

# COMMON ENERGY MARKET – INTERCONNECTORS

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# Drivers of investment

- Development of IEM (gas, electricity)
- Security reasons - gas
- Development of RES (decentralization of energy) – electricity.
  - Binding targets – 20 % of RES by 2020, 27 % by 2030.

# Common market and energy lines

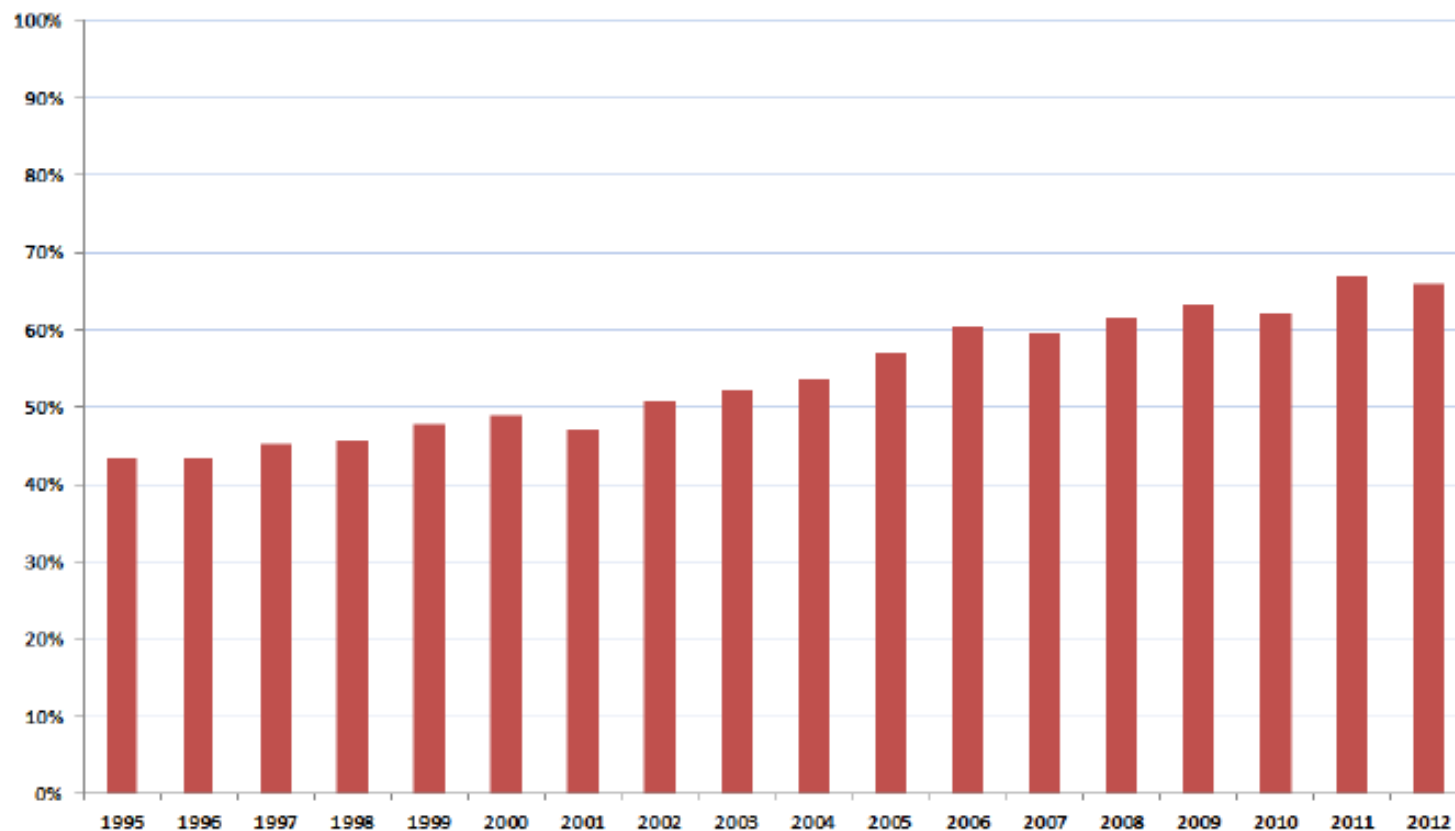
*„Despite... Directive 2009/72/EC ... and Directive 2009/73/EC ...the market remains fragmented due to insufficient interconnections between national energy networks and to the suboptimal utilisation of existing energy infrastructure. However, Union-wide integrated networks and deployment of smart grids are vital for ensuring a competitive and properly functioning integrated market, optimal utilisation of energy infrastructure, increased energy efficiency ...“*

Regulation 347/2009

- Art. 194 TFEU:
- 1) Ensuring the function of the energy market
- 2) Ensuring security of supply in the Union
- 3) Promoting energy efficiency and energy saving and the development of new and renewable forms of energy
- 4) Promoting the interconnection of energy networks

# Import dependence

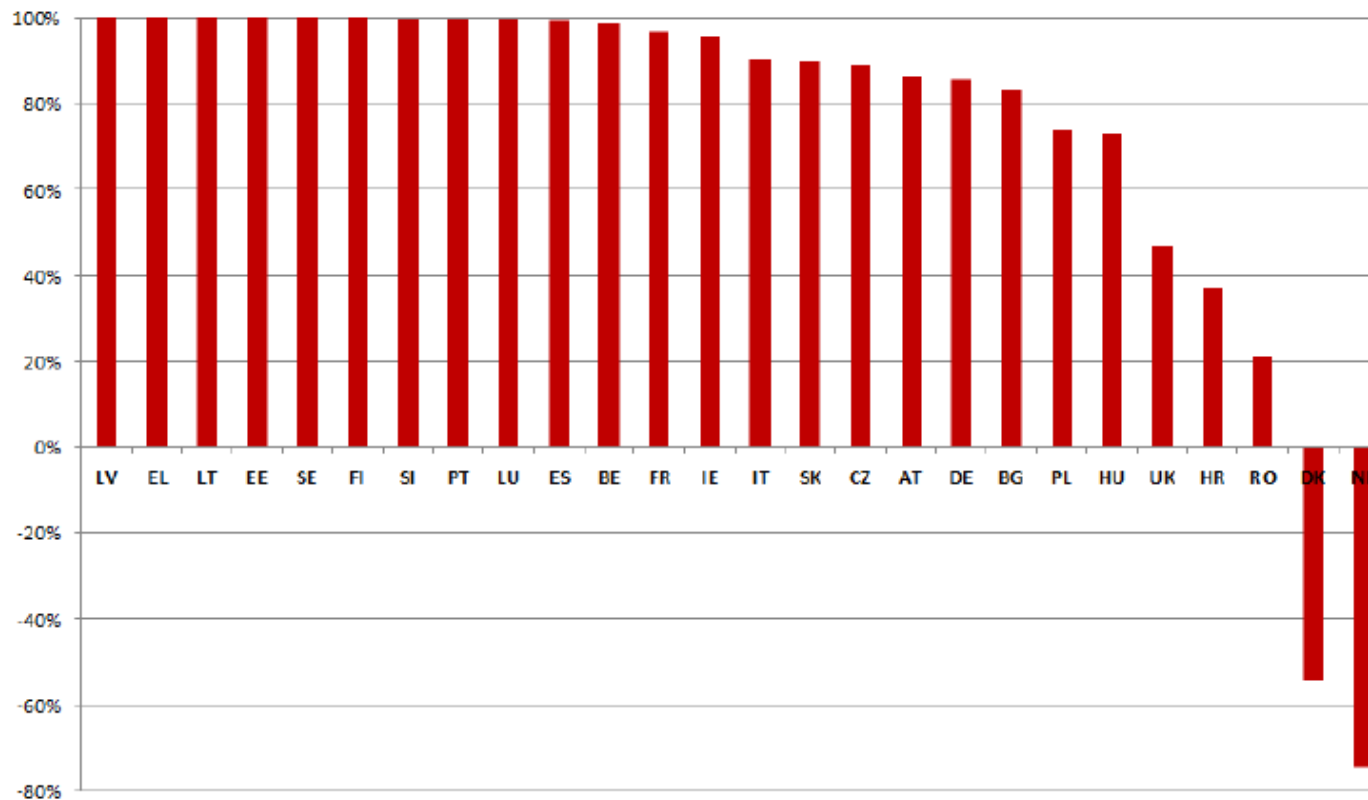
Natural gas import dependence in the EU, 1995-2012, %



Source: Eurostat, energy

# Import dependence

Natural gas import dependency by Member State (intra+extra-EU imports), 2012, %



Source: Eurostat, energy. European Commission calculations

# Import dependence

Extra-EU imports of natural gas, by main trading partners (share in monetary value and in mass in 2013)

Partner	VALUE (Share %)	NET MASS (Share %)
Russia	41%	39%
Norway	32%	34%
Algeria	14%	13%
Qatar	7%	7%
Libya	2%	2%
Nigeria	2%	2%

Source: Eurostat, Comext

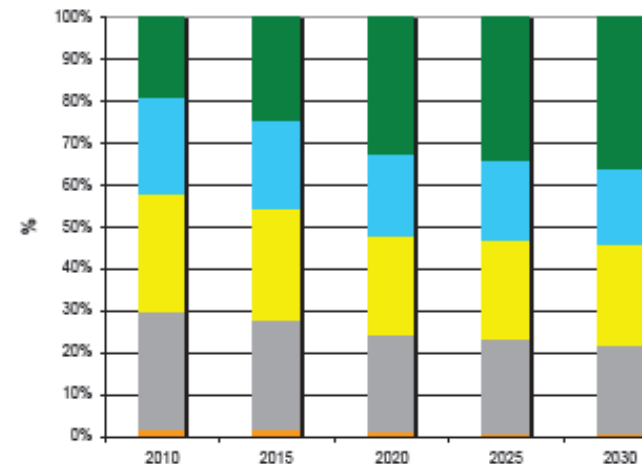
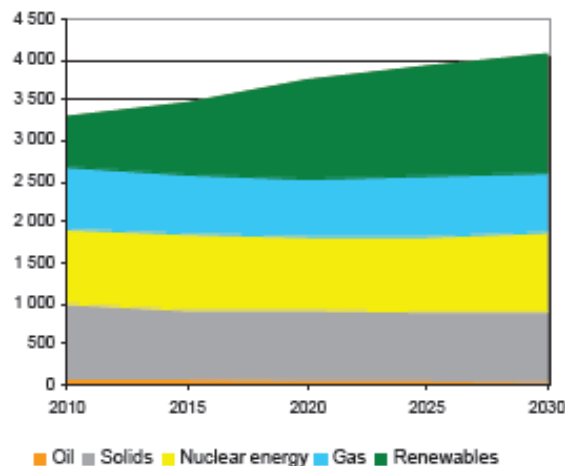
# RES expansion

PROJECTED EVOLUTION OF RENEWABLE ELECTRICITY GENERATION (TWH), 2010-2020

RESSOURCE TYPE	GENERATION 2010 (TWH)	GENERATION 2020 (TWH)	SHARE 2020 (%)	VARIATION 2010-2020 (%)
HYDRO	342.1	364.7	32%	7%
WIND	160.2	465.8	40%	191%
BIOMASS	103.1	203	18%	97%
SOLAR	21	102	9%	386%
OTHER	6.5	16.4	1%	152%
TOTAL	632.9	1151.9	100%	82%

SOURCE: EC, 2010

GROSS POWER GENERATION MIX 2010-2030 BY SOURCE IN TWH (LEFT) AND CORRESPONDING SHARES OF SOURCES IN % (RIGHT), ACCORDING TO THE PRIMES REFERENCE SCENARIO



SOURCE: EC, 2010

# Estimated investments (2010 – 2020)

- 1) Electricity sector – TYNDP (2010) stipulates about 70 bn. euro for transmission infrastructure, of which 28 bn. euro to be devoted to cross border interconnections.
- 2) Gas sector – 28 bn. euro for import pipelines, 21 bn. for intra-EU interconnectors.
- 3) CO2 pipelines infrastructure – 2,5 bn. Euro.



# Estimated investments (2010 – 2020)

## BUSINESS-AS-USUAL, COMMERCIALY VIABLE AND TOTAL NEEDED INVESTMENT BY SECTOR 2010-2020

SECTOR (INVESTMENT 2010-2020, BN €)	BUSINESS-AS-USUAL DELIVERY	COMMERCIALY VIABLE DELIVERY	TOTAL NEED
ELECTRICITY	45	90	142
GAS	57	63	71
CO <sub>2</sub> TRANSPORT	0	0	2.5
TOTAL	102	153	215.5
TOTAL (IN %)	47%	71%	100%
INVESTMENT GAP (IN BN €)	113.5	62.5	0

SOURCE: EC, 2010

# Investments - challenges

2 problems:

Financing

Lengthiness of permission and administration procedures (incl. local opposition)

= involvement of the EU

# EU financing

TSO's own equity financing complemented by loans from commercial banks and international financial institutions (EIB etc.)

= role of the EU in the economically non-viable cross-border interconnectors

**TOTAL AMOUNT OF PUBLIC EXPENDITURE IN THE FIELD OF ENERGY (NATIONAL AND EU LEVEL), 2009**

	<b>TOTAL (IN MILLIONS €)</b>	<b>AS PERCENTAGE OF TOTAL ENERGY-RELATED SPENDING IN EUROPE</b>	<b>AS PERCENTAGE OF TOTAL PUBLIC SPENDING THAT YEAR IN EACH LEVEL OF INTERVENTION</b>
MEMBER STATES	7,210	96	0.12
EU (EU BUDGET) <sup>10</sup>	300.2	4	0.26
TOTAL	7,510.2	100	...

# EU financing

- ❑ **TRANS-EUROPEAN ENERGY NETWORK – TEN-E**
  - ❑ Since 90s, upgraded in 2006 by Decision 1364/2006/EC.
  - ❑ Limited budget of about 22 million euro annually, with a total of 155 million euro for the period of 2007-2013.
  - ❑ Too many candidates for too small an amount of funding.
  - ❑ Support mainly to feasibility studies and studies related to the project (up to 50 % of costs). The project itself only up to 10 %.
  - ❑ Mainly gas and electricity sector.
- ❑ Inclusion of a given project in TEN-E means the chance to gain resources from other EU instruments (EIB, structural funds, Instrument of Pre-accession Assistance EIA, European Neighbourhood Policy...).

# EU Financing -EIB

Major source of EU infrastructure financing

Plays an important role in facilitating the implementation of the TEN-E – in 2007-2009 up to €6 bn. (3,4 bn. natural gas, 2,6 bn. electricity).

In addition to the conventional loan financing also Trans-European Network Investment Facility – for priority TEN projects (€0,5 – 1 bn. per year for energy)

Structured Finance Facility – since 2001, high-risk profile projects.

Infrastructure Equity Fund, JESSICA, JASPERS...

**EIB SIGNED LOANS FOR ENERGY INFRASTRUCTURE OF TRANS-EUROPEAN INTEREST IN THE PERIOD 2007-2009 (MILLION €)**

	2007	2008	2009	2007-2009
<b>ELECTRICITY (AMOUNTS)</b>				
TEN PROJECTS OF EUROPEAN INTEREST	0	90	600	690
TEN PRIORITY PROJECTS	140	140	0	280
TEN PROJECTS OF COMMON INTEREST	16.1	300	144.45	460.55
OTHER TEN PROJECTS	558	0	0	557.86
LOANS ALLOCATED TO A SET OF PROJECTS OF VARIOUS TEN PRIORITY LEVELS	150	163	260	572.5
<b>GAS (AMOUNTS)</b>				
TEN PROJECTS OF EUROPEAN INTEREST	185	50	0	235
TEN PRIORITY PROJECTS	160	375	275	810
TEN PROJECTS OF COMMON INTEREST	255	183	0	438
OTHER TEN PROJECTS	0	642	337	979
LOANS ALLOCATED TO A SET OF PROJECTS OF VARIOUS TEN PRIORITY LEVELS	0	574	371	945
<b>TOTAL AMOUNTS</b>				
TEN PROJECTS OF EUROPEAN INTEREST	185	140	600	925
TEN PRIORITY PROJECTS	300	515	275	1090
TEN PROJECTS OF COMMON INTEREST	271	483	144	898.55
OTHER TEN PROJECTS	558	642	337	1536.86
LOANS ALLOCATED TO A SET OF PROJECTS OF VARIOUS TEN PRIORITY LEVELS	150	737	631	1517.5

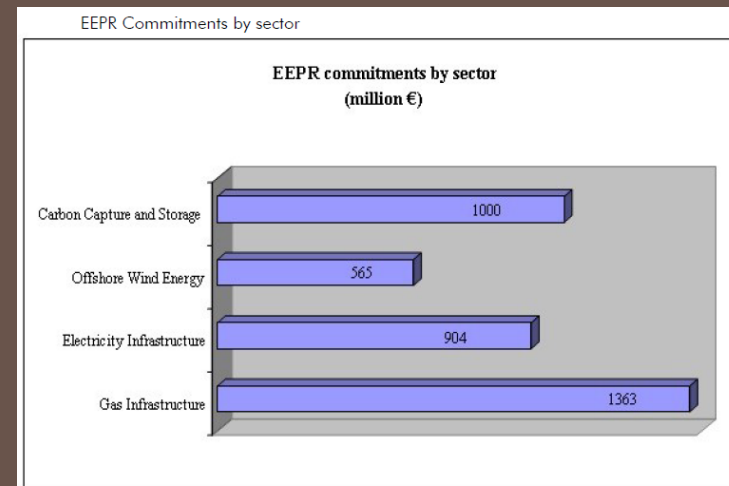
# EU financing

## □ The European Economic Recovery Plan

- A special one-time impetus aimed at boosting EU economies (due to the financial crisis 2008) through a combination of short-term measures to stimulate demand and long-term investments in strategic sectors.
- Regulation 663/2009, aim was to co-finance projects in energy infrastructure, offshore wind energy and CCS. Rapid allocation, 96,3 % (€3,8 bn. out of 3,9 bn. total) by the end of 2010 in the form of commitments to 59 projects.
- 44 gas and electricity projects, 9 offshore wind farms and 6 CCS.

18 gas infrastructure projects = 1,440 million

Central and South East Europe = 310 million

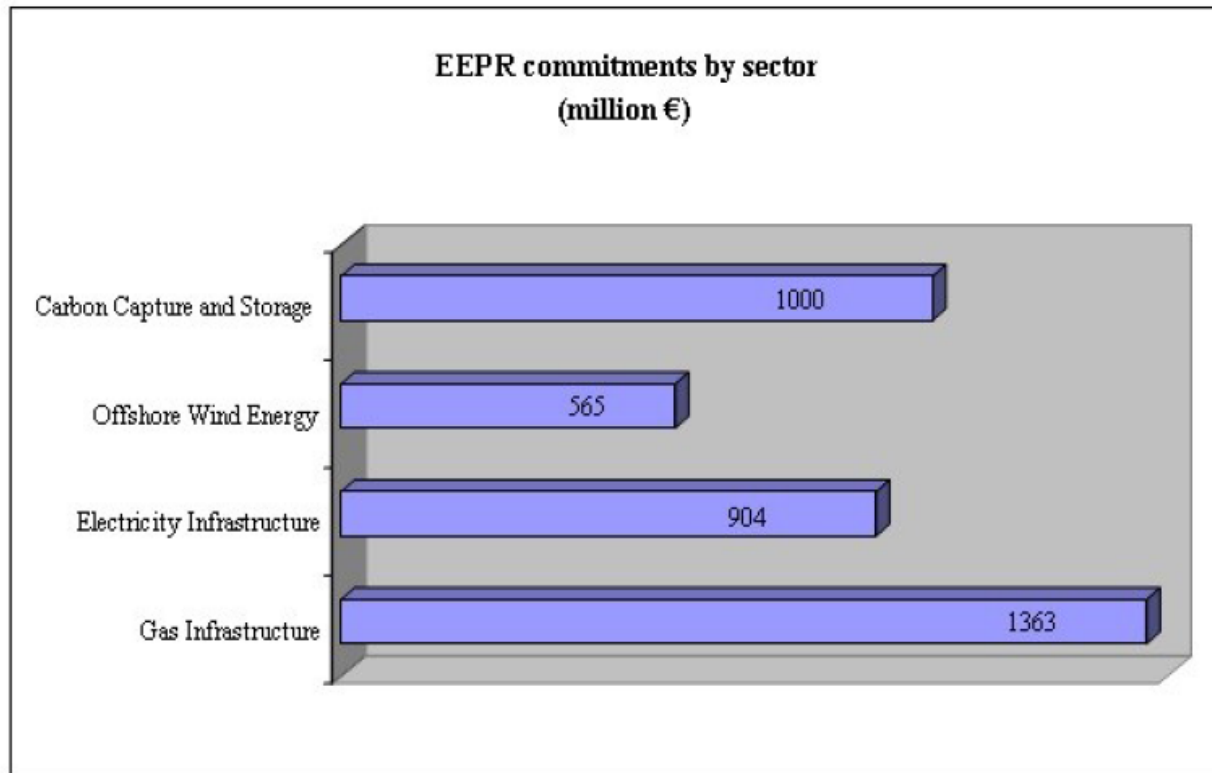


Source: Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the Trans-European Energy Networks in the period 2007-2009.

# EU financing

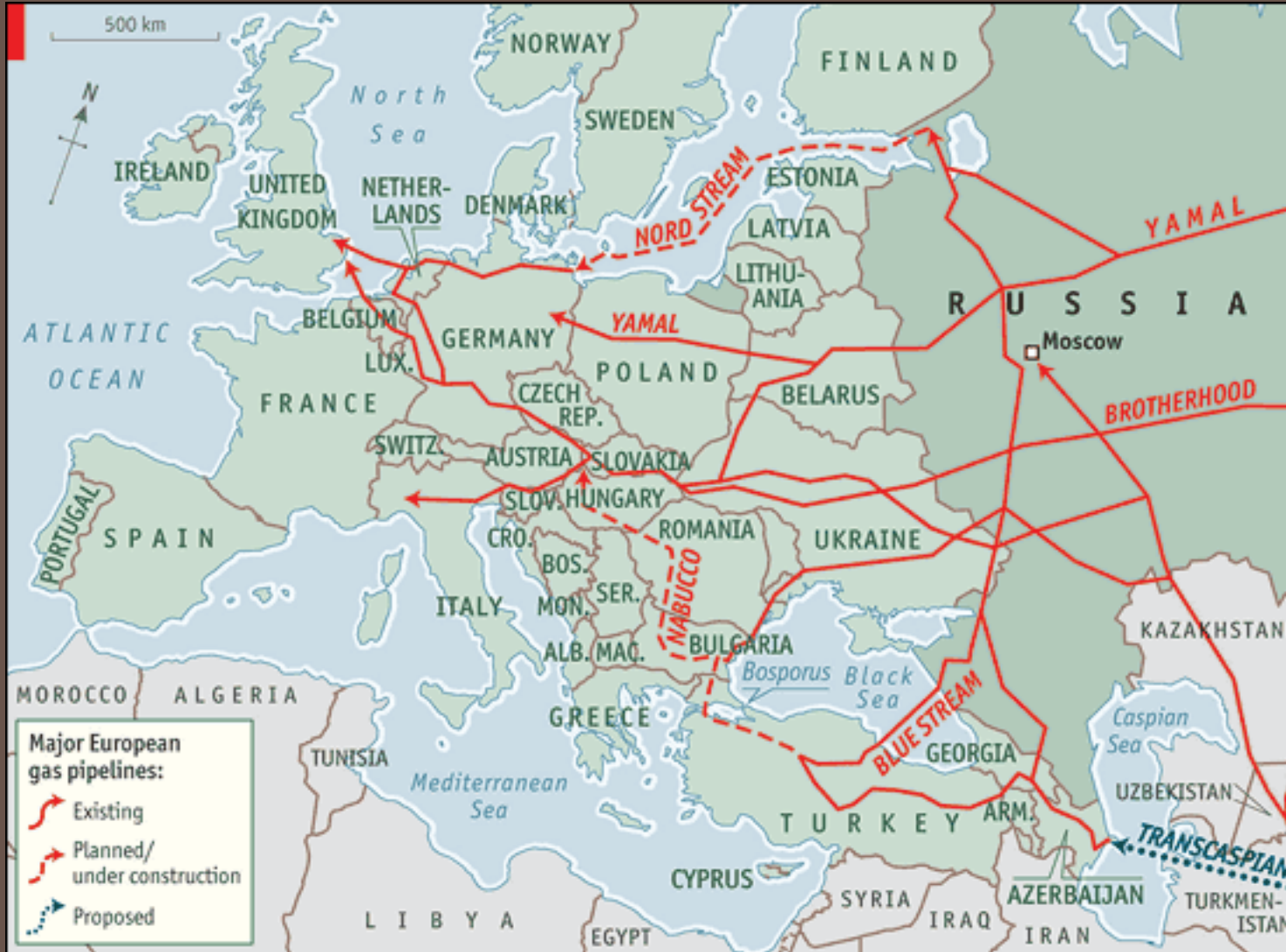


EEPR Commitments by sector



Source: Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the Trans-European Energy Networks in the period 2007-2009.

# Gas Crisis in 2009





## Infrastructure developments in Central and South-East Europe since 2009





Source: GIE, Presentation at the 25<sup>th</sup> Madrid Forum 6/5/2014

# Protracted permit granting procedures

- ❑ **Difficult and time consuming procedures**
- ❑ **Public opposition**
- ❑ ENTSO-E = new power generation equivalent to 1/3 of present capacity will be built in the EU (220 out of 250 GW net increase from RES). 100 grid bottlenecks are expected to the end of the decade .
- ❑ 53 300km of new and upgraded high-voltage routes (104 bn.euro) needed. 1/3 of investments of this kind are being delayed „...*mostly because of social resistance and longer than initially expected permitting procedures...they are lengthy and often cause commissioning delays...it is of utmost importance to smooth the authorisation processes*“.
- ❑ **GB:** a 2005 proposal to expand a 200km transmission line carrying wind power across Scottish mountains to south cities attracted 20 244 objections. (approved in 2010).

# Energy Infrastructure Package

- 2011, to speed up and complete the EU transmission infrastructure (strategic energy networks and storage facilities) by 2020.
- Regulation No 347/2013 on guidelines for trans-European energy infrastructure
  - 12 priority corridors and areas
  - Projects of Common Interests (PCIs) – label for the projects contributing to implementing these priorities. Projects displaying economic, social and environmental viability, with at least 2 MS.
  - Streamlining of bureaucracy and permitting procedures to reduce their duration for PCI, increase public participation and acceptance of the implementation of such projects. Facilitating the regulatory treatment of PCI, providing market-based and direct EU financial support.

# Energy Infrastructure Package

- In the field of energy the amount of EU financial support shouldn't exceed 50 % of the eligible cost of studies and/or works. Co-financing no more than 80 % for actions with a high degree of regional or EU-wide security of supply or strengthened solidarity of the EU or comprise highly innovative solutions.
- Co-financing rates may be increased by up to 10 % for actions having cross-sector synergies, reaching climate mitigation objectives, enhancing climate resilience or reducing the greenhouse gas emissions.

# Energy Infrastructure Package

## ■ Connecting Europe Facility

- Plan to invest 50 bn. euro (€5,1 bn. to energy infrastructure).
- Providing the financial resources for the PCI.

# Energy Corridors

## □ **The electricity sector**

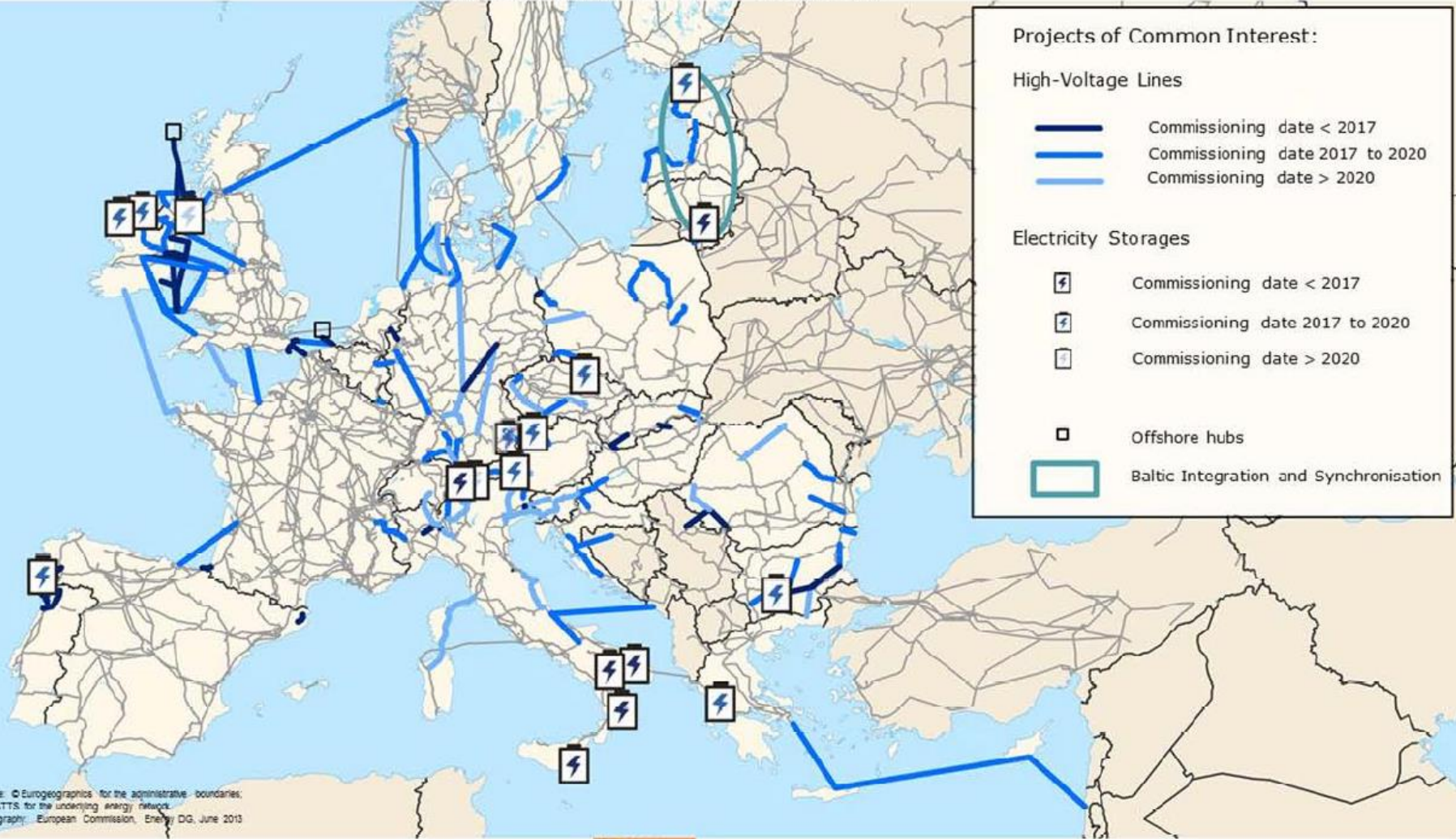
- An offshore grid in the Northern Seas and connection to Northern and Central Europe to transport power produced by offshore wind parks to consumers in big cities and to store power in the hydro electric power plants in the Alps and the Nordic countries.
- Interconnections in South Western Europe to transport power generated from wind, solar, hydro to the rest of the continent.
- Connections in Central Eastern und South Eastern Europe, strengthening the regional network.
- Integration of the Baltic Energy Market into the European market.
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# Energy Corridors

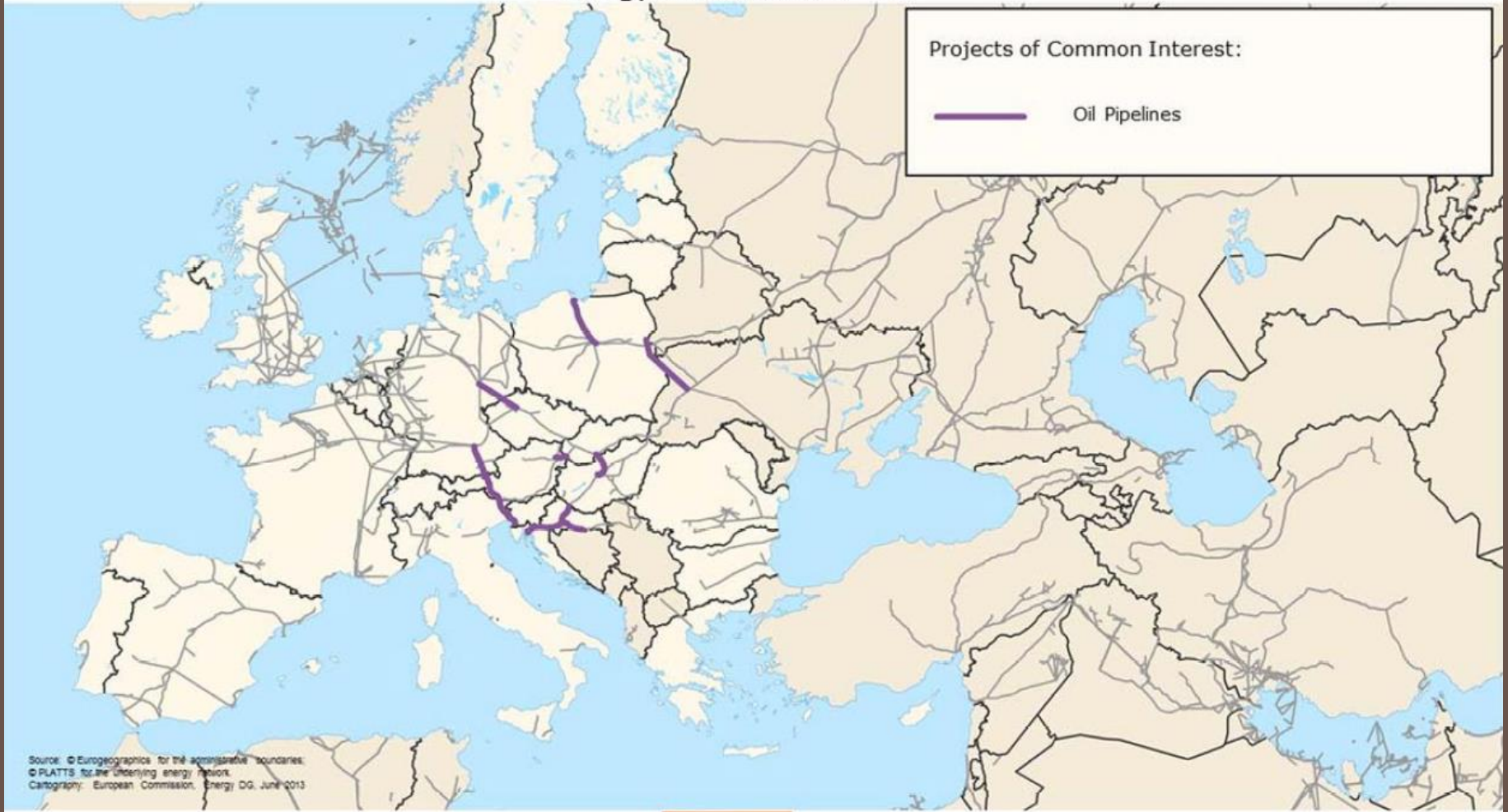
- ❑ **The gas sector**
- ❑ Southern Corridor to deliver gas directly from the Caspian sea to Europe
- ❑ Baltic Energy Market Integration and connection to Central and South East Europe
- ❑ North-South corridor in Western Europe
- ❑ **The oil corridor**
- ❑ Oil supply connections in Central Eastern Europe ("OSC")
- ❑ **3 priority areas**
- ❑ Smart grids deployment:
- ❑ Electricity highways: first electricity highways by 2020, in view of building an electricity highways system across the Union;
- ❑ Cross-border carbon dioxide network



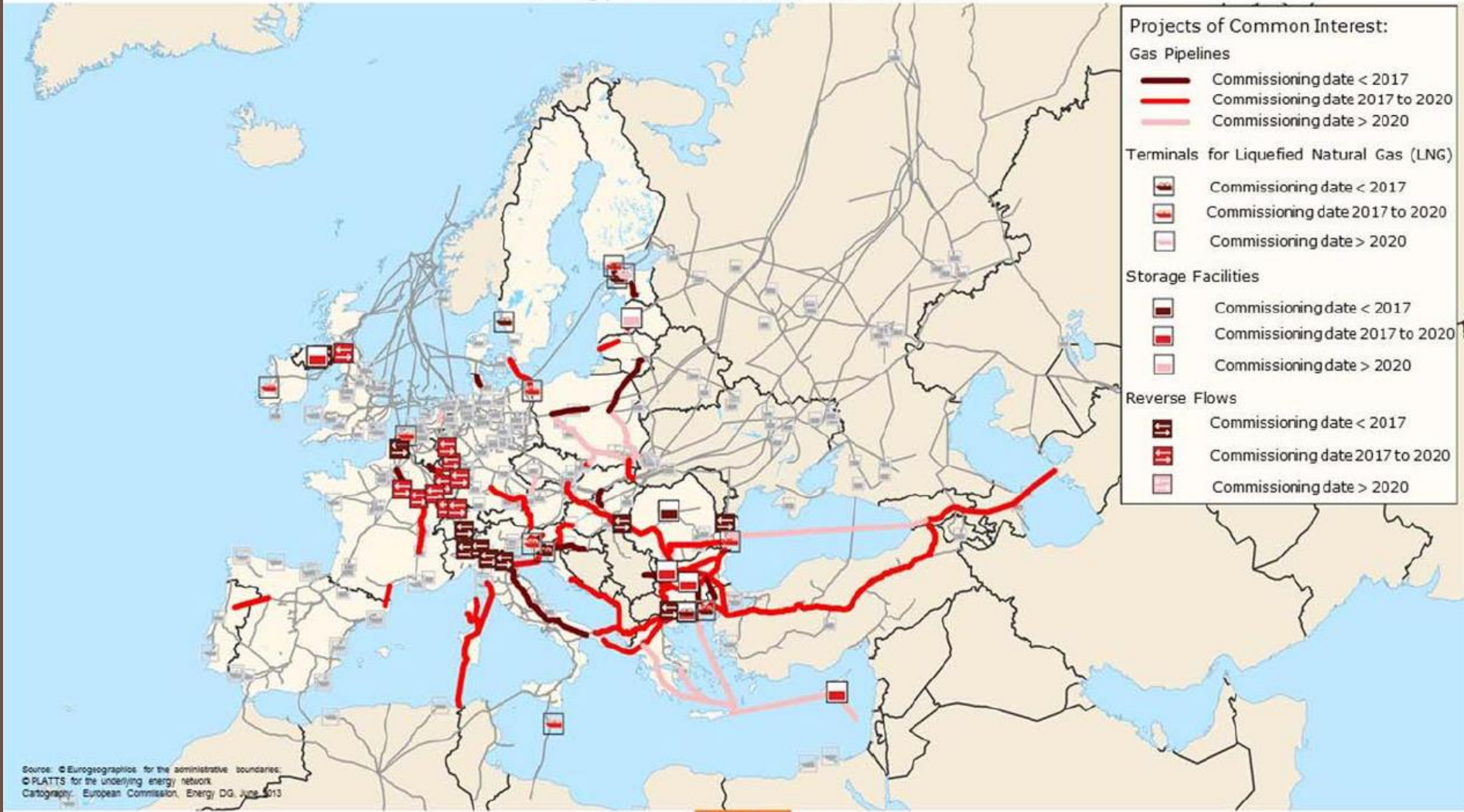
## Energy Infrastructure - Electricity



## Energy Infrastructure - Oil

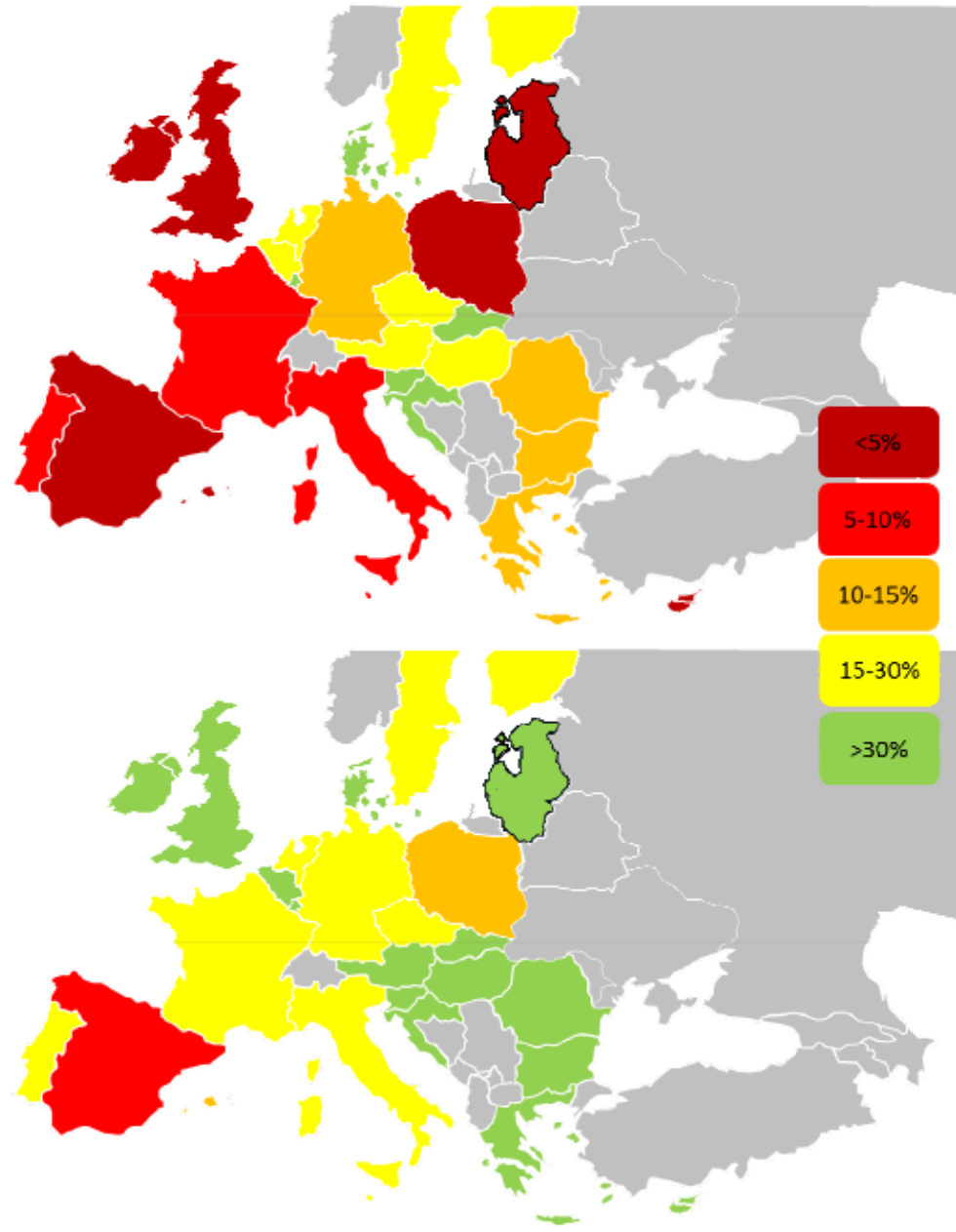


## Energy Infrastructure - Natural Gas



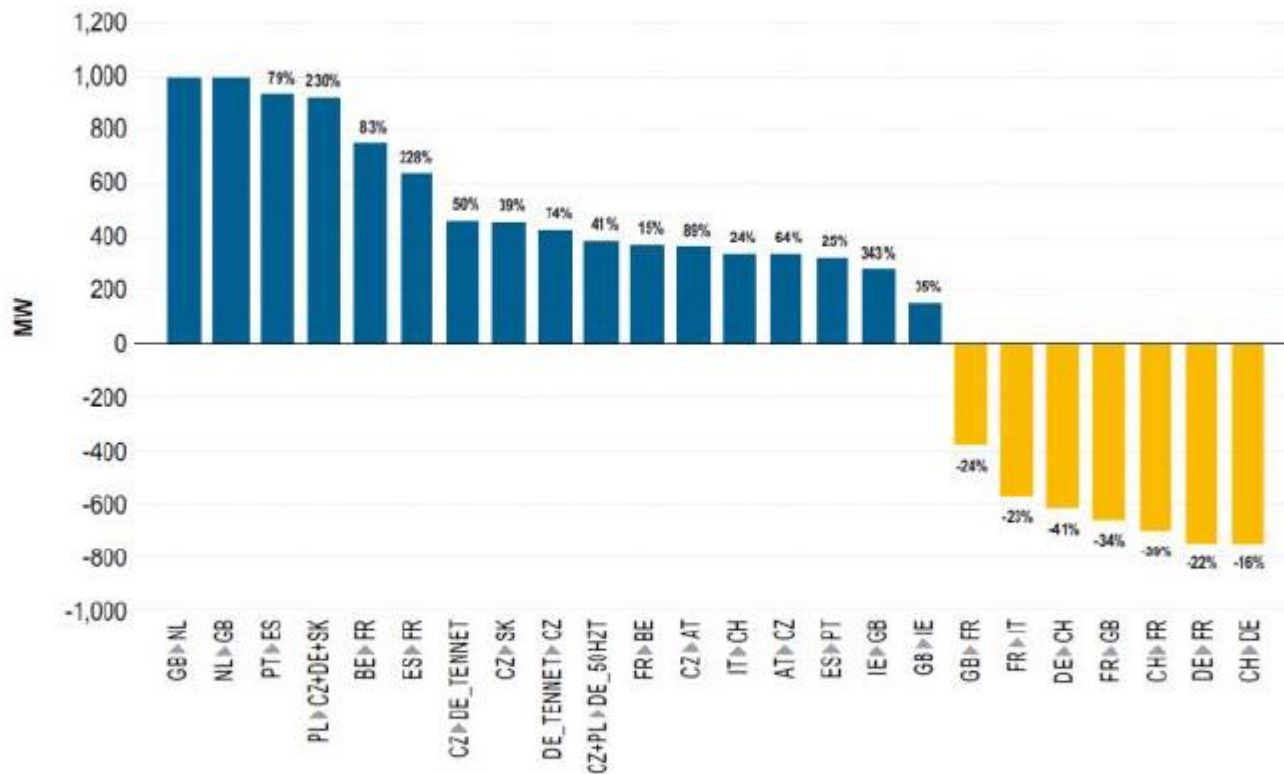
# PCIs

10% interconnection target in electricity before and after the PCIs



# Change of net transfer capacity (NTC) at selected EU borders, 2008 and 2012

Figure 19: Change of the average hourly NTC values in 2012 compared to 2008 for a selection of border directions (MW)



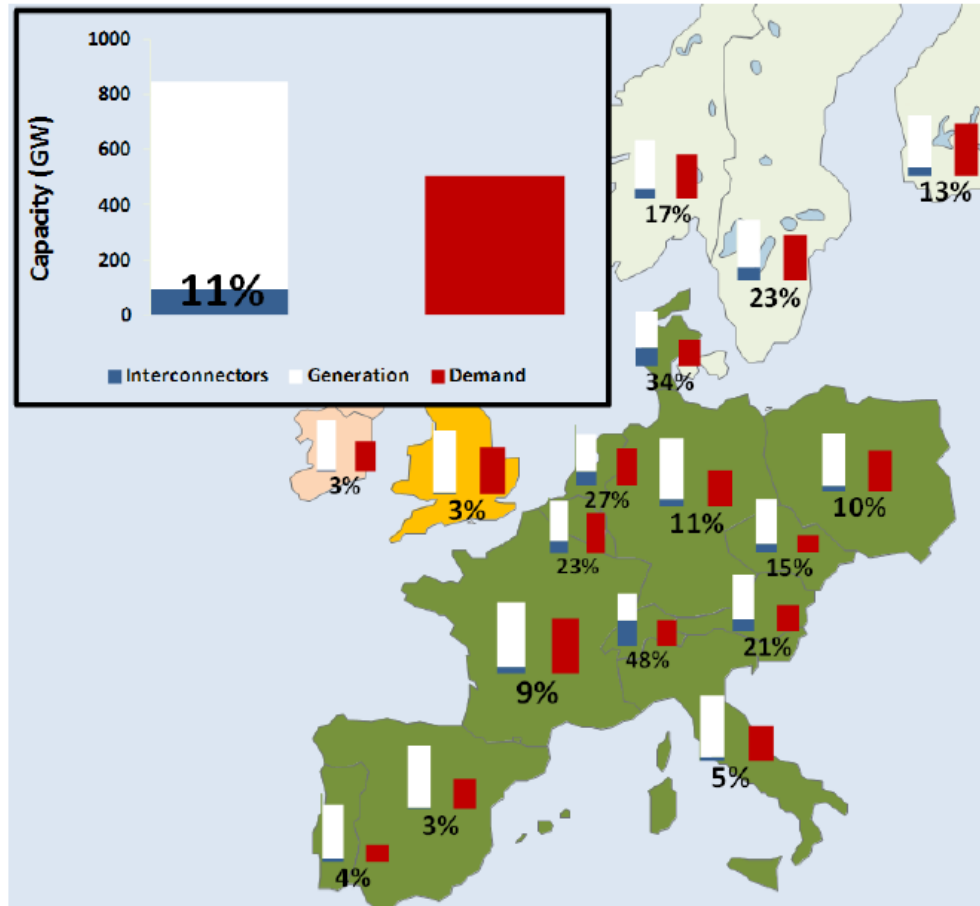
Source: ENTSO-E (2013), data provided by NRAs through ERI (2013), Regional reporting on electricity interconnection management and use in 2008, and ACER calculations

Note: 46 border directions were initially included in the analysis. This figure shows only those directions where the observed variation was simultaneously higher than 150MW and the increase above 10% of the initial average value in 2008. The vertical axis represents the variation (MW), while the percentage variations are shown above each bar.

# Electricity Network Integration

- In the last decade interconnectors to link the Nordic market to the continent were built, and interconnections in the CE market reinforce. Europe is turning into a large synchronous frequency area, to the genuine European network.
- Interconnectors amount to a total 11 % of installed generation capacities across EU. Not enough to meet essential parts of domestic demand via external supply.
  - Central West Europe have interconnection levels of around 10-30%, states located at periphery in the South West and the Baltic States below 5 %.

# Interconnections, generation and demand in selected EU/EEA countries and Switzerland



Source: IEA graph based on data from ENTSO-E, 2013b.

# Gas network integration

- ❑ One new import pipeline on stream (Nord Stream). Trans Adriatic Pipeline (From Azerbaijan to Greece, Albania, Italy) to be build. Other in planning stage.
- ❑ Since 2008 new gas storage capacity added in Germany, Austria, the Netherlands, Poland, Czech Republic and Hungary. Total capacity has grown by 15% from 2009 – 2013. Under TPA rules.
- ❑ Commercial network investment in natural gas is effectively hampered by the low gas demand – that slows down upstream development outside the EU.
- ❑ Until end 2014 also regulatory uncertainty due to the changing network rules – esp. on capacity allocation and congestion management.