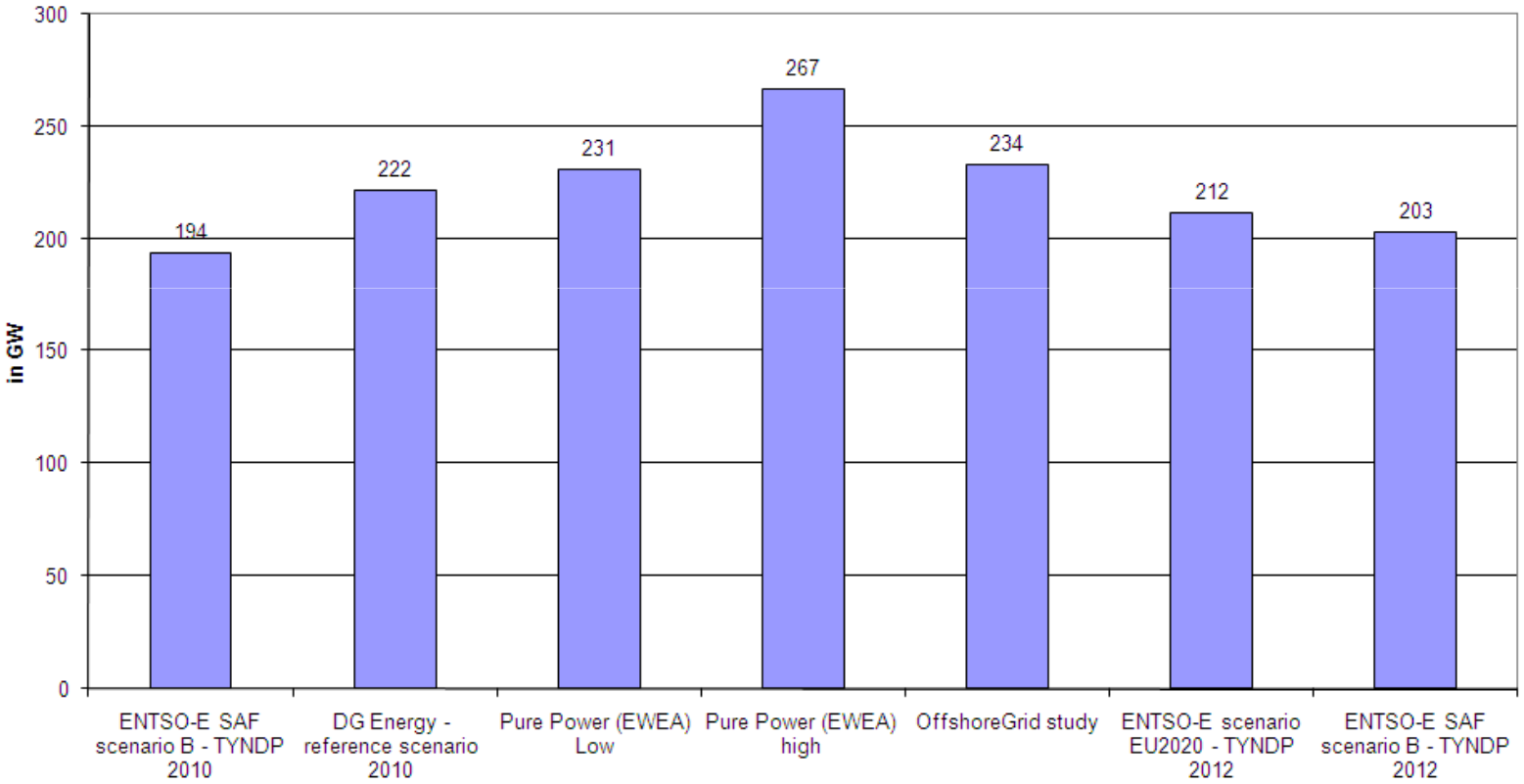
Discrepancies among Scenaria

Comparing the installed wind capacity in 2020 in the EU27 (without Malta) in the reference scenarios TYNDP 2012 and some EU top down scenarios



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Continental South East Regional Group

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CSE Regional Group

- 11 TSOs

HTSO	GR
TERNA	IT
ESO	BG
MEPSO	MK
EPCG	ME
NOsBiH	BA
HEP	HR
EMS	RS
TRANSELECTRICA	RO
ELES	SI
MAVIR	HU

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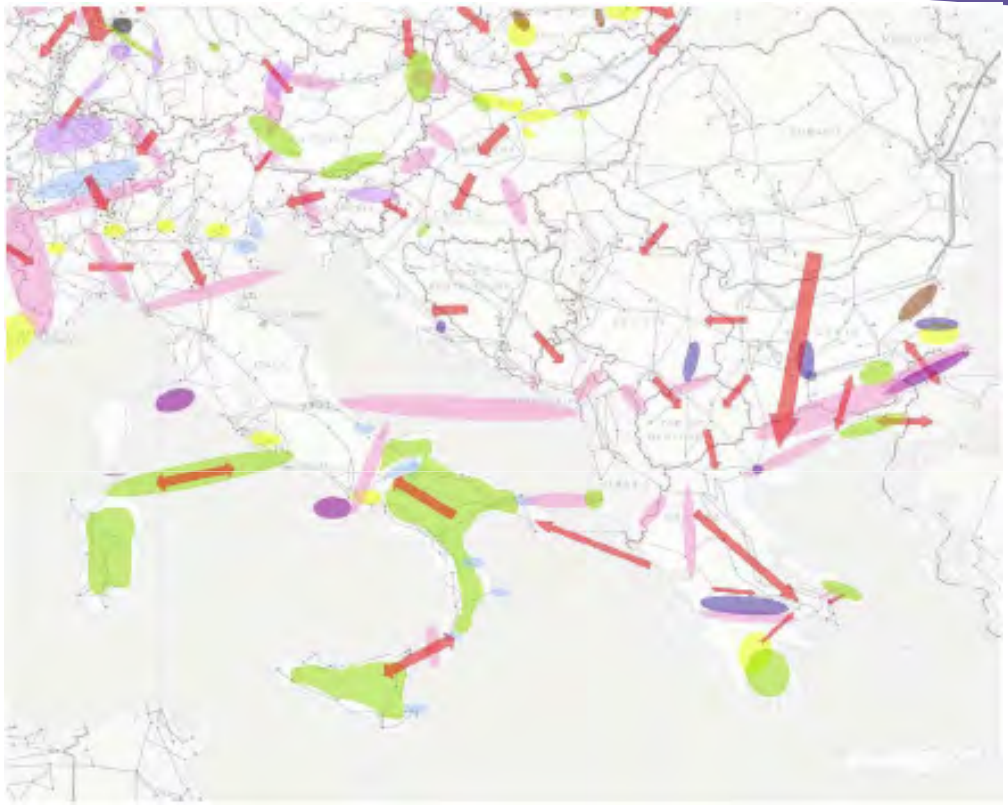
Motivation for transmission investments in CSE Europe

- **Sparse network – needs to enhance the Regional network in the predominant power flow directions (N-S, E-W)**
- **Accommodation of foreseen new conventional and RES generation**
- **Increase reliability and security of supply**
- **Increase transfer capacities and volume of commercial exchanges in the region**
- **Extension of the synchronous zone to the East (Turkey and Ukraine & Moldova)**

Grid investment needs for SE Continental system up to 2015



The most significant reinforcement projects for this period appear in Greece and in south Italy

Grid investment needs for SE Continental system after 2015

Major reinforcement projects for this period appear also in other Balkan countries e.g. Bulgaria, Romania

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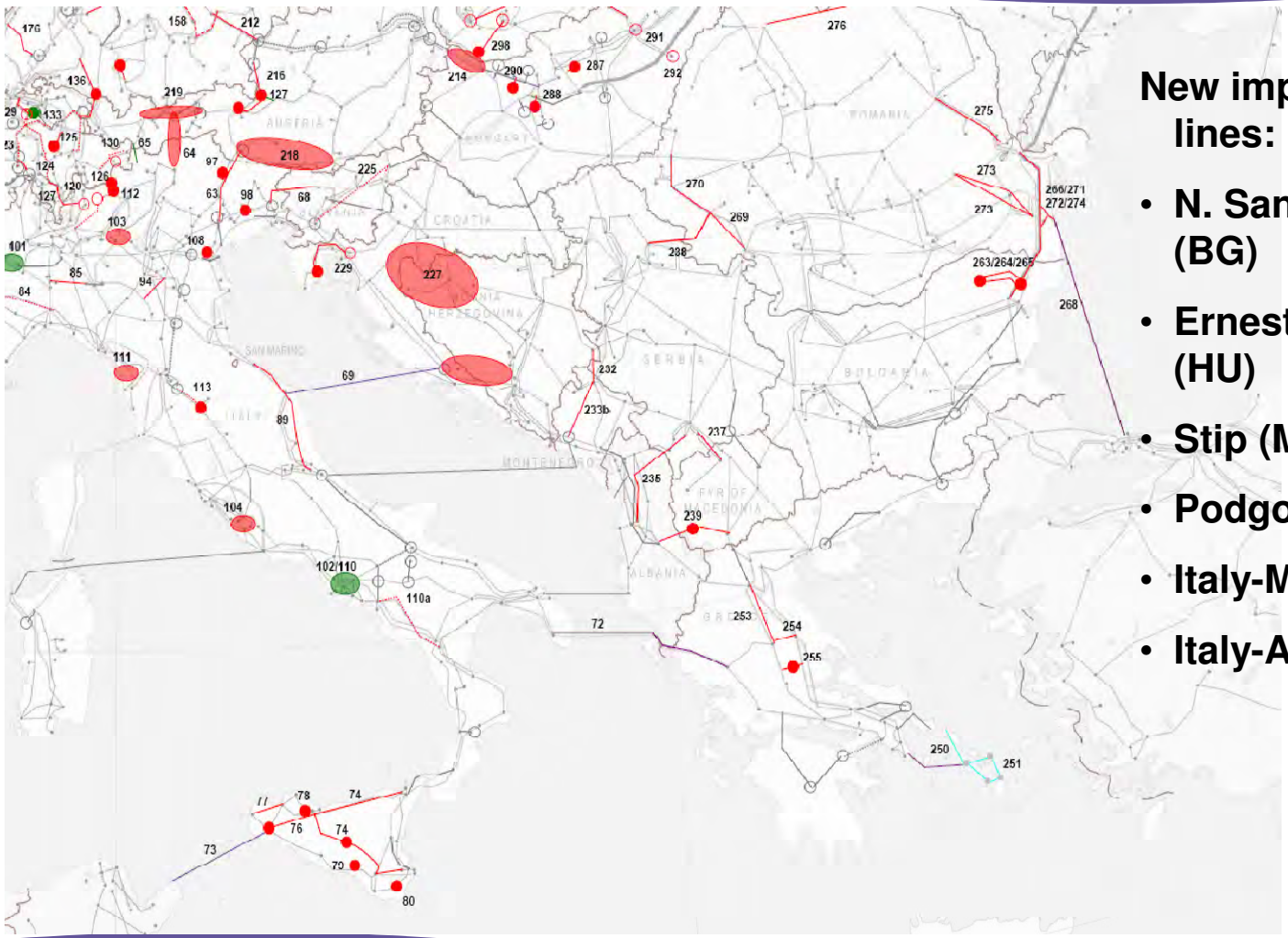
New projects in SE up to 2015



New important transmission lines:

- **N. Santa (GR)-Maritsa (BG)**
- **Ernestinovo (HR)-Pecs (HU)**
- **Stip (MK) – Nis (RS)**
- **Podgorica (ME)-Tirana (Al)**
- **Italy-Montenegro (DC)**
- **Italy-Albania (DC)**

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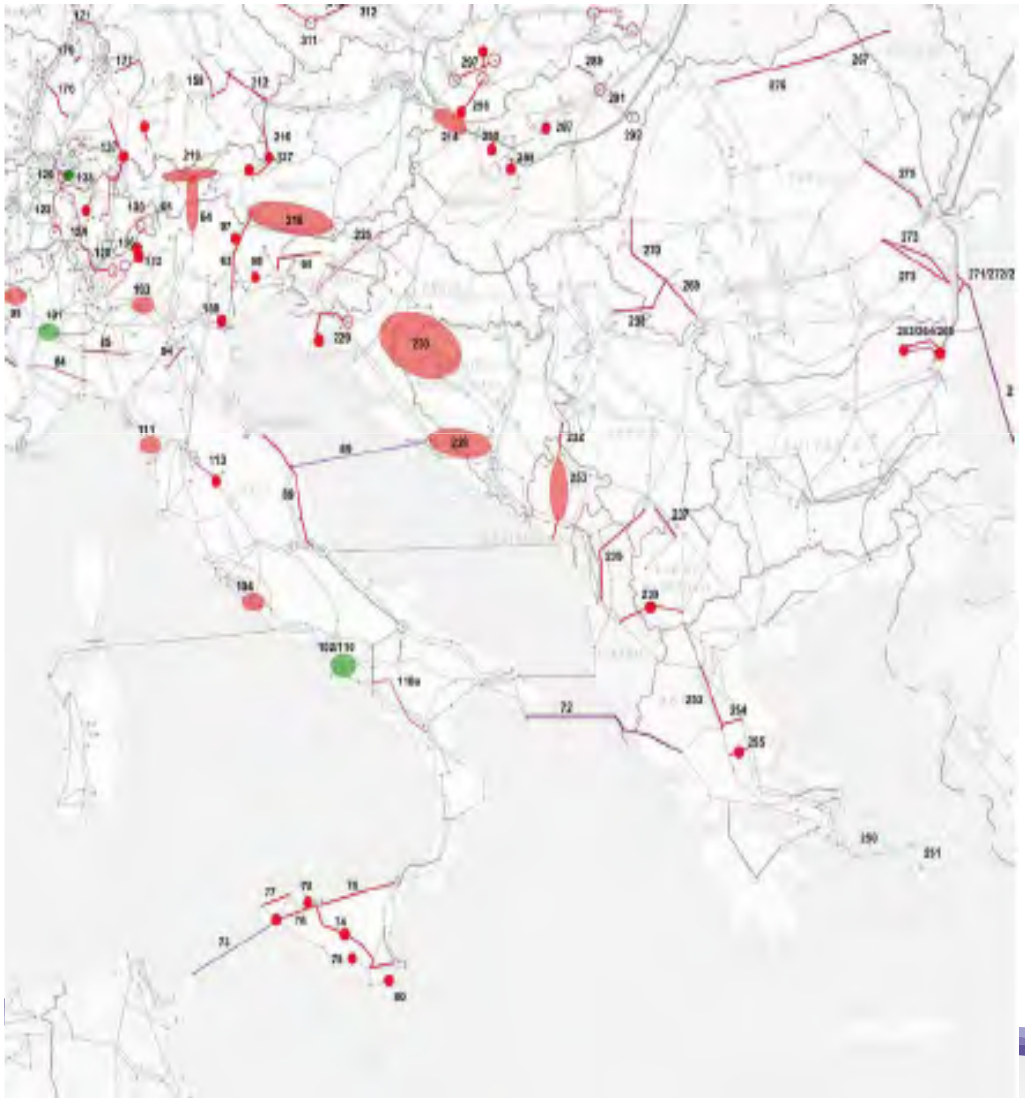
New projects in SE after 2015



- New important transmission lines:
- Cirkovce (Sl) - Heviz (Hu)
- Pancevo (RS)-Resita (RO)
- Okroglo(Sl) - Udine(IT)
- Italy – Greece new dc cable

CSE Regional Group – Summary of projects

- **Upgrade or construction of ~6,500km of AC lines (380-400kV)**
- **Upgrade or construction of ~ 513 km of AC lines (<380kV)**
- **Construction of ~2270km of DC lines**
- **Estimated cost 4-5 billion Euros for the next 5 years**

Next steps towards the Regional Investment Plan and TYNDP (1/2)

- Common market and network studies:
  - ➢ Regional market modeling and studies (compatible to Pan-European Database)
  - ➢ Network adequacy studies and provisional needs for transmission investments
  - ➢ Sensitivity analysis studies
- Three scenaria will be examined - compatible to the corresponding Pan-European scenaria
- Common hypotheses for generators dispatch, fuel and emissions cost, security criteria etc
- A Regional (coordinated) Investment Plan will be issued on December 2011

Next steps towards the Regional Investment Plan and TYNDP (2/2)

- Delivering estimations on:

- the transmission adequacy and expected increase of transfer capacities
- future Grid Transfer Capacities values
- illustration of the “most likely” power flows

- To assess and qualify the impact of each project through indicators for:
  - Security of Supply
  - Social Welfare
  - RES exploitation
  - CO2 Emissions reduction
  - Energy efficiency
  - Technical resilience
  - Compatibility (to alternative generation scenaria)

Thank you

kabouris@desmie.gr

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Visions and Actions towards 2050

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The Strategy: Sustainable solutions for the big challenges ahead need in-depth analysis before investment decisions.

ENTSO-E takes over a responsible role for the future energy system

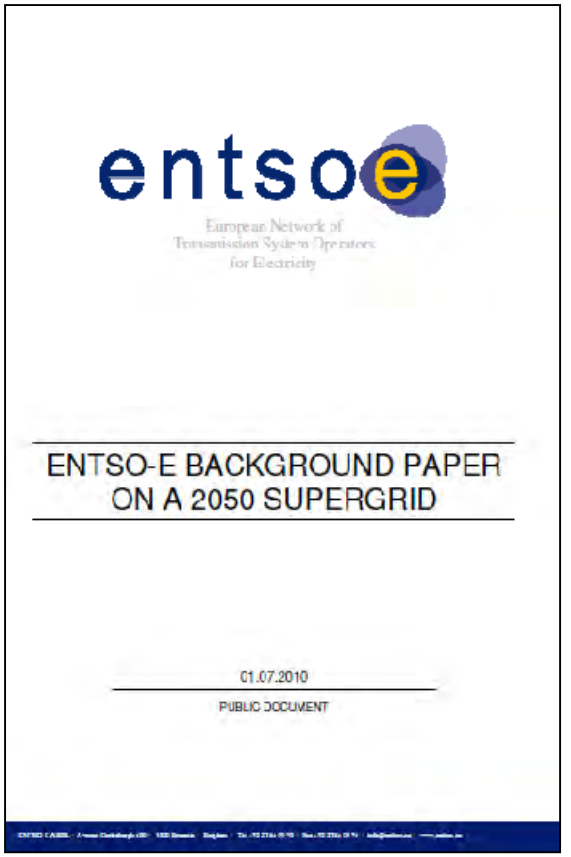
- **Integrated concept**
  - **Taking all aspects into account**
  - **Involving all major stakeholders in the process**
- **Huge investment budget**
  - **In-depth study necessary to avoid stranded investments**
- **Modular approach**
  - **Gaining know-how along the learning curve, realization should proceed step-by-step**
- **In line with EIP, ENTSO-E takes the lead in a 3-year in-depth study project to finally develop by end 2014**

the Modular Development Plan for a

Pan-European Electricity Highways System

The overall ENTSO-E Mission

- **Identify studies and elaborate a "Roadmap towards a pan-European power system 2050"** with special focus on a 2050 supergrid as an overall guideline for the supergrid conceptual phase
- **Perform consultations** and **closely collaborate with** EC, stakeholders and the public for achieving a common understanding of supergrid issues
- **Manage ENTSO-E supergrid studies** and **address all essential results** at EU level
- **Develop strategies for increasing the social acceptance** for grid development measures as a precondition for the realization of the supergrid concept.
- **Develop strategies for increasing the readiness of decisionmakers** to support and promote the idea of a supergrid as an answer to European energy needs.



New Context: Possible Electricity Highways Stakeholder Platform

Member States

Energy regulators

Energy industry associations

DSO association

European Commission

Manufacturer

ENTSO-G

ENTSO-E

ACER

Universities/ R&D performer

Renewable energy associations

Financial institutions

Consumer associations

NGOs

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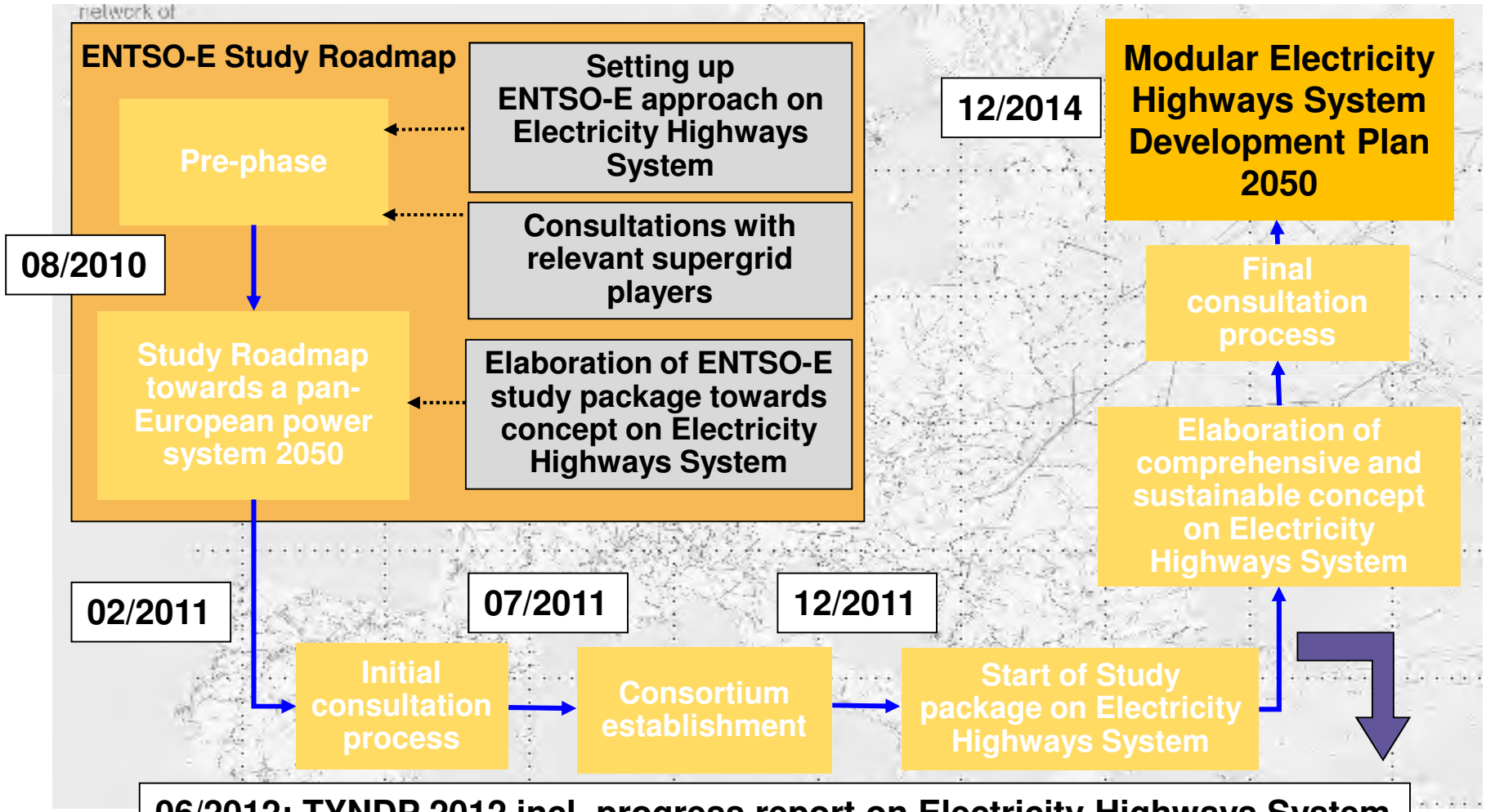
The Approach – ENTSO-E Study Roadmap



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