CLINGENDAEL INTERNATIONAL ENERGY PROGRAMME | CIEP

Energy Transition

A view from Nederland

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CEGMP Conference

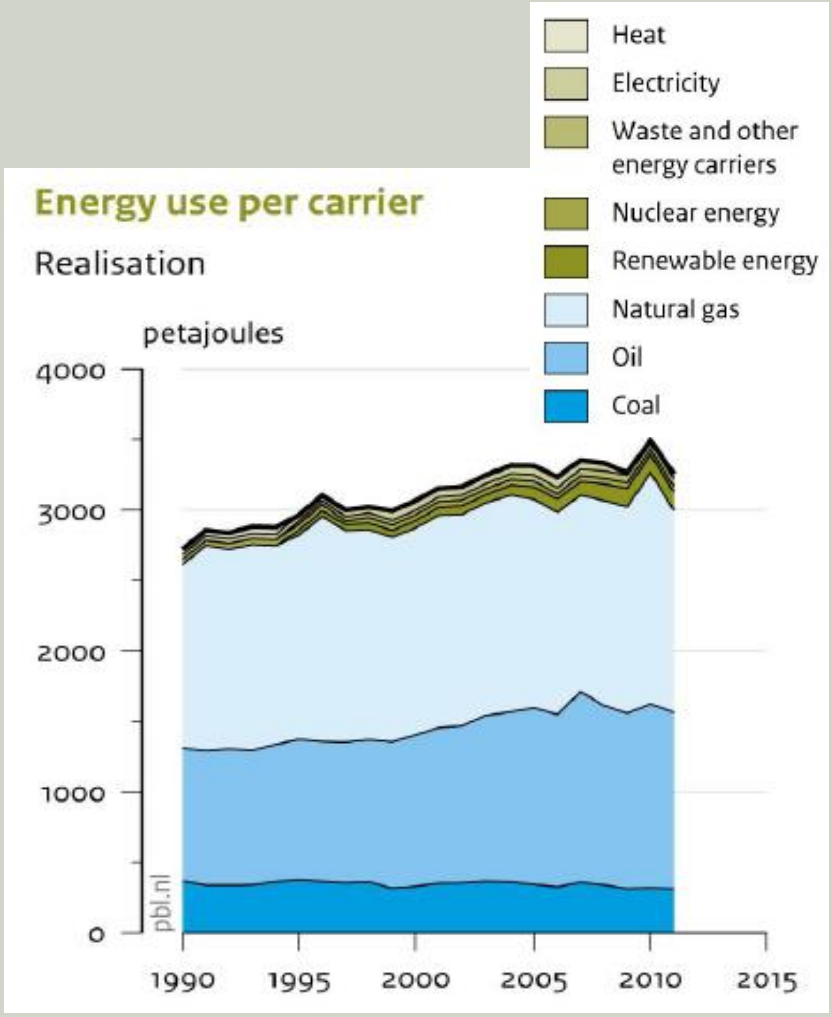
Paris 30/31 May 2013

Agenda

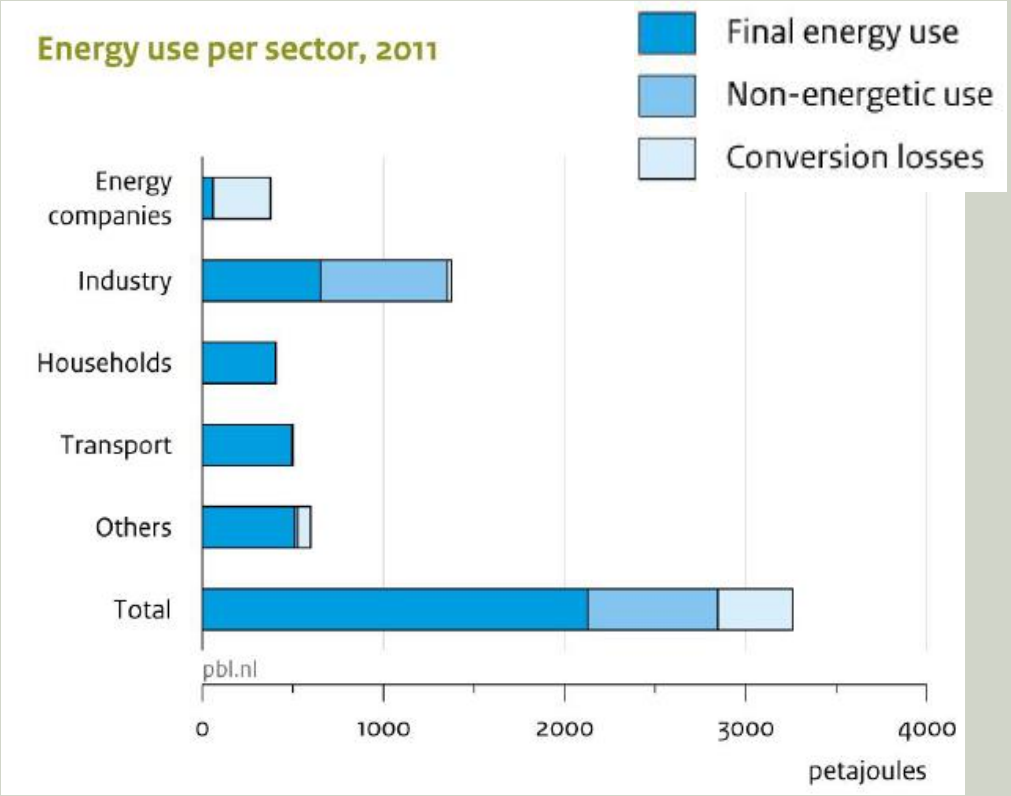
- The Dutch situation
  - Facts/figures
  - Policies
  - Issues at stake

- The German impact
- The EU or the Penta-context?

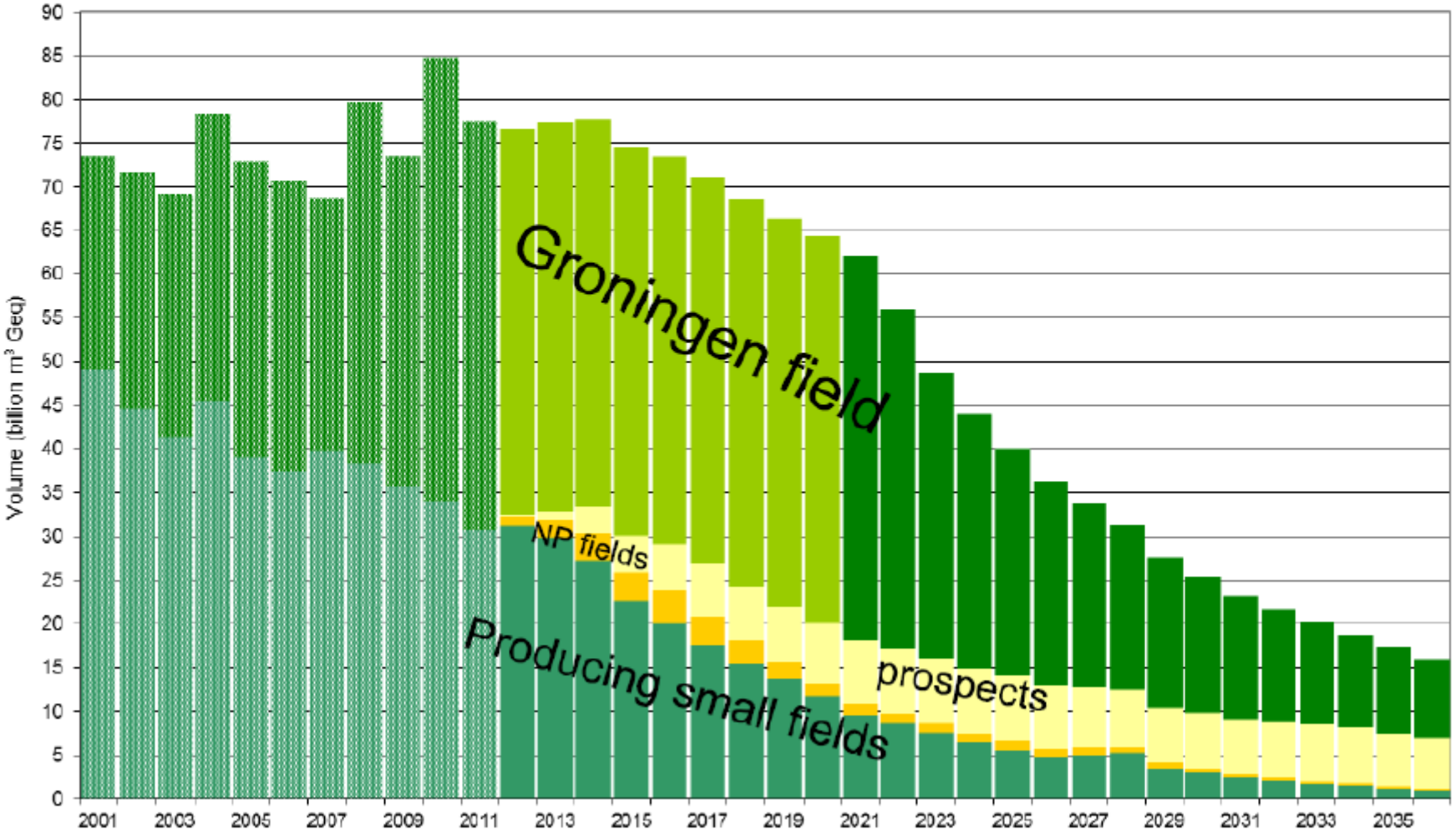
Dutch energy: gas, industrial use,….



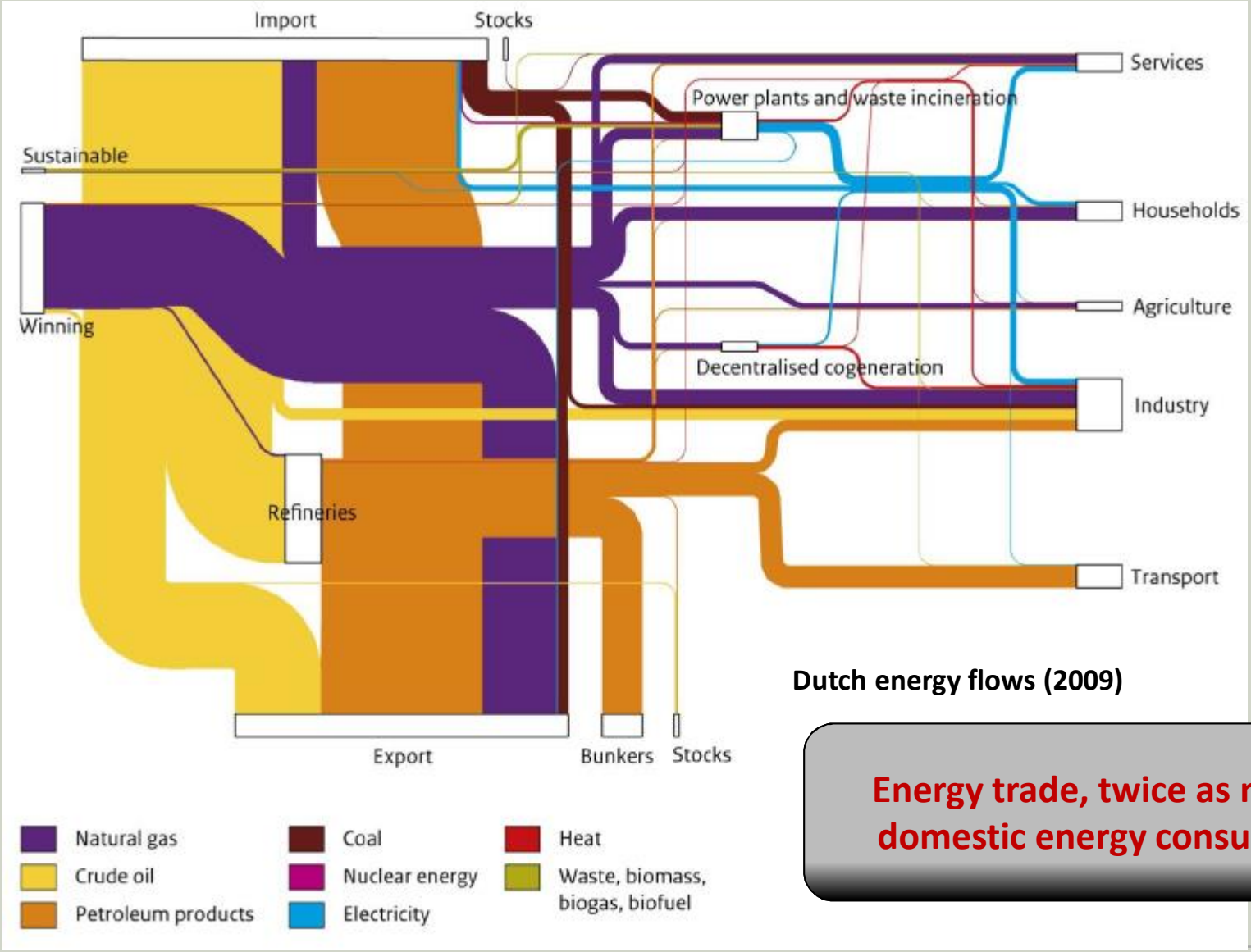
Planbureau voor de Leefomgeving ECN



Documented Dutch Resources (source: TNO, EBN, 2012)



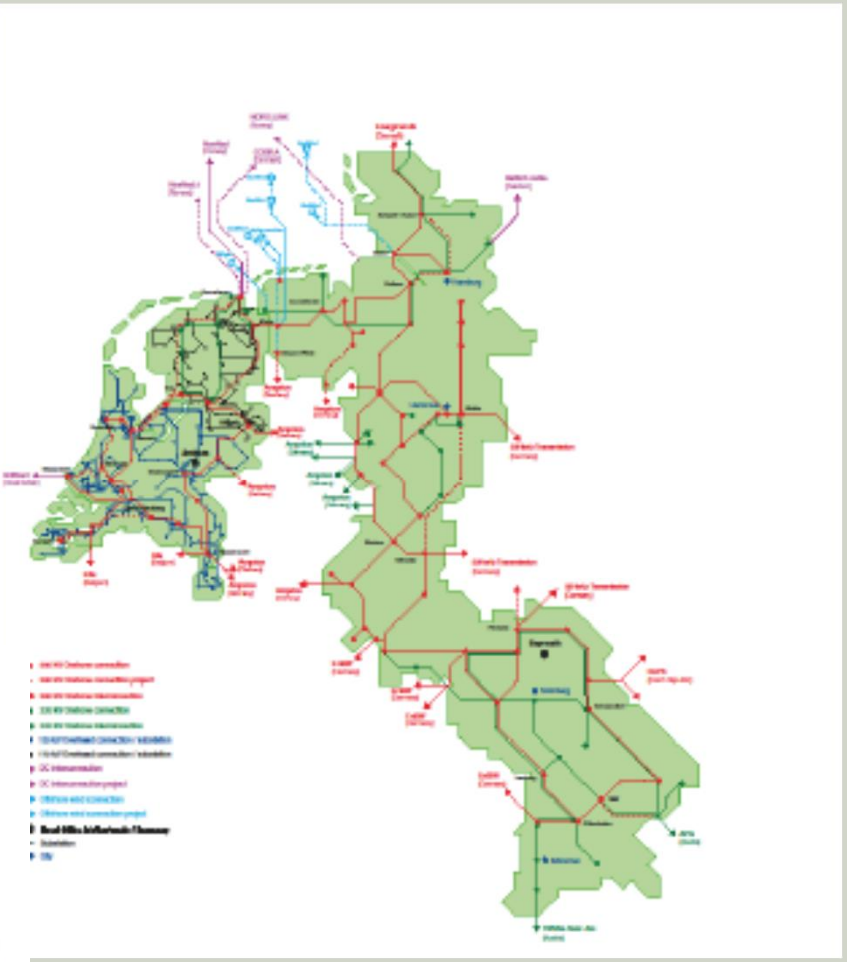
Dutch energy: trade & …..

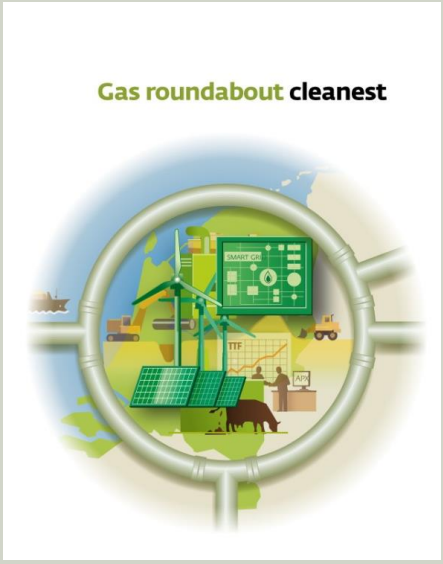


Dutch energy flows (2009)

Energy trade, twice as much as domestic energy consumption

….roundabouts…





Some policy…..

Key Issues

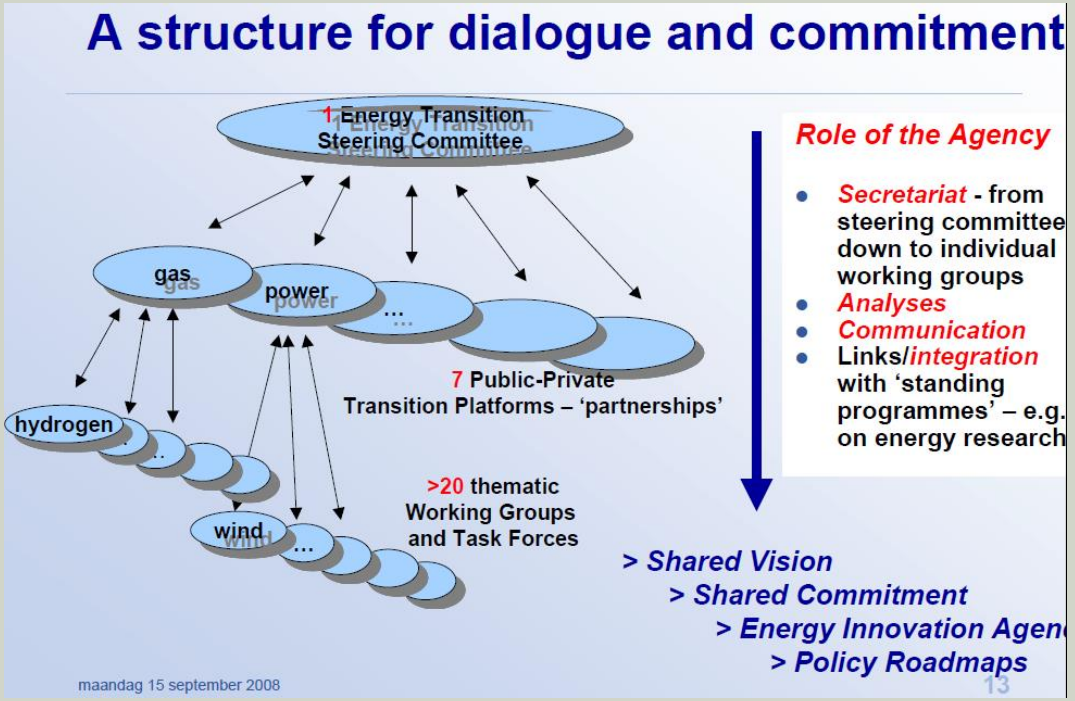
- With regard to electricity, the Netherlands needs to step up its efforts to develop renewables in order to reach its 2020 target. The Netherlands has been able to attract new investments in generation capacity, making the country a net exporter. It needs to continue to expand its grid in order to reduce the need for congestion management, to keep redispatch costs down and to accommodate the development of renewables.
- With regard to gas, cross-border capacity to Germany and Belgium is fully subscribed well into the future, but is underutilised. Swift implementation of new rules on congestion management and capacity allocation could alleviate the situation without the need to invest

More is needed…..

Energy transition policies

- **Ambitions 1990's**
  - **Climate, RES**

- **The 2000's:**
  - **More market, more EU**
  - **The LT transition poldering process**
  - **The transition platforms**
  - **Ultimate failures, succesfull frustrations**
  - **No LT vision**
  - **EU commitments,**
  - **Do we make it or not, how and when?**

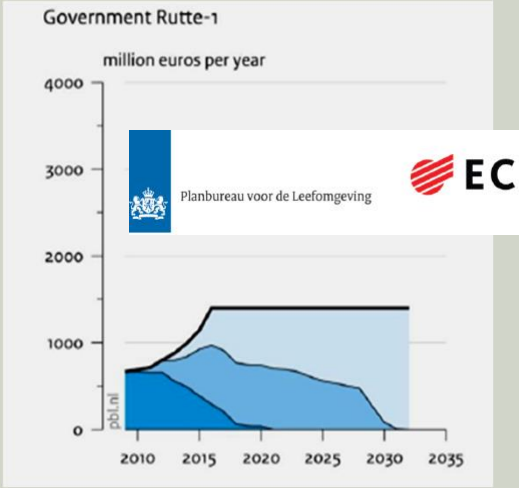


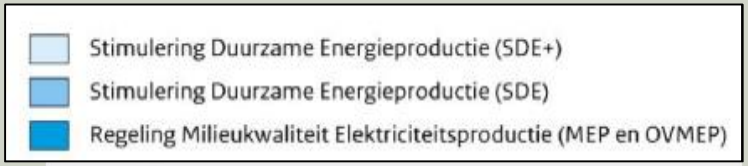
Transition policies as of 2010

The Rutte-I (2011/12) not sufficient to meet EU-obligation 14% in 2020:

- **2011: 4.3% RES share**
- **2020, standing policies: 8% , but with proposed policies: 11%**

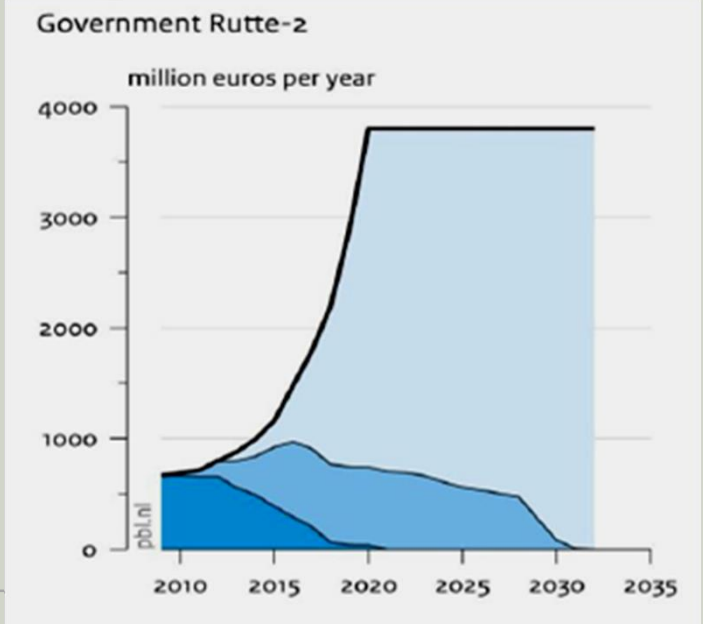
Growth in biofuels, wind, biogas, renewable heat; Rutte-I policy: more wind energy, biomass co-firing





Rutte-I I (since 2012): RES-share 16% in 2020:

- **Increased funding (SDE+)**
- **Wind offshore, from 0,2 GW to 5 GW**
- **Wind onshore from 2 GW to 7 GW**
- **Solar PV 4GW**
- **Co-firing biomass (coal) some 40%**



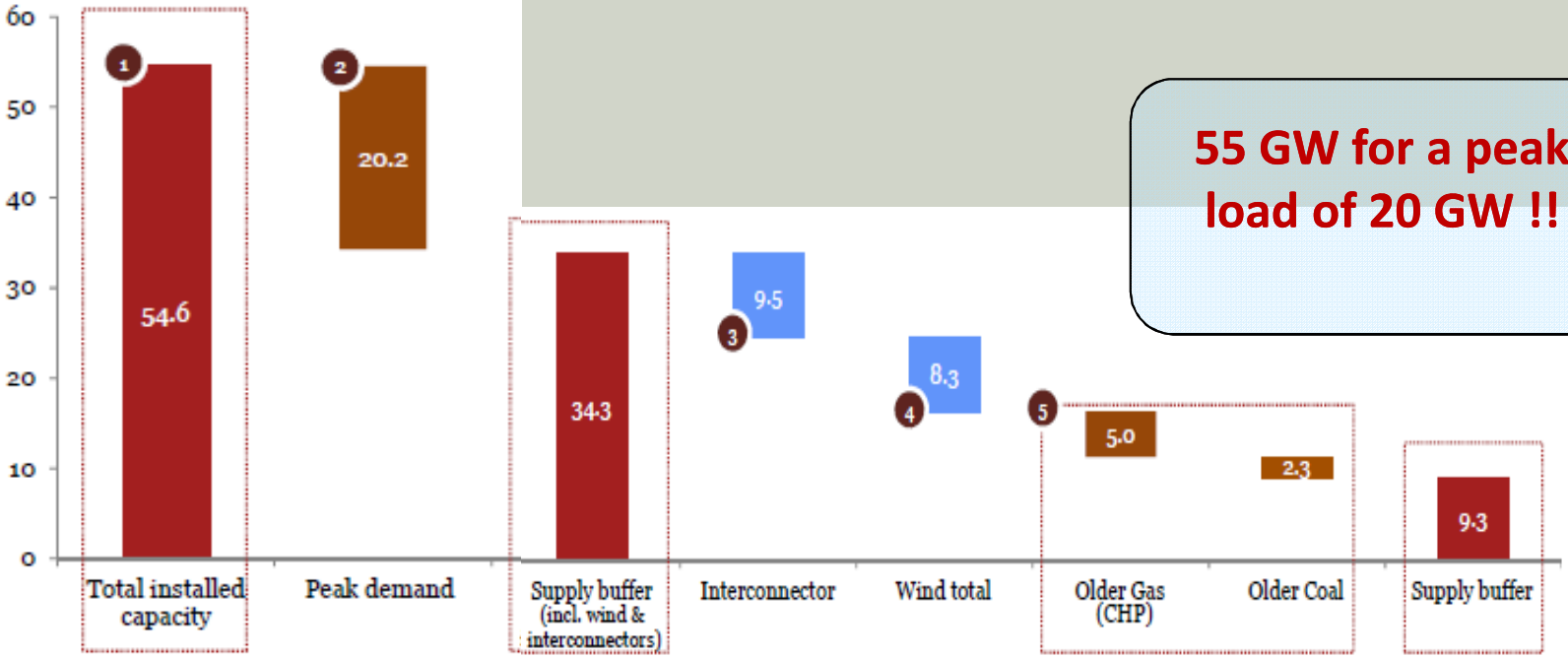
The 2013 prospects

- **Greenhouse gas emissions:**
  - **Non-ETS 2020 target will probably be met**
  - **Increase of ETS-emissions**
- **RES:**
  - **Rutte-II more ambitions than Rutte –I , from <14% to 16% in 2020**
  - **New target can be met, but with very large effort**
- **Electricity market:**
  - **Strong growth of generation capacity**
  - **Dispatch becomes complicated, lower CCGT's, more German imports**

Security of supply is not at risk due to the overcapacity in the current Dutch power market

Security of supply in 2020 (in GW)

energie-nederland



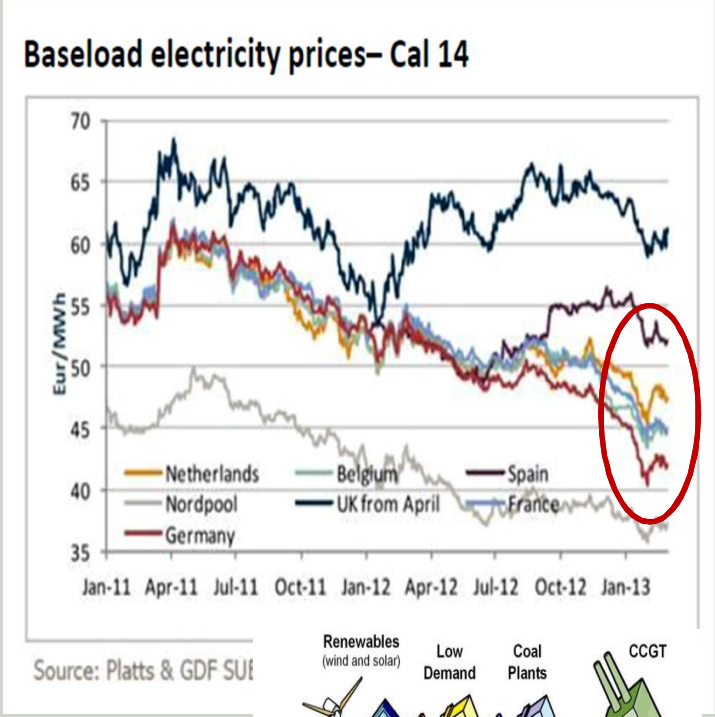
55 GW for a peak load of 20 GW !!

Assumptions

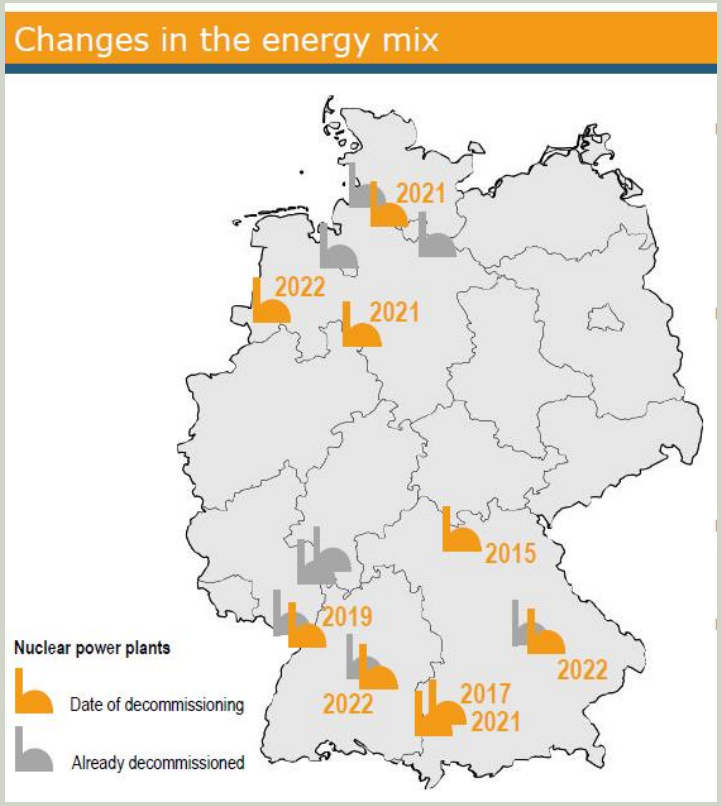
1. Total projected installed capacity in 2020 to reach 55 GW, including all potential interconnection capacity (9.5 GW)
2. Capacity needed for the peak demand is projected to be 20 GW in 2020, without considering the effect of demand sidde management
3. All available interconnection capacity is not dependdable
4. 75% of the total wind capacity is considered as not dependable, and is therefore excluded from the reserve capacity
5. 5 GW gas-fired CHP and 2.3 GW older coal capacity will be retired by 2020. This obviously depends on the financial position and the decisions by the owners. The assumption of the retirement of 5 GW CHP by 2020 is not unlikely. A recent study of Productschap Tuinbouw/LTO (November 2012) shows that all existing CHPs would not able to generate sufficient returns to cover their costs in 2019 in some unfavourable scenarios. Must-run CHPs would be replaced by cheaper alternatives. In 2007, VEMW already indicated a potential reduction of 4.5 GW CHP by 2020 in its report "INDUSTRIËLE WARMTEKRACHTKOPPELING"

Dutch power market 2013

- Increase of (German) power imports:
  - *2012, 32 TWh, twice the amount of exports*
- Increasing difference NL/FRG in wholesale day-ahead prices since 2012
  - *Despite market coupling, avg 2012 >€4MWh;*
- Less generating hours for Dutch coal & especially:
  - *Gas-power 2012 decrease from 2010: 25%;*
  - *Hot spinning reserve will become a scarce commodity;*
  - *Coal will remain 'in the money', but unfitted for ancillary services;*
  - *Merit (NL en EU) order will exist of coal and renewables*
- Loop flows, PSTs!! More coordination between Elia, Tennets (NL/FRG and Amprion



The German case, with….



- **In 2011, following the Fukushima catastrophe, accelerated nuclear generation exit (previously foreseen only for 2036)**
- **Moratorium imposed by the Government on the eight oldest nuclear power plants immediately after the Fukushima catastrophe was rendered permanent**

- **Closure of the remaining nine nuclear power plants by 2022**
- **BNetzA assessing generation adequacy and network development requirements**

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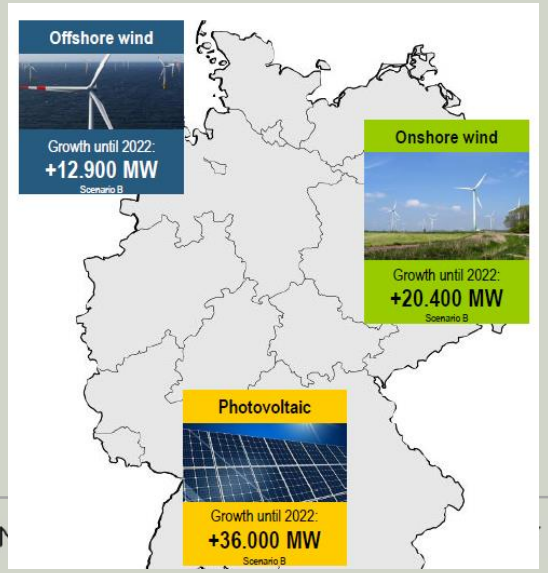
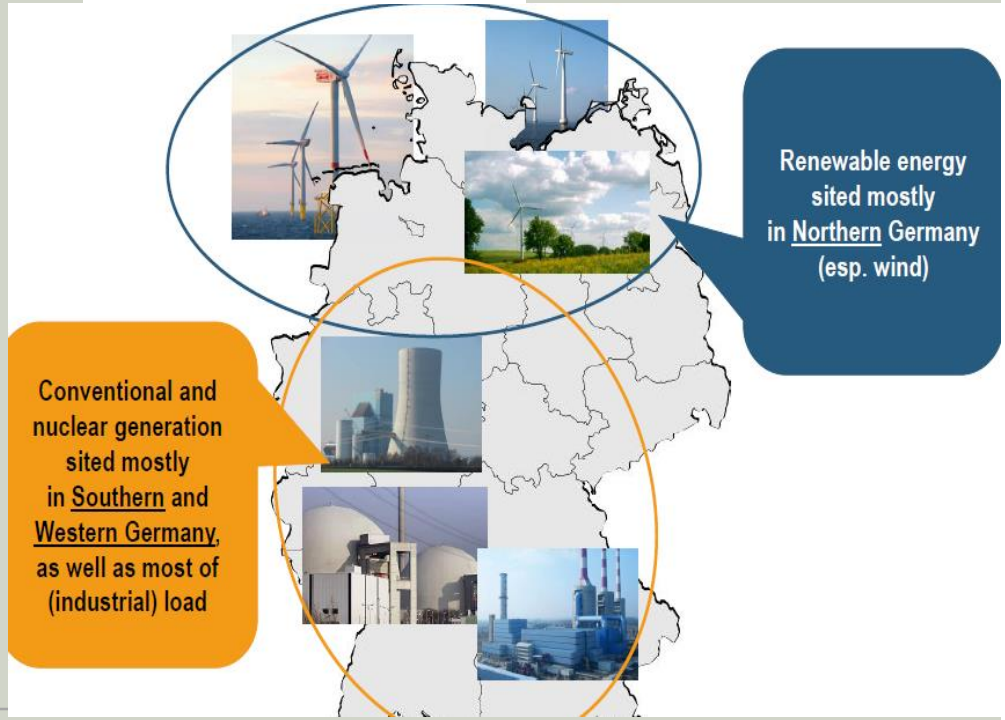
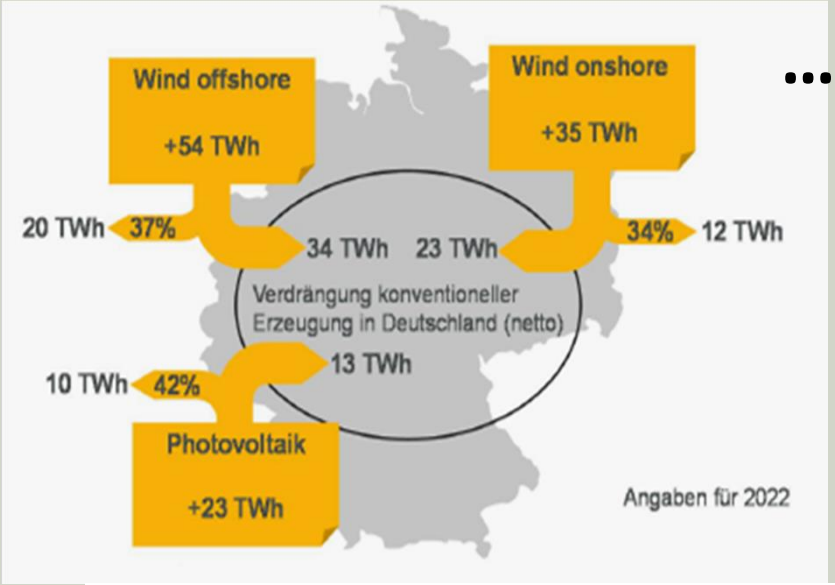
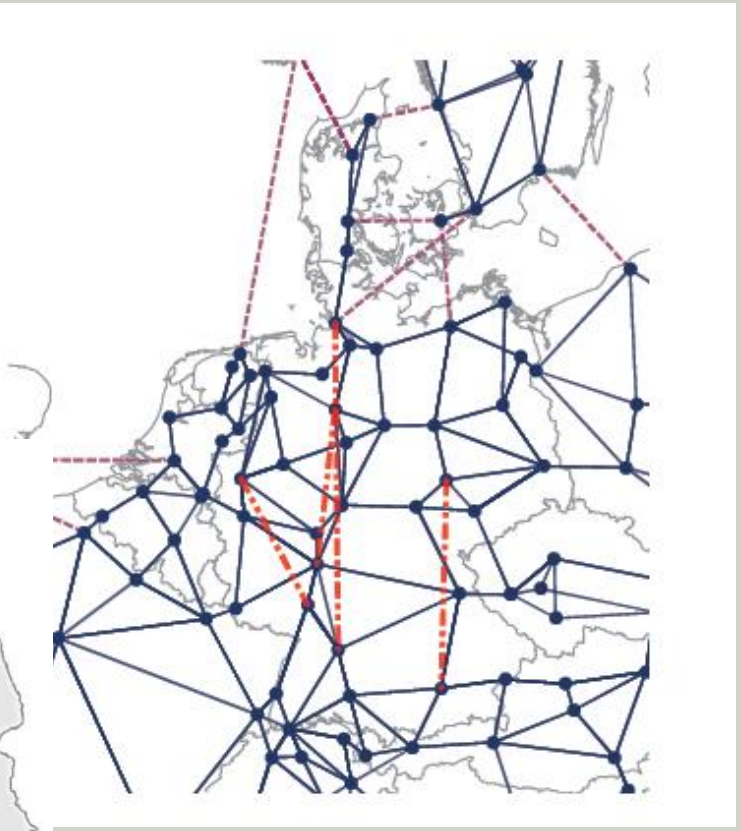


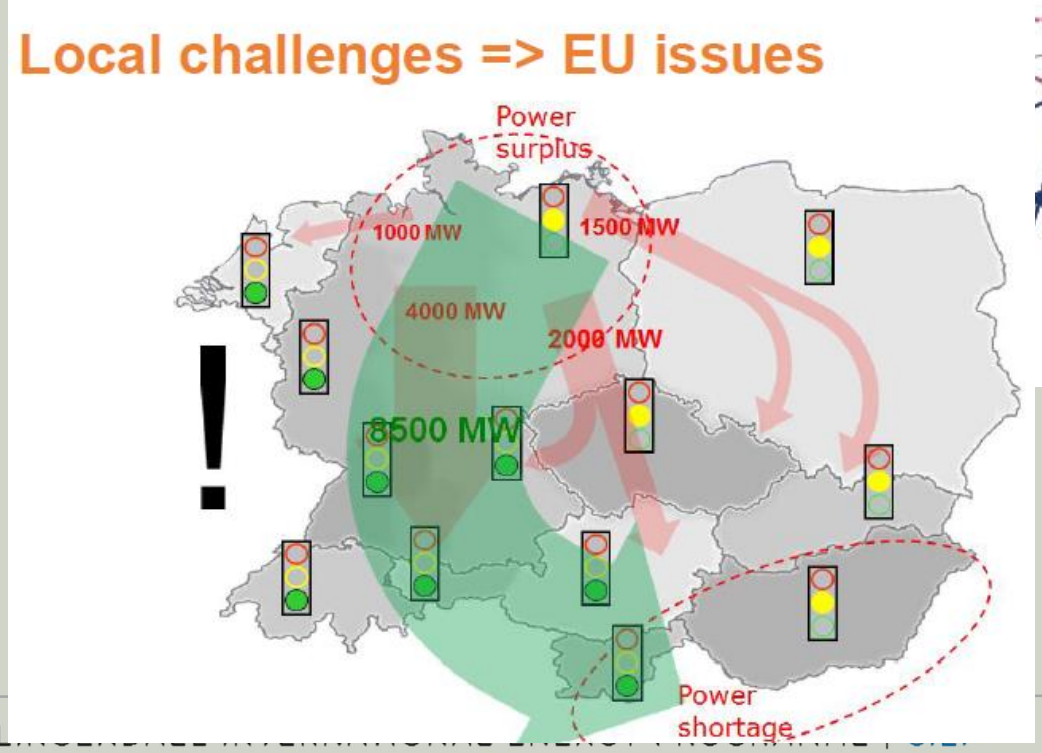


…huge cross-border impacts…

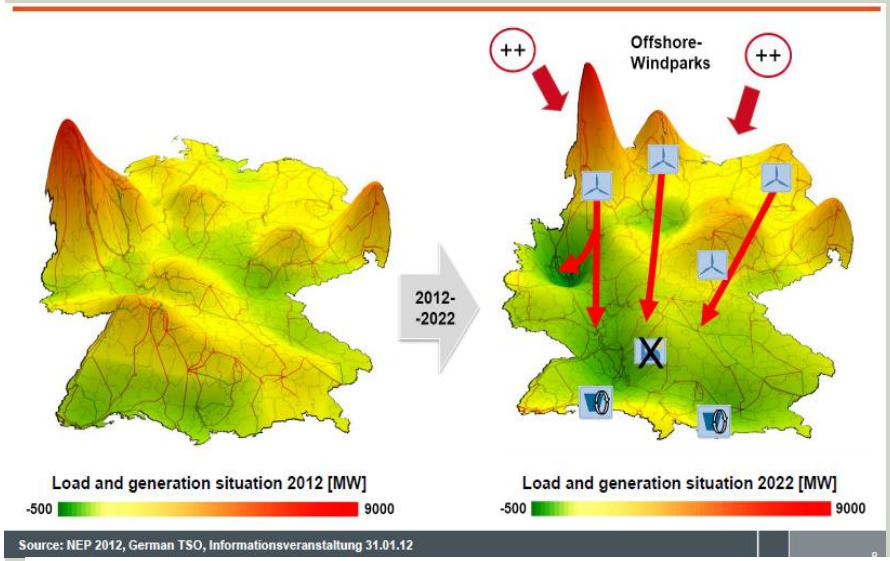




Local challenges => EU issues



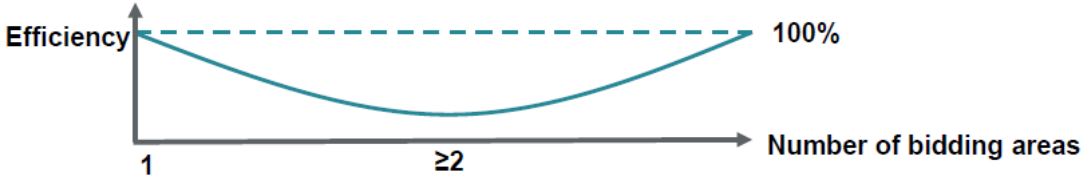
…and challenging domestic issues!



50hertz

Distance between generation and load will further increase

Growing north-south transports in Germany because of growing renewables in the north and nuclear phase-out in the south.



Common bidding area plus optimal redispatch

Several bidding areas plus optimal redispatch

„*Nodal Pricing*" (one bidding area per node)

50hertz

Optimal bidding areas are not easy to determine

One common bidding area as well as Nodal Pricing could lead to the theoretical optimum, while market splitting might cause welfare losses if not properly designed.

Also other aspects have to be considered like liquidity, market power, stable market conditions.

Major grid expansions, ….

Grid Development Plan 2012

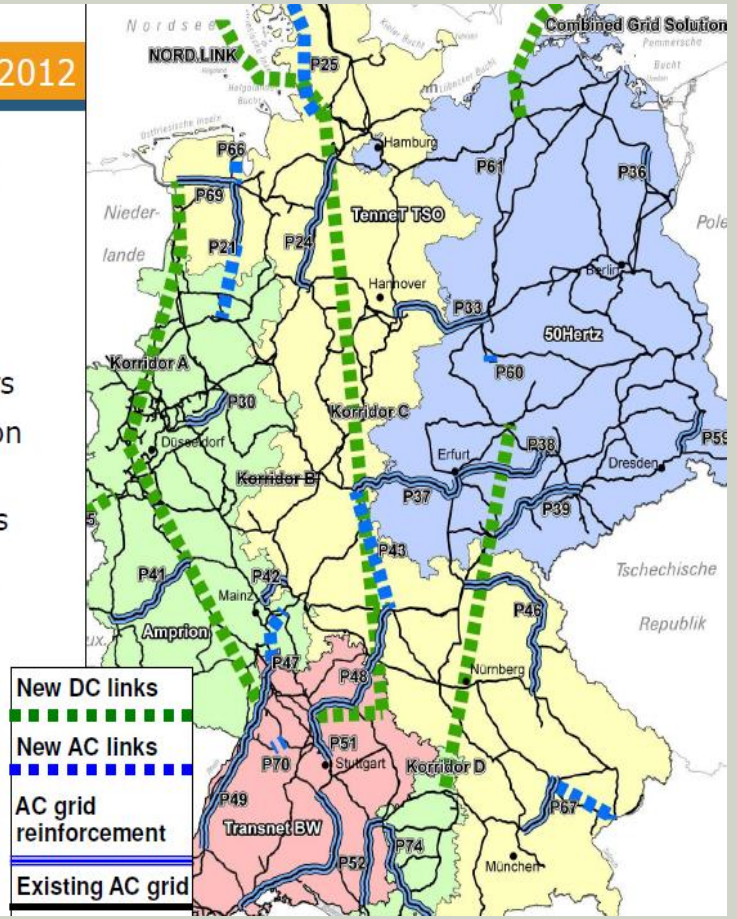
BNetzA approved:

- 51 out of 74 proposed projects; mainly AC grid expansion
- 3 out of 4 proposed overlay High-Voltage Direct Current corridors
- 2900 km grid expansion in existing routes
- 2800 km of new routes

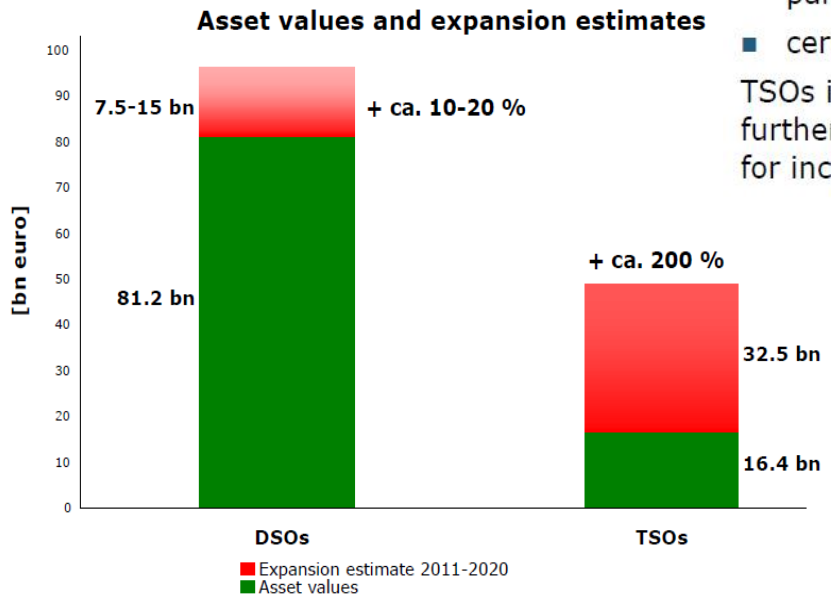
BNetzA rejected inclusion in the GRD 2012 of:

- DC corridor B, parts of corridor C
- certain AC links

TSOs invited to provide further evidence allowing for inclusion in GRD 2013

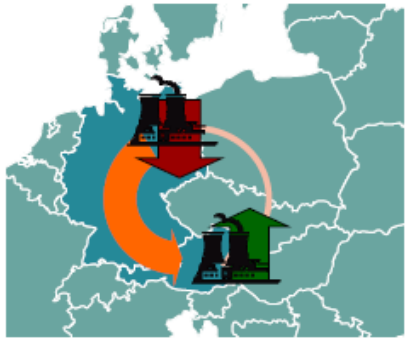
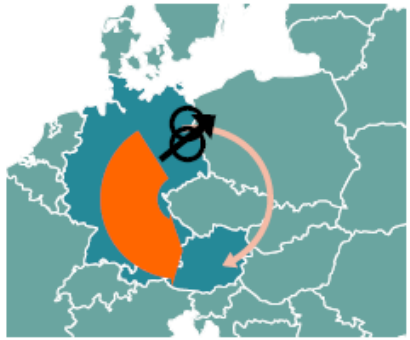


Grid investment estimates in Germany (2)



….and impacts on bordering grids:

Adjacent grids carry unscheduled power flows

Redispatch (e.g. virtual PST)	Phase Shift Transformers (PST)	Grid expansion
		
– Reduces security relevant power flows – Effectiveness und cost efficiency challenging to ensure	– Reduces security relevant power flows on Interconnectors – Flow is redirected via other lines	– Supports security of the entire system – Supports the Integrated European Energy Market

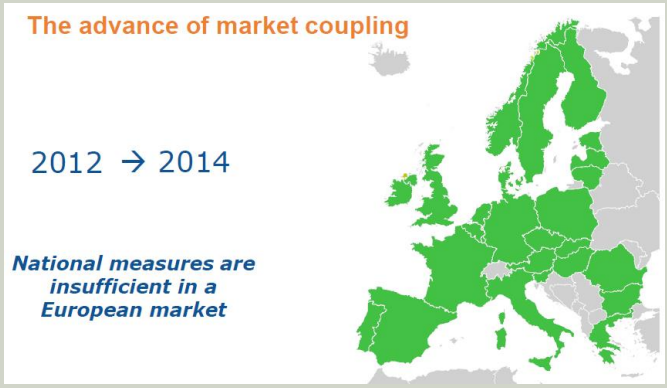
Counter measures to be developed over time

short-term → mid-term → long-term

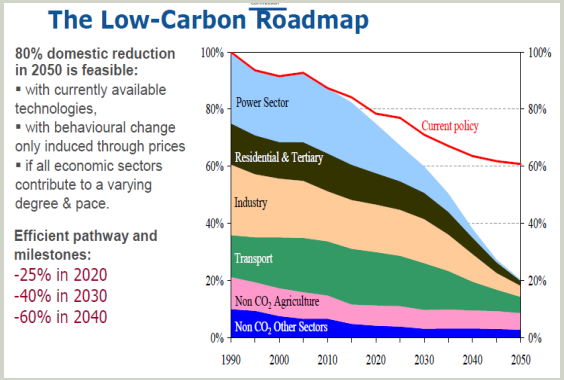
….an all EU-issue??

The EU agenda

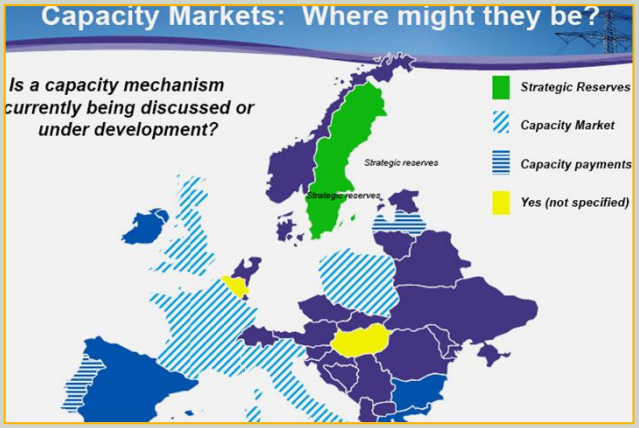
Making the Internal Energy Market work



The market seems to be moving……



But the policy-challenges are stalling……



Concerns about generation adequacy

and uncertainties are increasing….

Perfect Storm for gas in NW European market

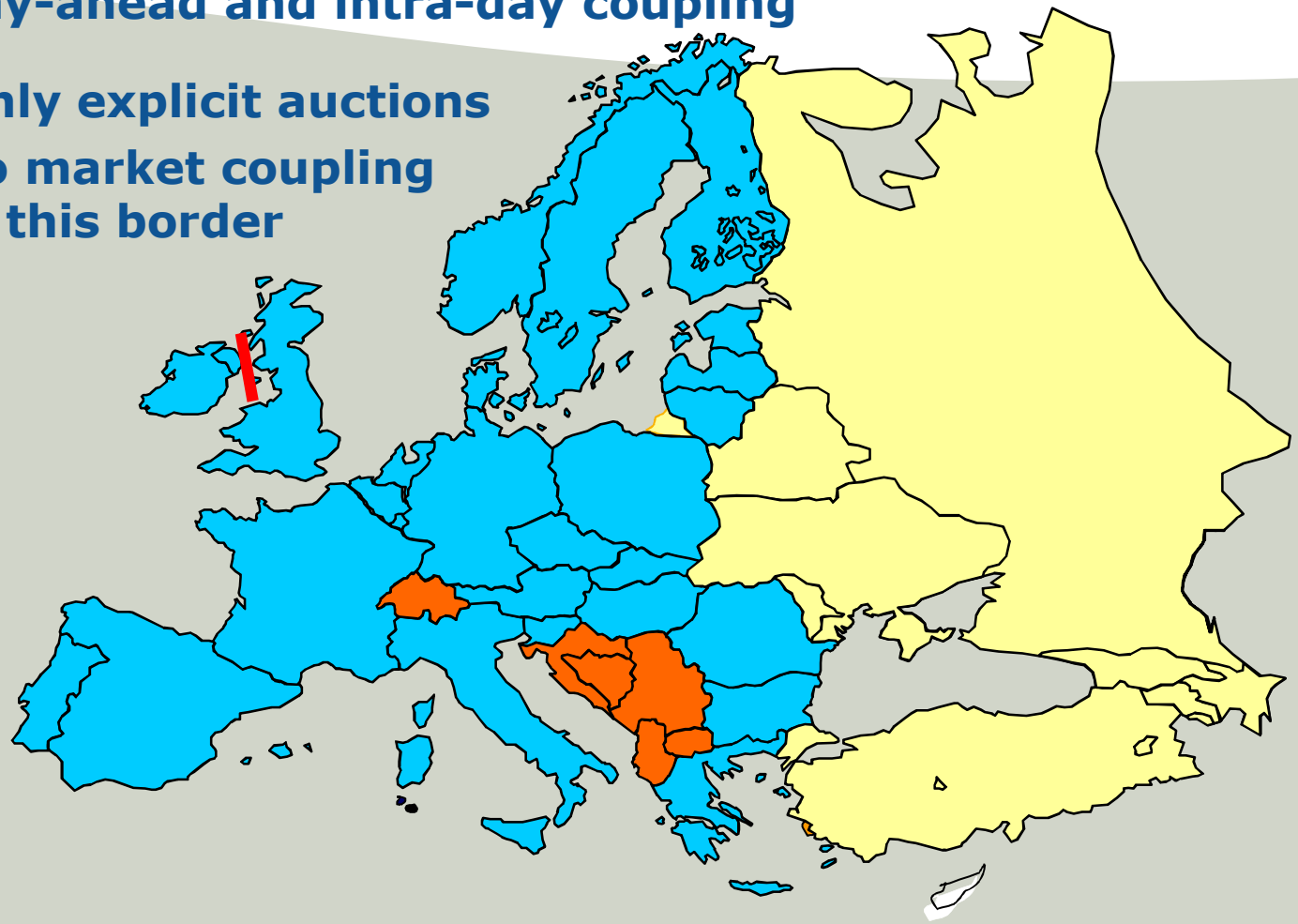
European power market in 2014?

The electricity target model

Day-ahead and intra-day coupling

Only explicit auctions

No market coupling at this border



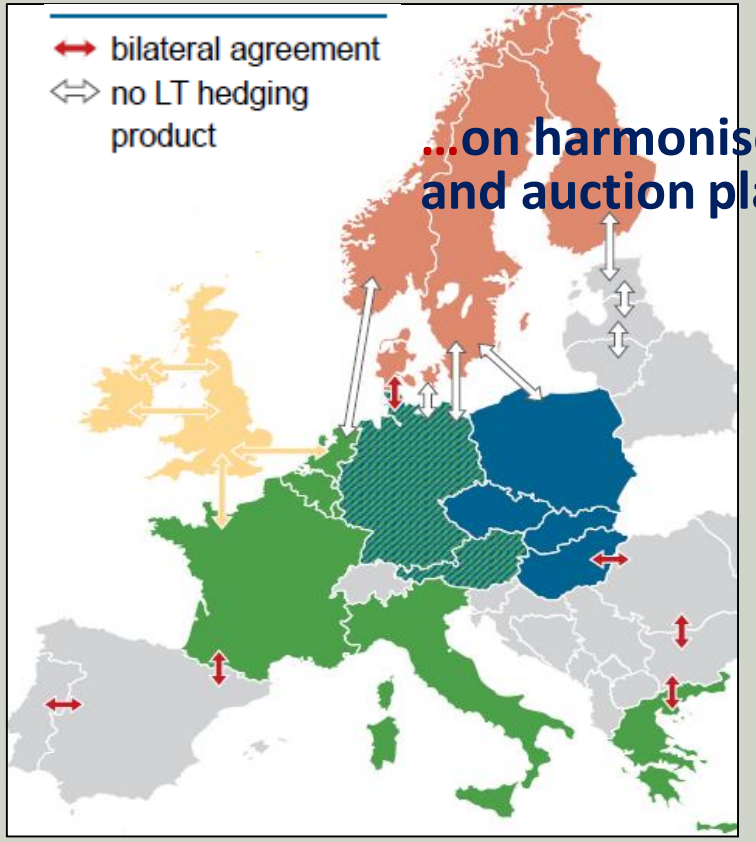
But, many pending issues as well….

on day-ahead coupling solutions

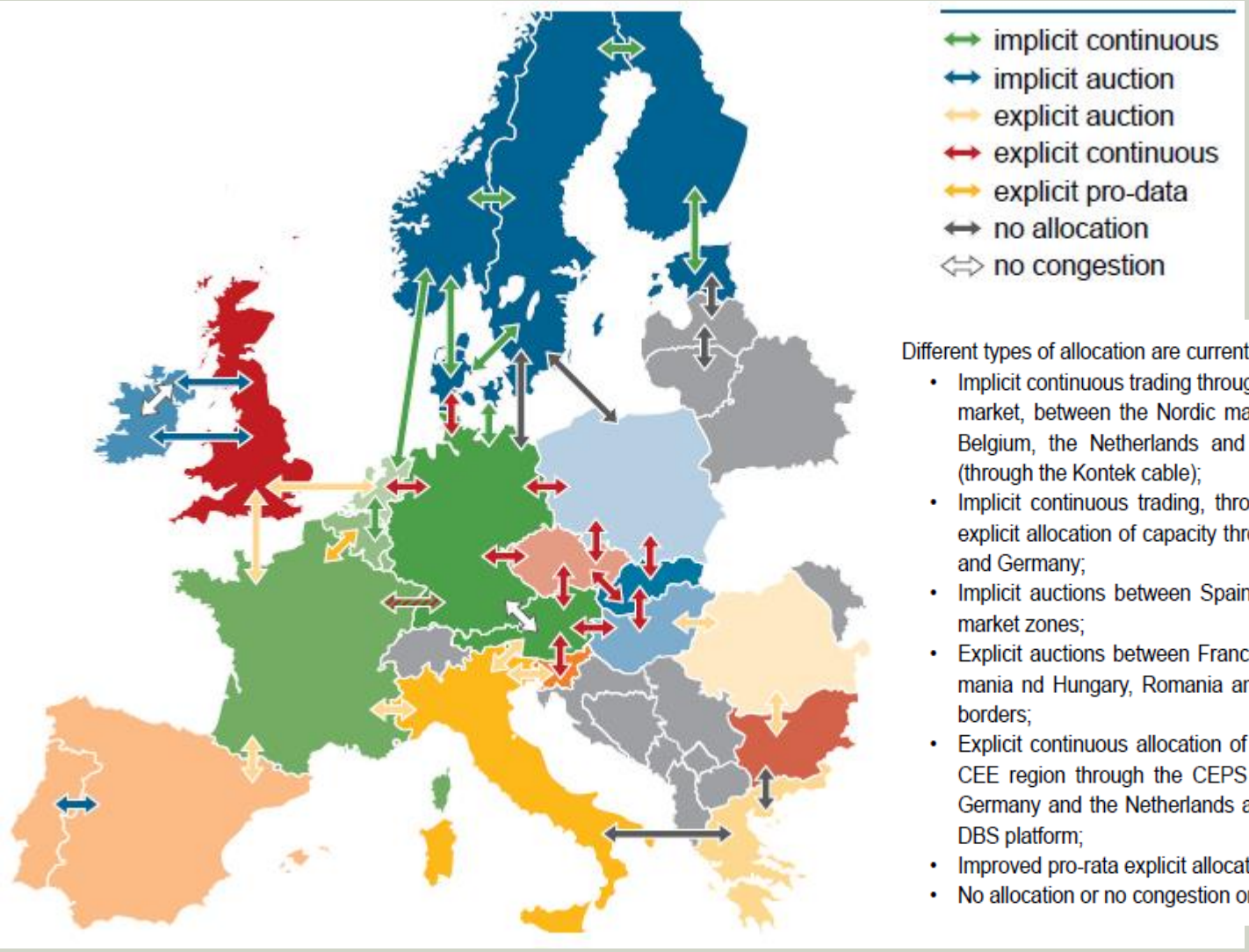
Different price market coupling solutions have been implemented:

- In the Iberian Peninsula;
- In the CWE region;
- Between CWE and Great Britain through the BritNed cable;
- In the Nordic region and Estonia through Estlink and in the Nordic region and Poland through the SwePol Link;
- Between the Czech Republic, Slovakia and Hungary;
- Between Italy and Slovenia;
- On Ireland north and south;
- A volume coupling solution, Interim Tight Volume Coupling (ITVC), has been implemented between the Nordic area and the CWE region.

…on harmonised rules and auction platforms….



…on intraday capacity allocation….

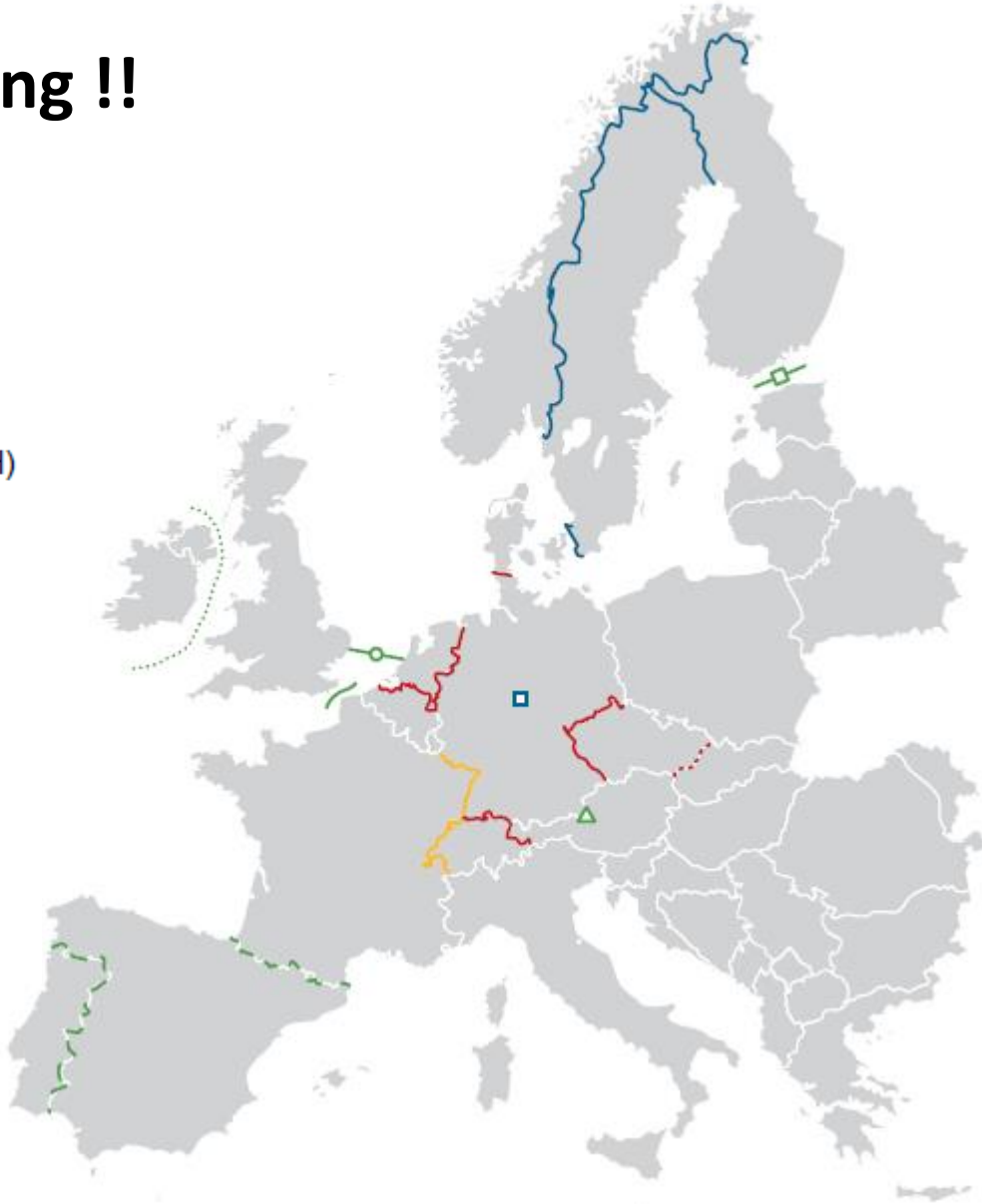


Different types of allocation are currently in operation:

- Implicit continuous trading through the ELBAS platform, within the Nordic market, between the Nordic market and Estonia, the Netherlands and Belgium, the Netherlands and Norway and Germany and Denmark (through the Kontek cable);
- Implicit continuous trading, through the FITS platform and continuous explicit allocation of capacity through the DBS platform between France and Germany;
- Implicit auctions between Spain and Portugal and between the Italian market zones;
- Explicit auctions between France and England, France and Spain, Romania nd Hungary, Romania and Bulgaria and on the Northern Italian borders;
- Explicit continuous allocation of capacity on the internal borders of the CEE region through the CEPS Damas Energy platform and between Germany and the Netherlands and Germany and Denmark through the DBS platform;
- Improved pro-rata explicit allocation between France and Belgium;
- No allocation or no congestion on the remaining borders.

…and cross-border balancing !!

Cross-border balancing mechanisms and projects*



Imbalance netting
- I-GCC mechanism
- E-GCC mechanism

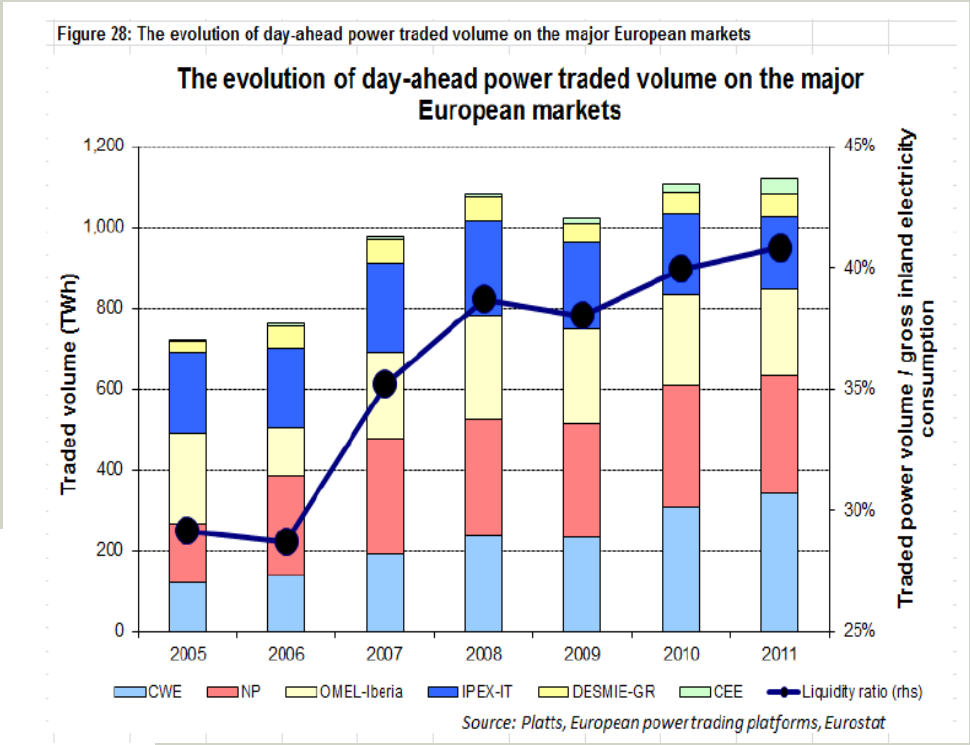
TSO-BSP model
- Exchange of energy from RR (FR-DE and FR-CH)

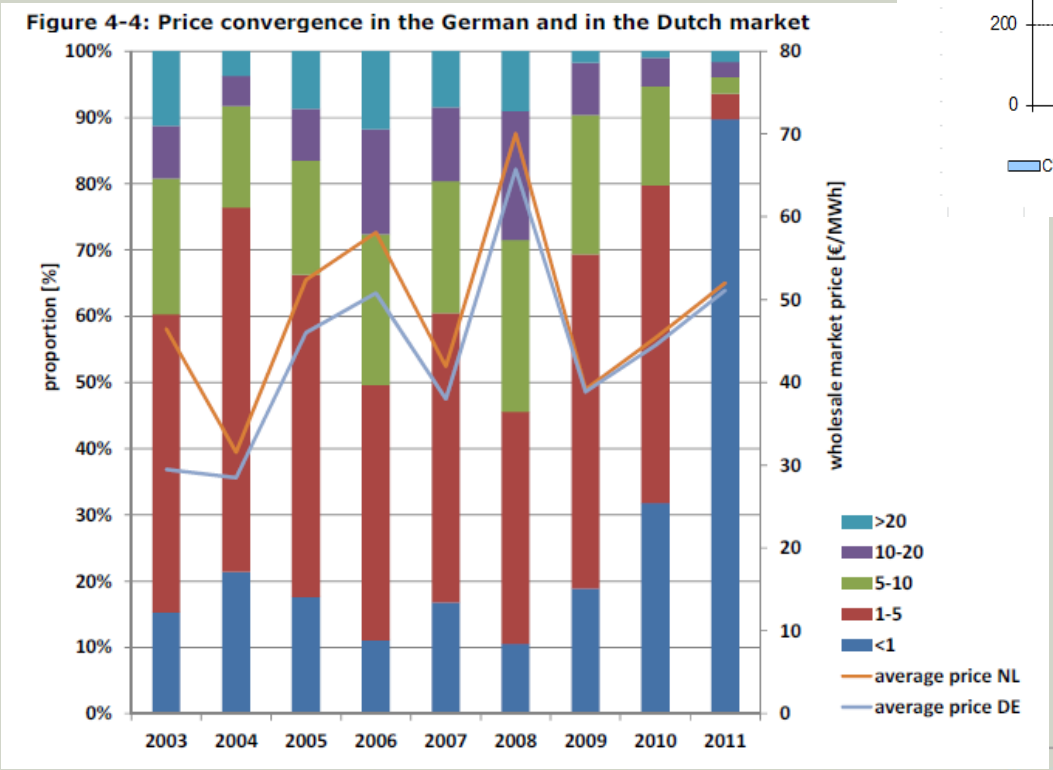
TSO-TSO with margins
- BALIT mechanism over FR-UK
- Extension of BALIT over FR-SP & PT-SP
- Balancing over Moyle & East West
- Future arrangements over Britned
- Nordic-Baltic cooperation
- BRP-TSO exchanges over AT-DE

TSO-TSO with Common Merit Order
- Common Nordic Balancing Market
- Balancing cooperation between German TSOs

* models for balancing energy: this does not include exchange of reserves

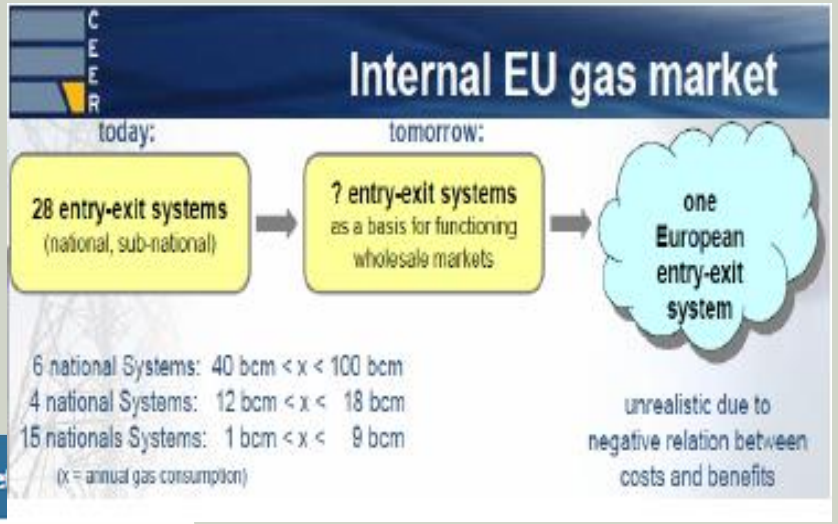
….but trade & price alignments are (still?) flourishing….

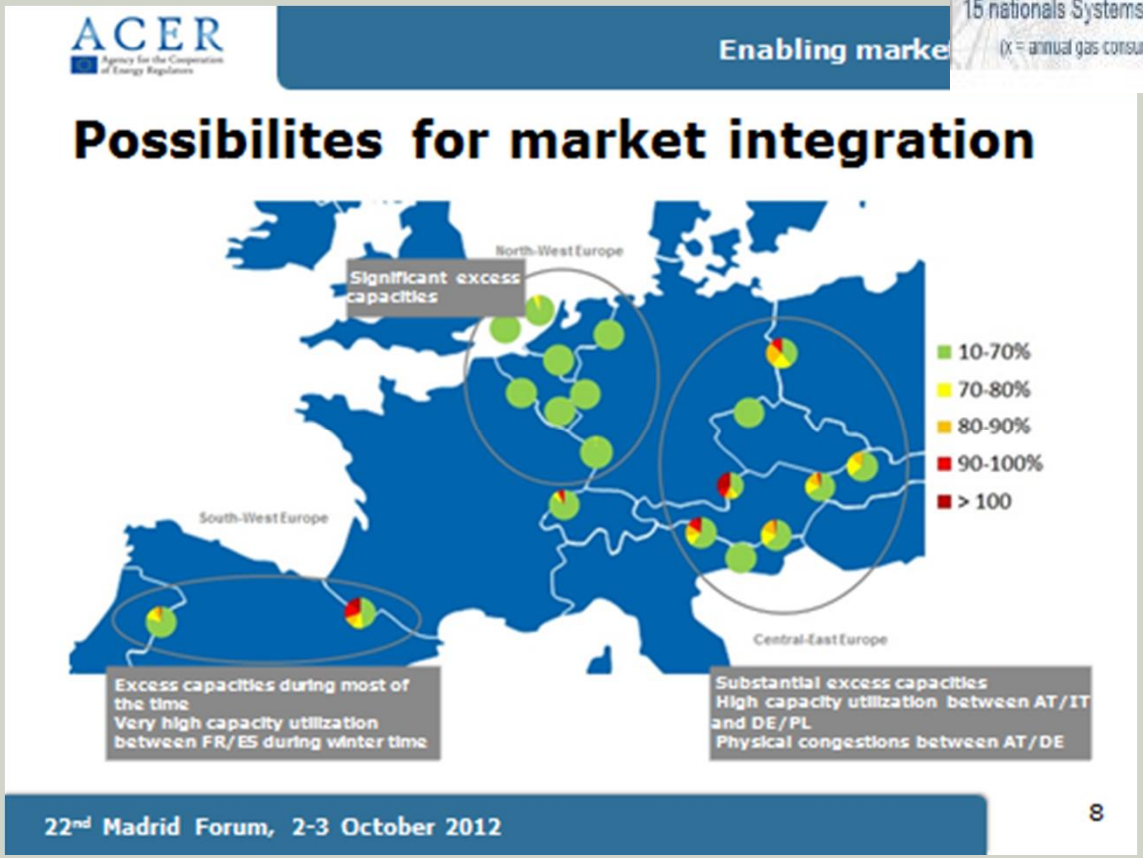




….but gas market integration rather unclear…..

E/E zones and market integration……
market coupling?



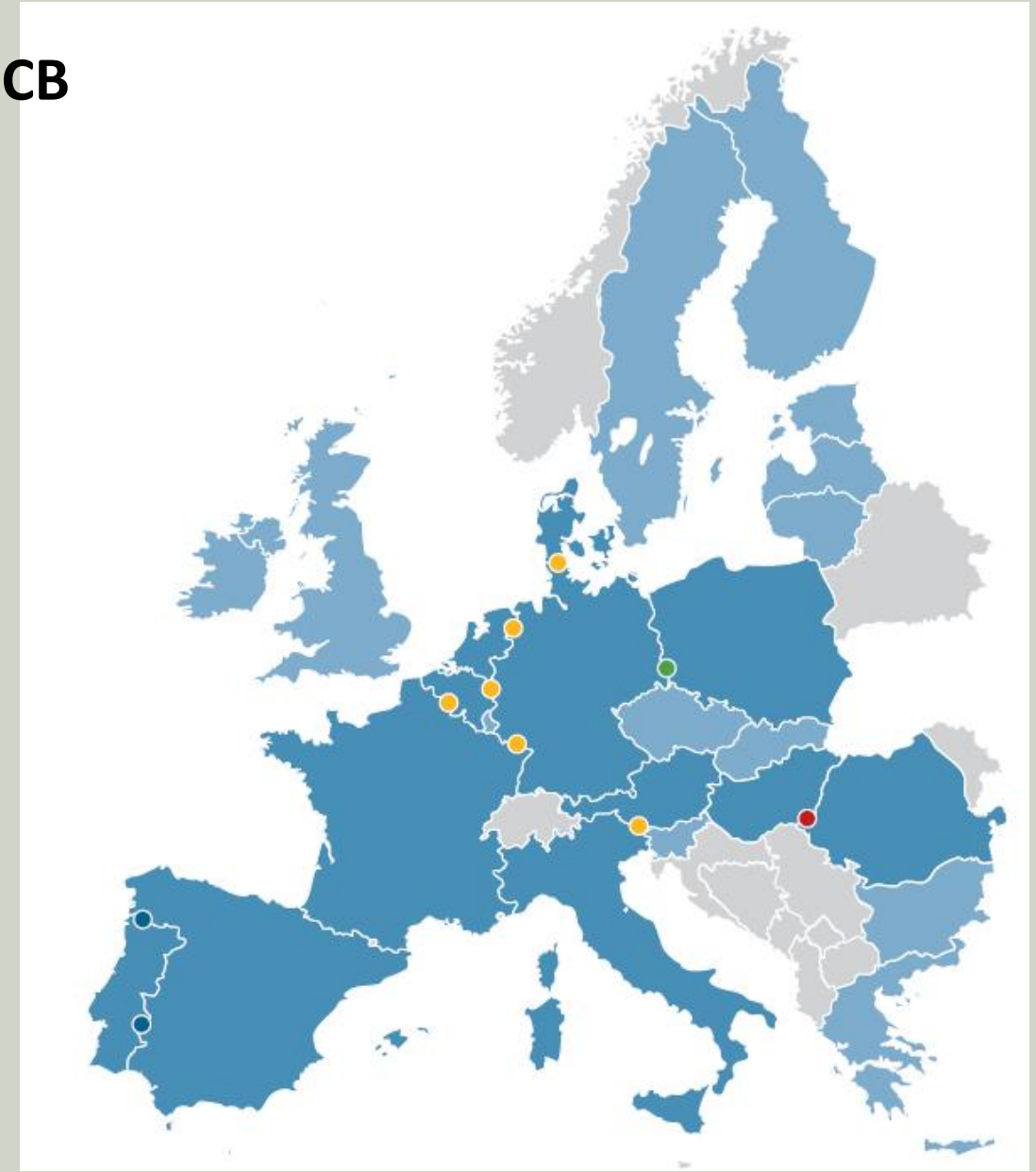


…only a few projects on CB capacity allocations….

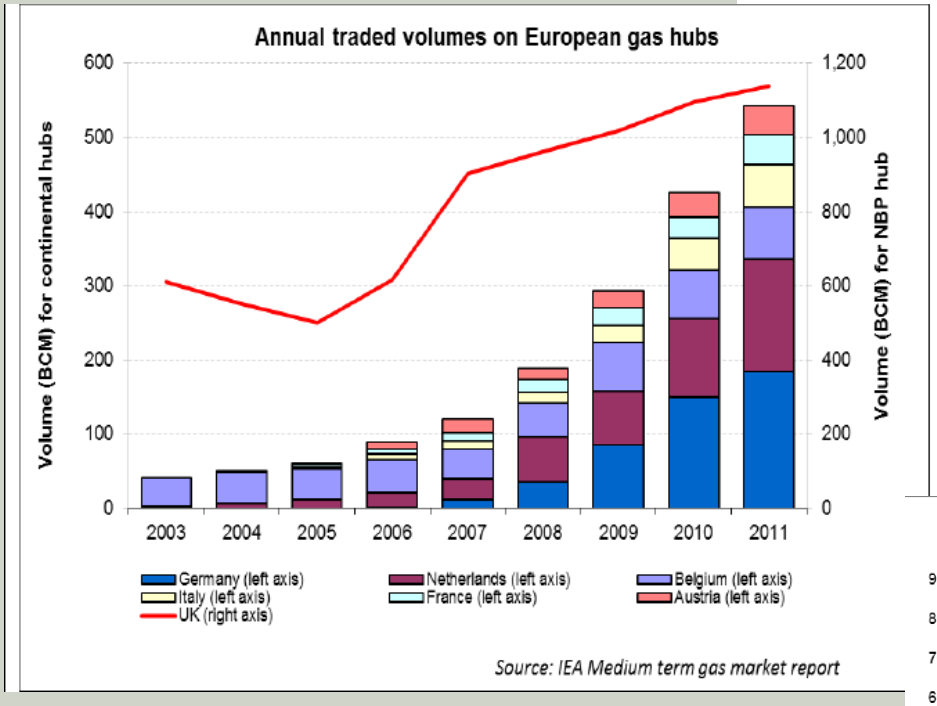
Pilot projects in the CAM Roadmap

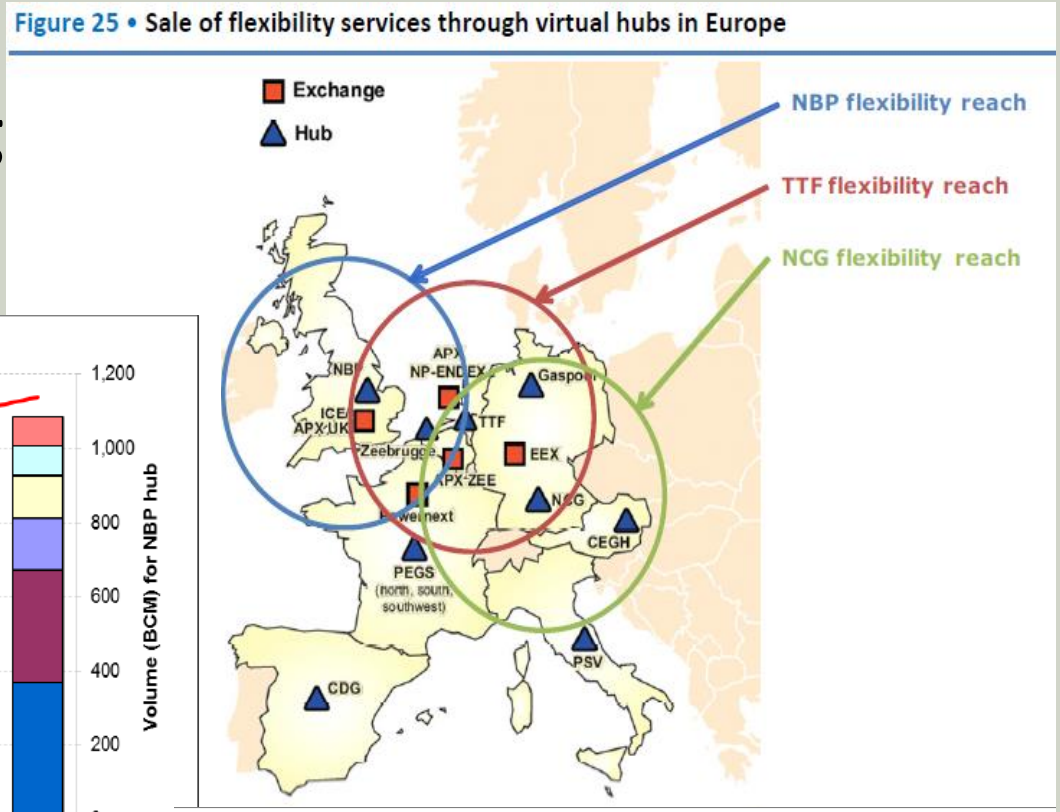
- Bundling product at Lasów IP
- PRISMA platform (current participating bundling initiatives)
- Hungary-Romania capacity bundling project
- Pilot testing of CAM NC between spain and Portugal

- EU countries with TSOs involved in pilot projects of the CAM Roadmap
- EU countries without TSOs involved in pilot projects of the CAM Roadmap
- Non-EU Member States

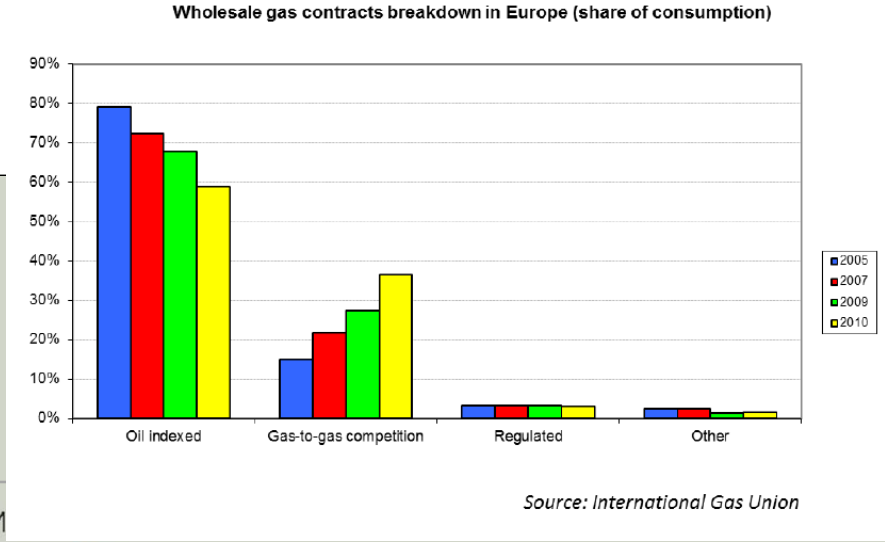


….some hubs are going in the right direction…

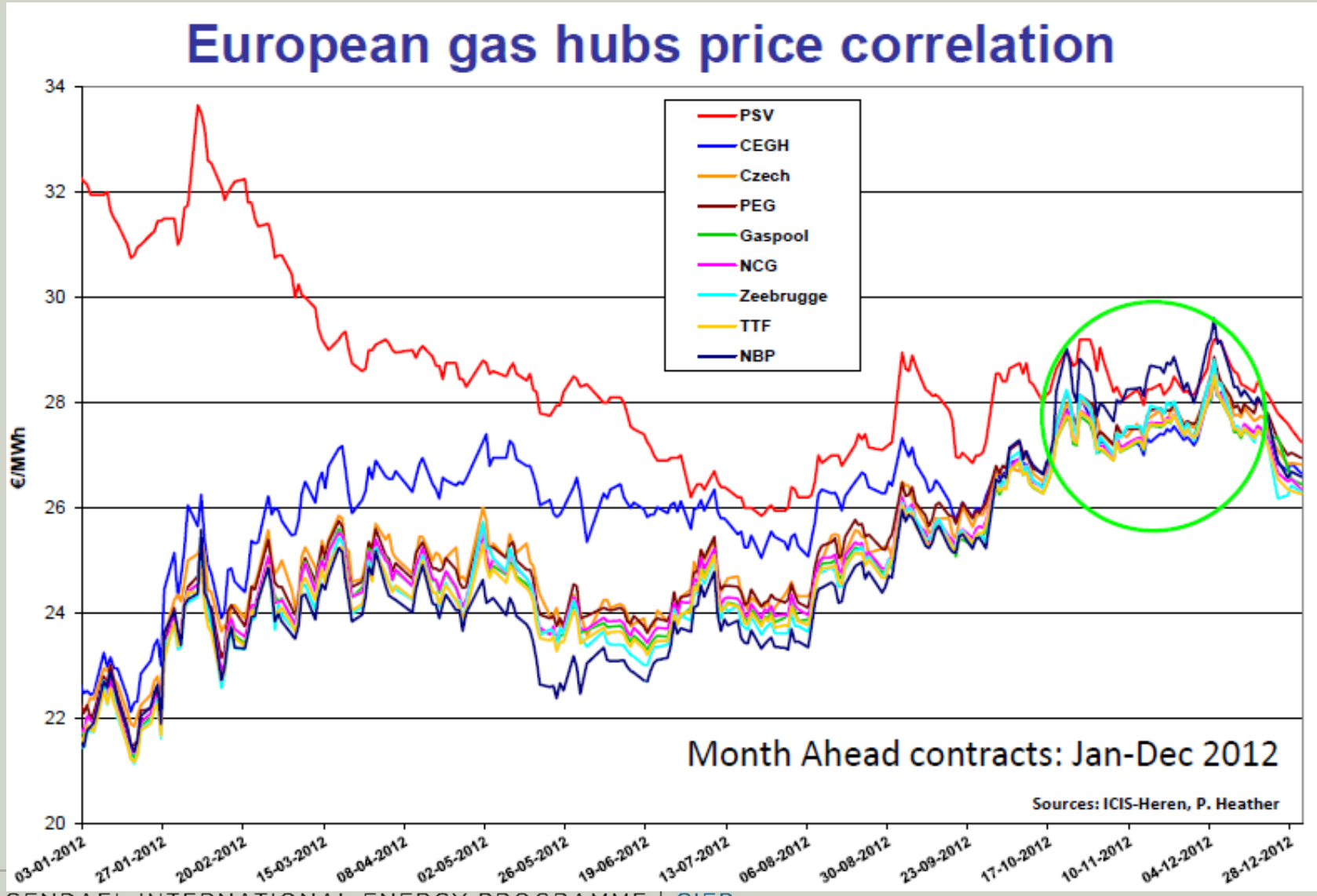




..with hub-trade increasing…

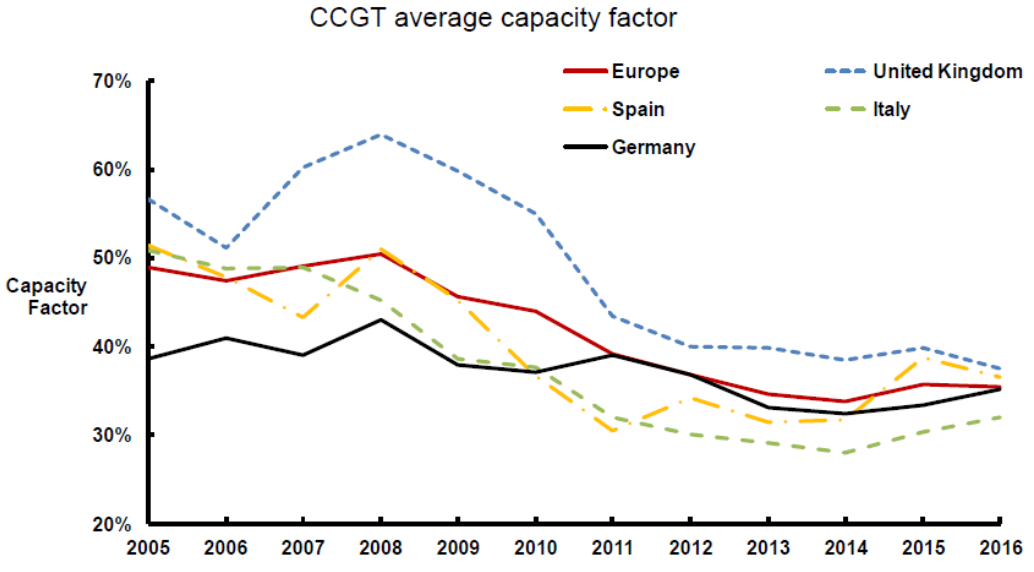


…and hub prices are moving together.

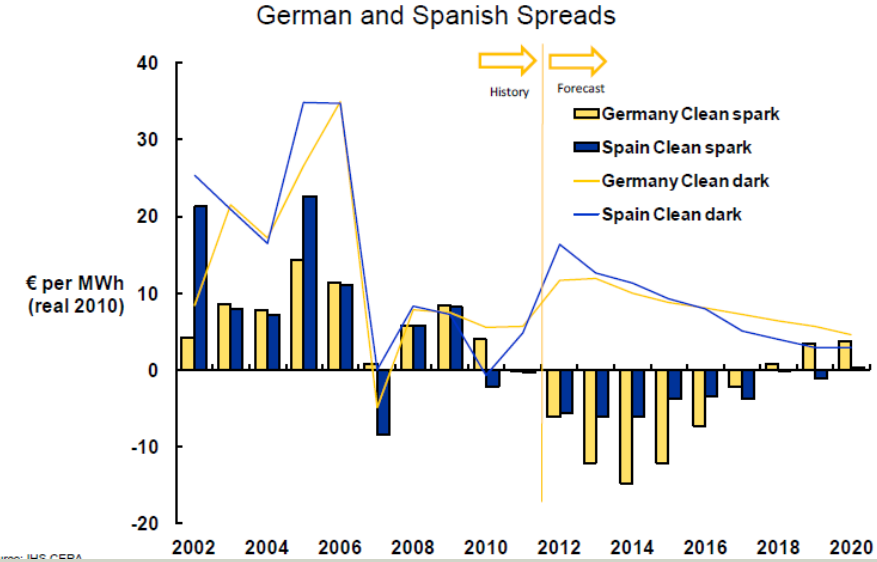


EU Gas Market however in disarray?

Weak Demand and Poor Economics Will Keep CCGT Running Hours Low Across Europe in the Medium Term



Clean Spark Spreads Are and Will Likely Remain Negative for a Number of Years

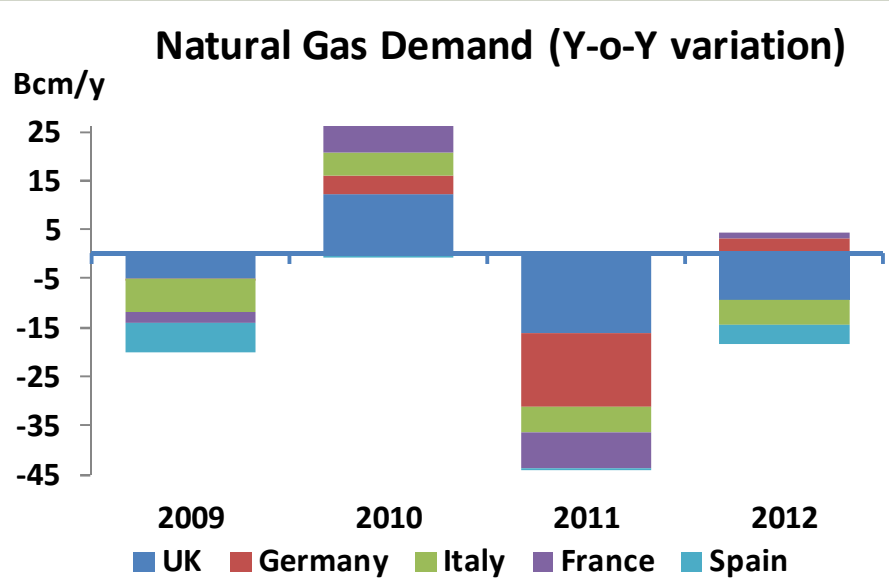


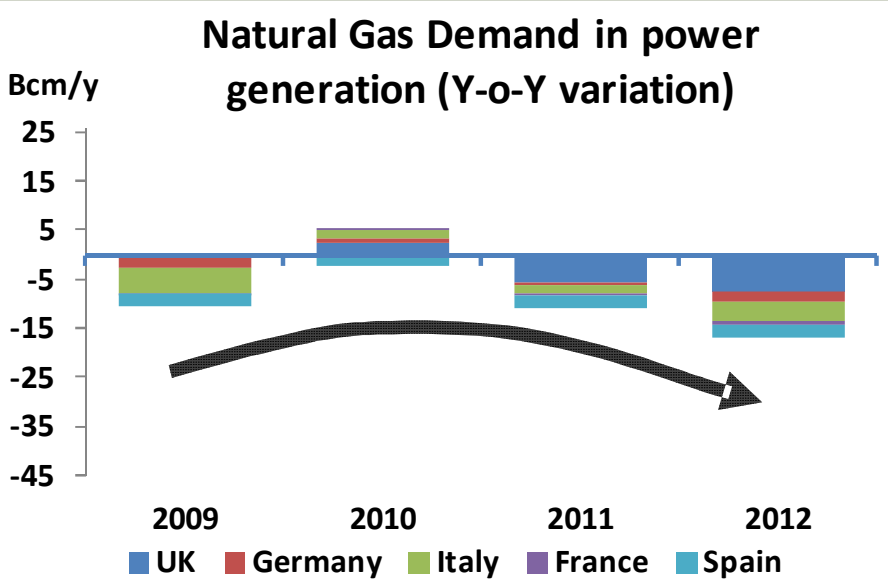
Europe big 5*: gas demand is lower than in 2009

have we reached the bottom?

Gas demand in Europe: still declining …

… demand for power generation a key factor in 2012





- 53 Bcm in 2012 vs. 2008

-35 Bcm in 2012 vs. 2008

Source: Total

Source: Network Operators

*UK, Germany, Italy, France, Spain

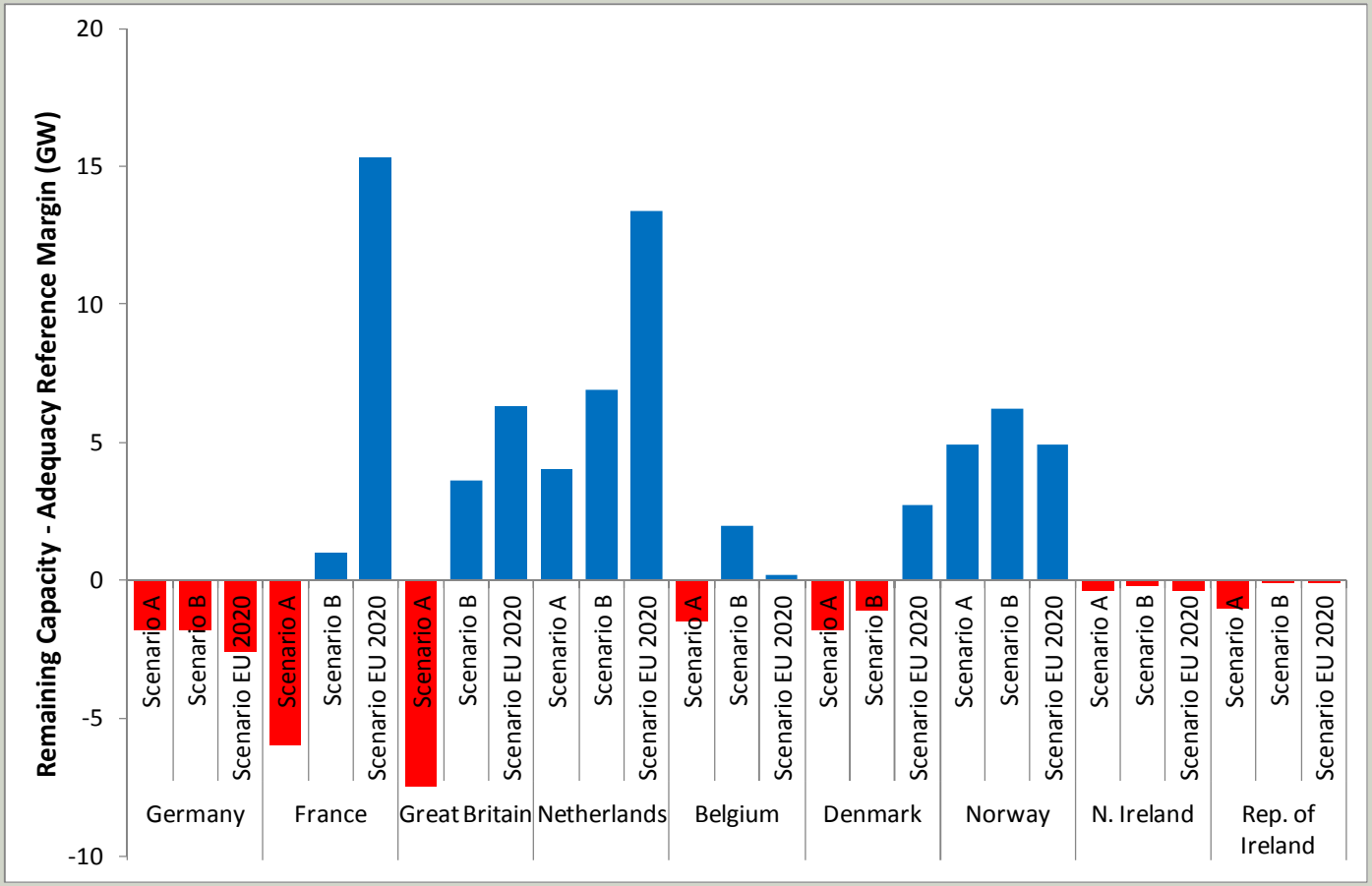
…resulting in investment uncertainties for (new) power generation capacity.

Shift of focus and concern from “energy” to “capacity”

- **RES needs short term balancing peak and as well as long term back-up capacity.**
- **There are limited alternatives to long term back-up capacity ➔ mid-load generation capacity needs to stay in the system with significantly lower running hours.**
- **Reduced number of running hours of conventional capacity, results in poorer economics, potentially leading to mothballing/retirement**

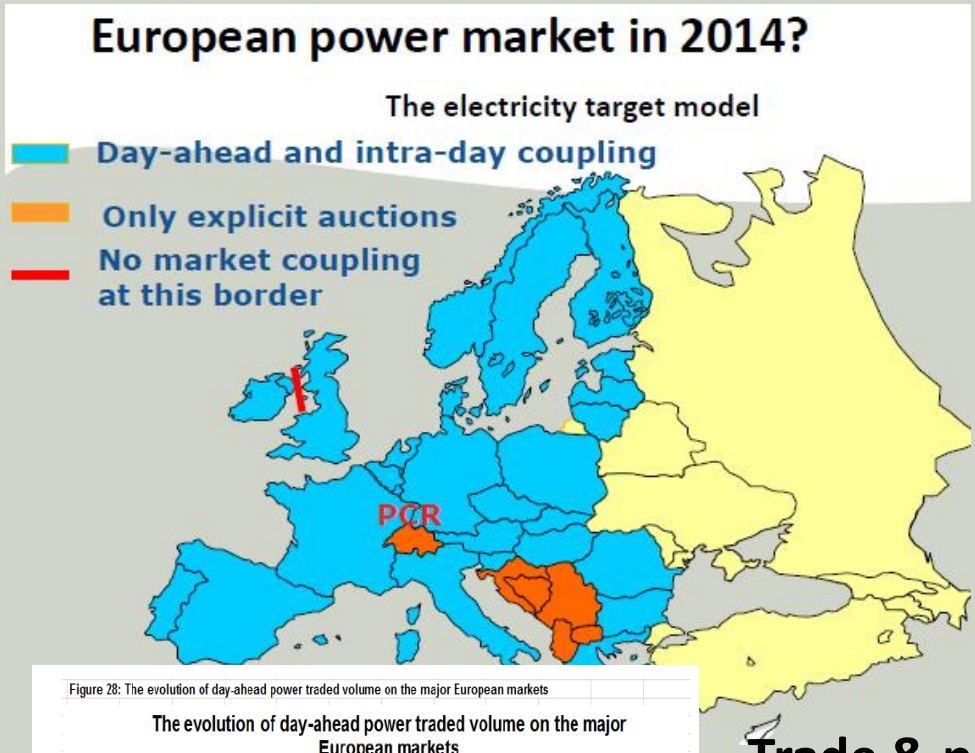
New market mechanisms for investments in power generation capacity?

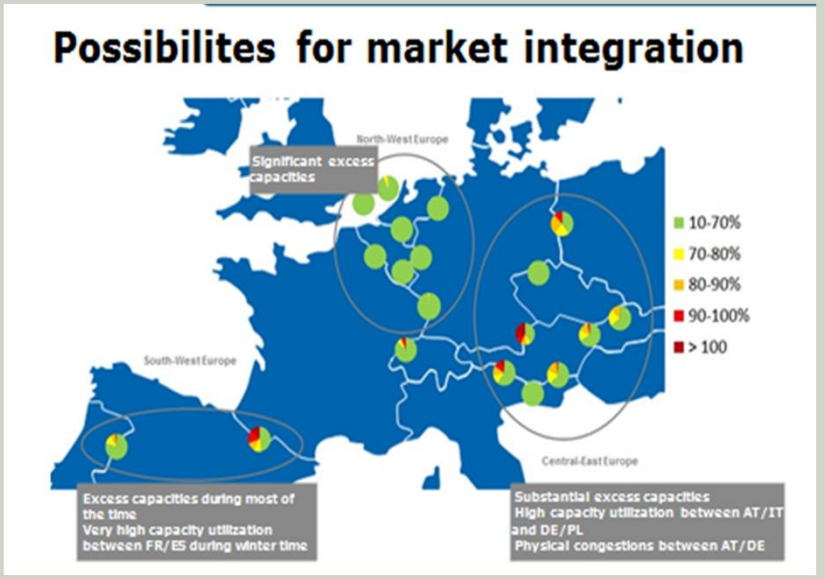
Urgency for new market mechanisms differs considerably within the NW-EU context

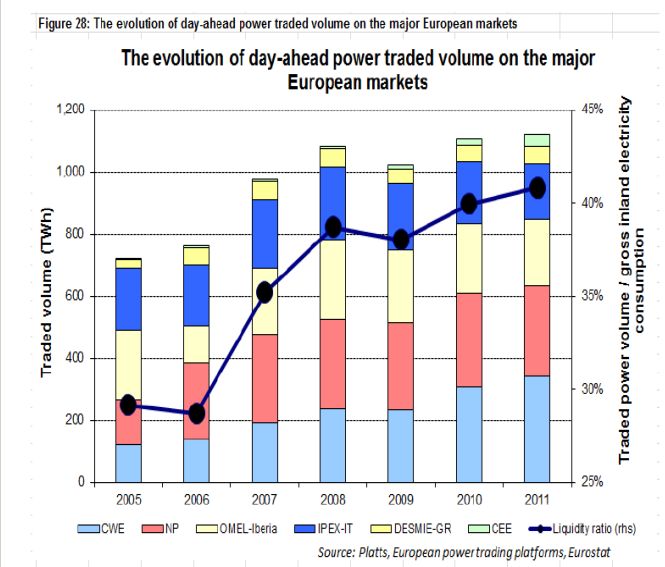


Source: CIEP. Data from ENTSO-E

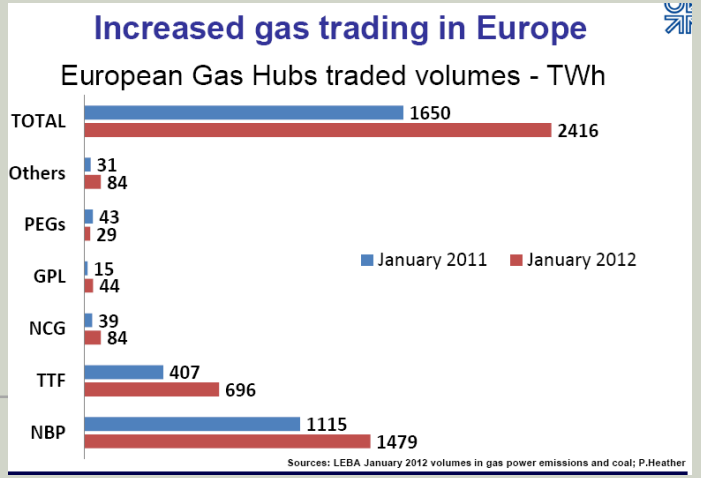
Again, Markets are integrating….







Trade & price alignments are flourishing….



…and industry structures are following…..

Gas Industry (TSO's):
PRISMA, joint auctioning platform

PRISMA EUROPEAN CAPACITY PLATFORM

bayernets, ENERGINET.DK, FLUXYS, FLUXYS | TENP, gasunie transport services, GASCADE, BOG, GRTgaz, nowega, GTG NORD, GRTgaz, Thyssengas, GAS CONNECT AUSTRIA, eeX, ontras, TAG, Open Grid Europe The Gas Wheel, terranets bw, SNAM RETE GAS

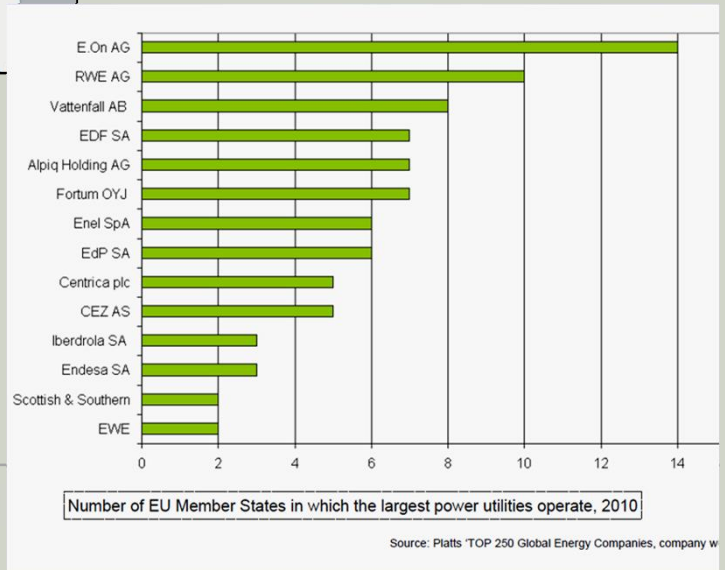
Electricity Industry (TSO, PEs):
CASC, EMCC, Coreso

CASC CWE

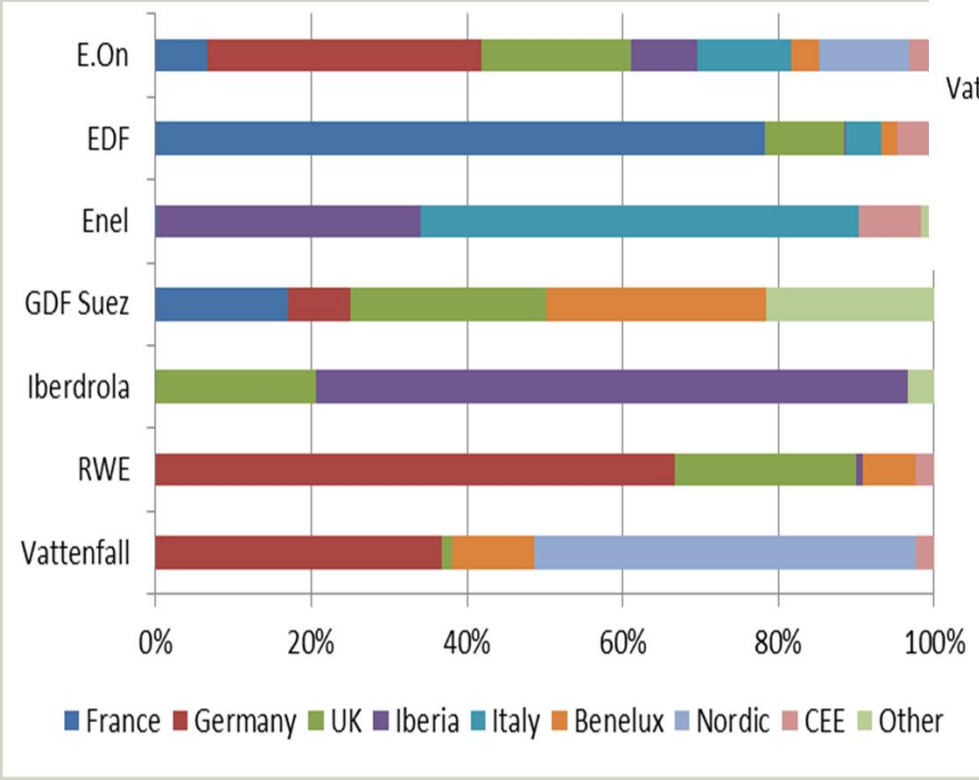
Cross border TSO M&A's

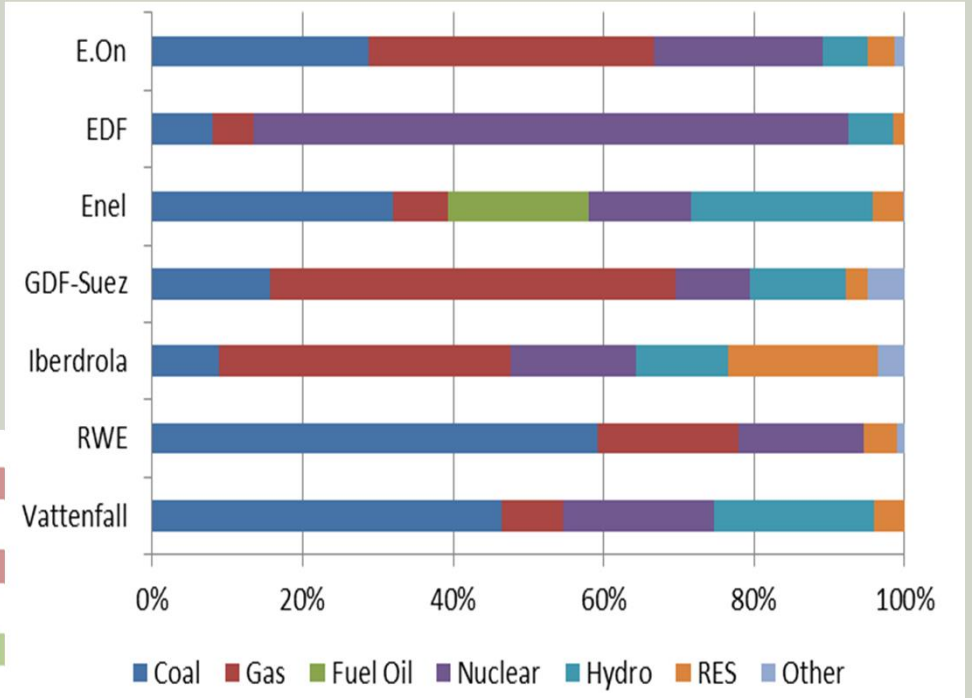
Tennet (NL/FRG); Elia (B/FRG)
Gasunie (NL/FRG);
Fluxys/CB participations
…..

New opportunities from market opening



EU big 7; fuel mix & international focus

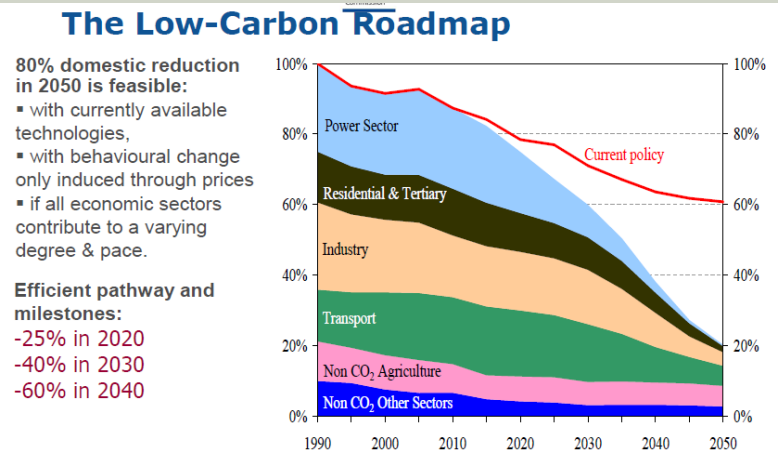




	Revenue (EUR Billions)	Non-EU power sector revenue (% of total)	Net profit (EUR Billions)	Capacity (GW)	Production (TWh)
E.On	142.94	20%	2.18	70.00	271.20
EDF	72.73	4%	3.32	134.79	631.28
Enel	84.89	41%	0.87	97.34	291.09
GDF-Suez	97.04	65%	1.55	117.31	465.00
Iberdrola	34.75	24%	2.84	46.03	145.13
RWE	50.77	8%	1.31	49.24	205.70
Vattenfall	19.22	4%	1.98	35.85	153.70

Sources: CIEP Research

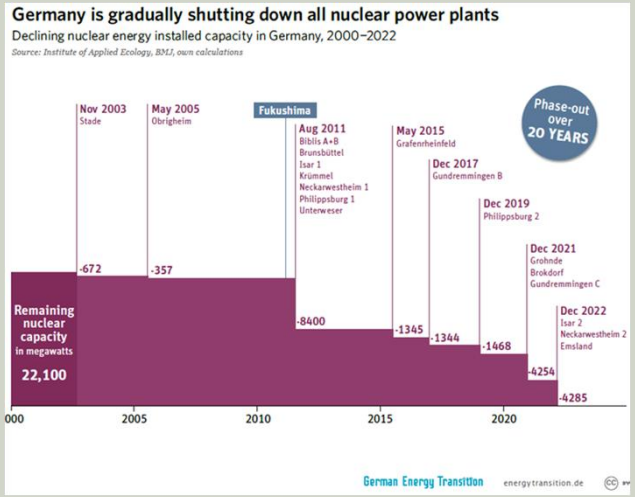
But where is the policy…..?

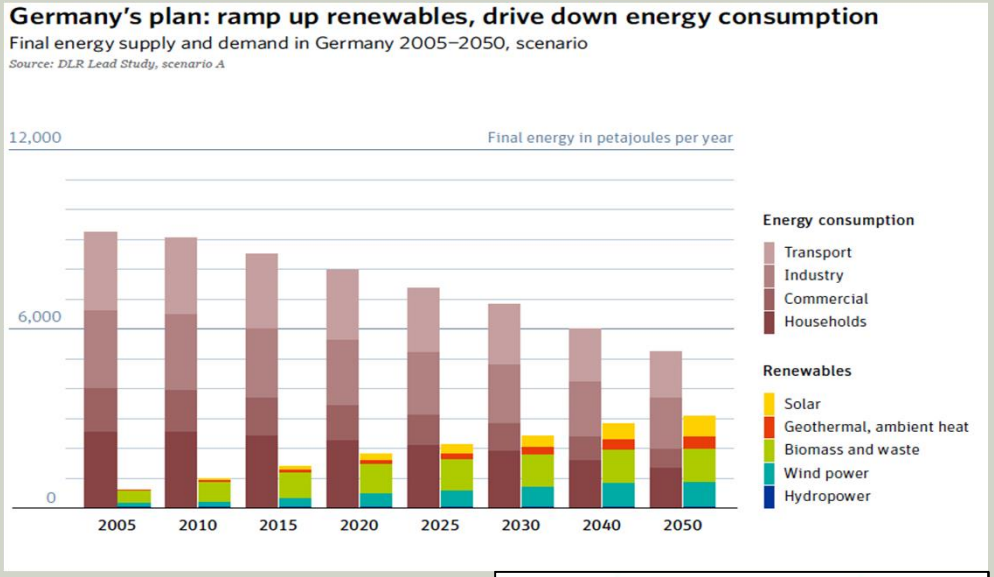


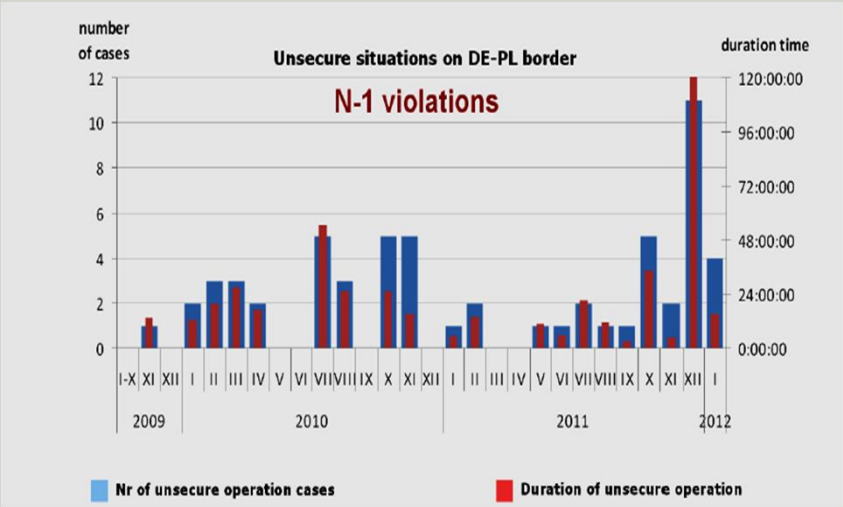
	B	Dk	Fr	FRG	NL	UK
Security of supply	1	1	2	2	4	4
Affordability	2	4	1	4	1	2
GHG mitigation	3	2	4	3	3	1
Industrial opportunities		3	3	1	2	3
Ethical issues				5		

The Road Map; a common view, national reactions with different drivers…….

…and sometimes very specific consequences

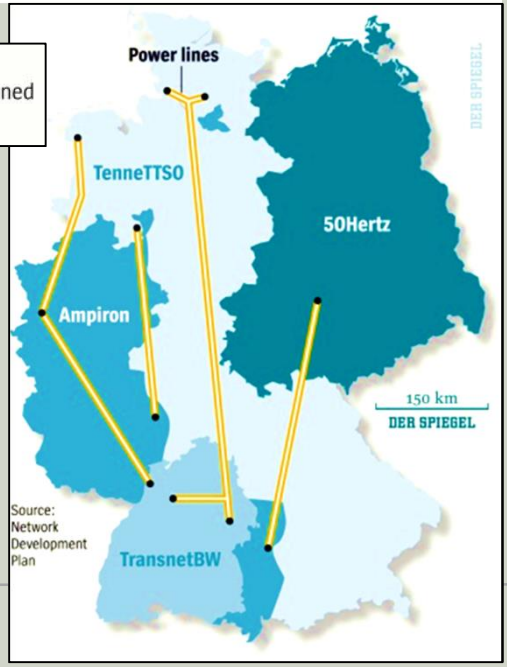






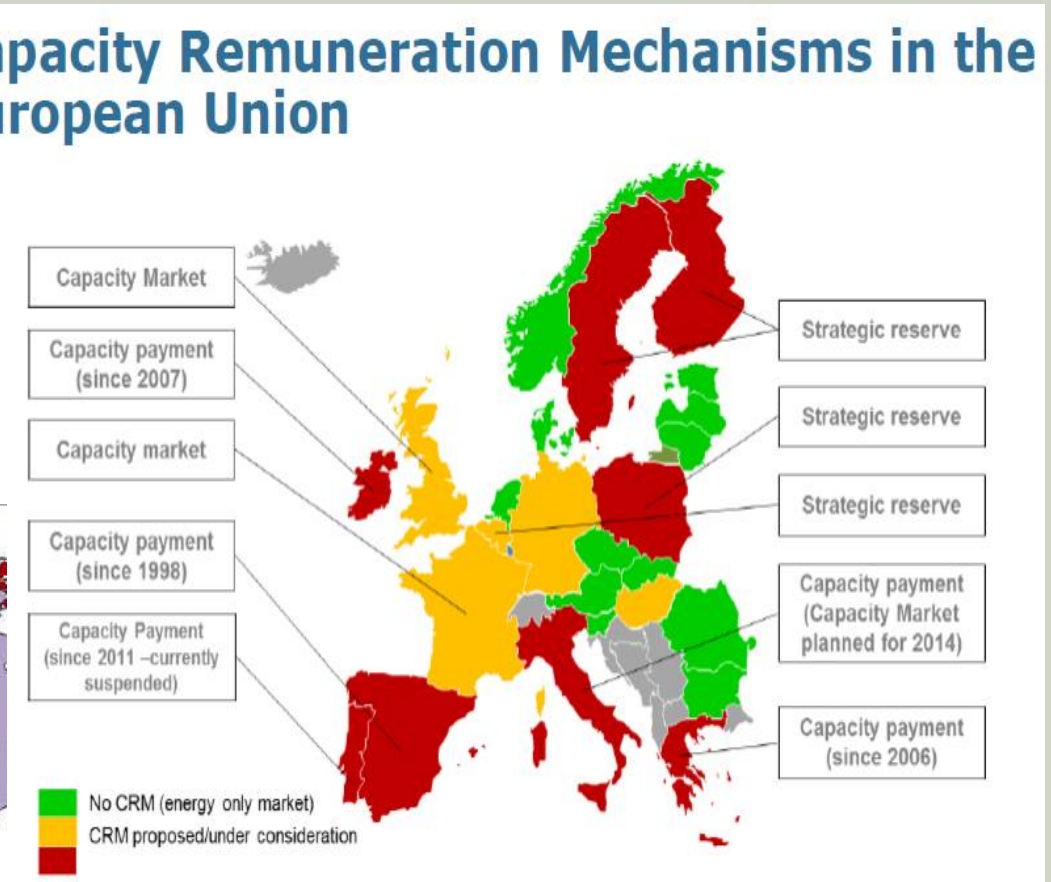
Unsecure situation in the Polish grid caused by unplanned power flows

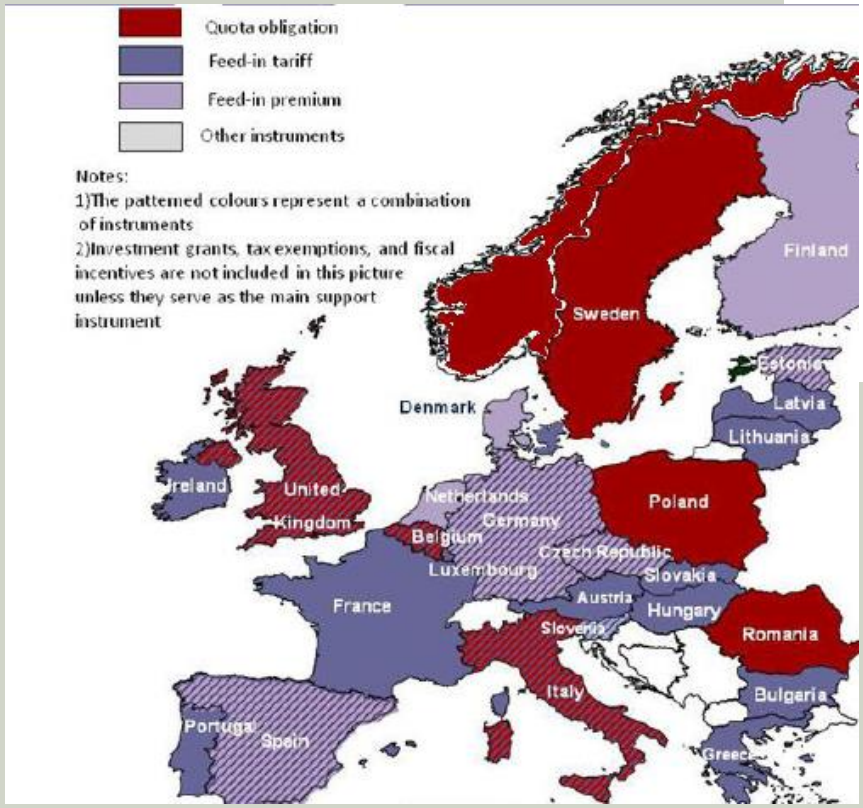
Long Lines
Power-grid operators and the planned power-line expansion



And more policy to come……

Capacity mechanisms

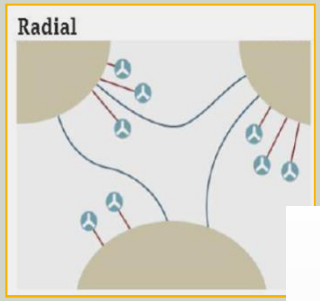


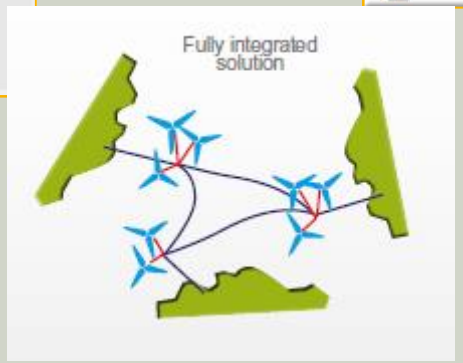


RES subsidies

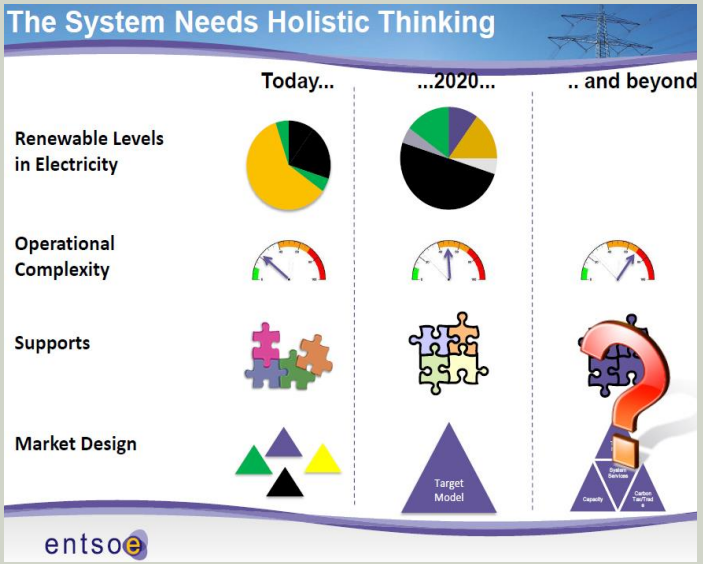
And more……

- **Infrastructure investments**
  - **Specific projects/CBA's**
  - **New grid provinces**
  - **NSCOGI**
  - **Others…..**





- **Going to new market designs……**



How to manage policy issues…..

Fuel mix issues?
- national sovereignty
- the nuclear dilemma?

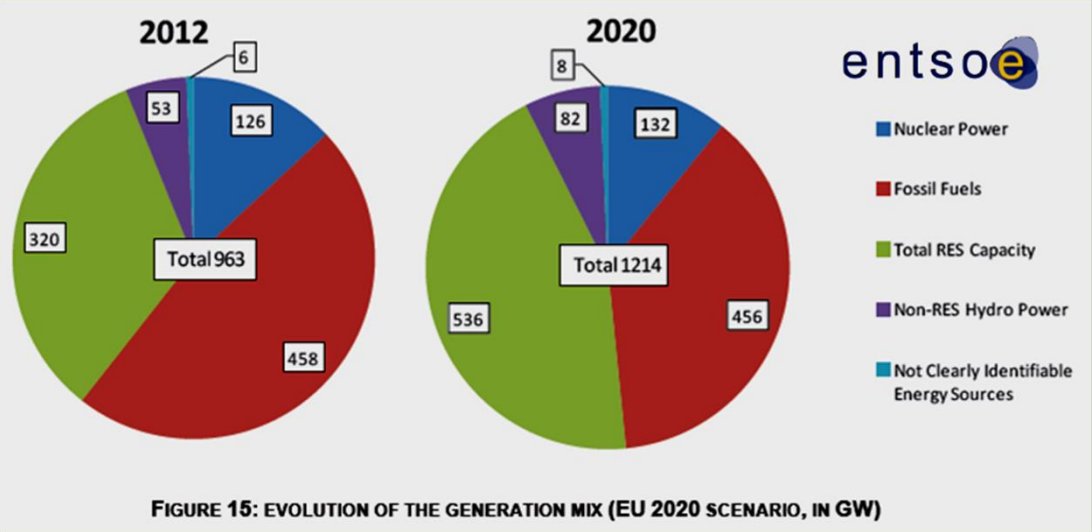
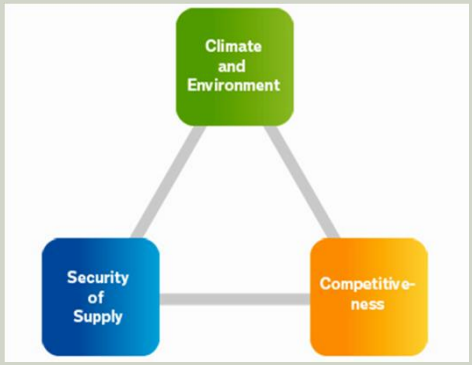


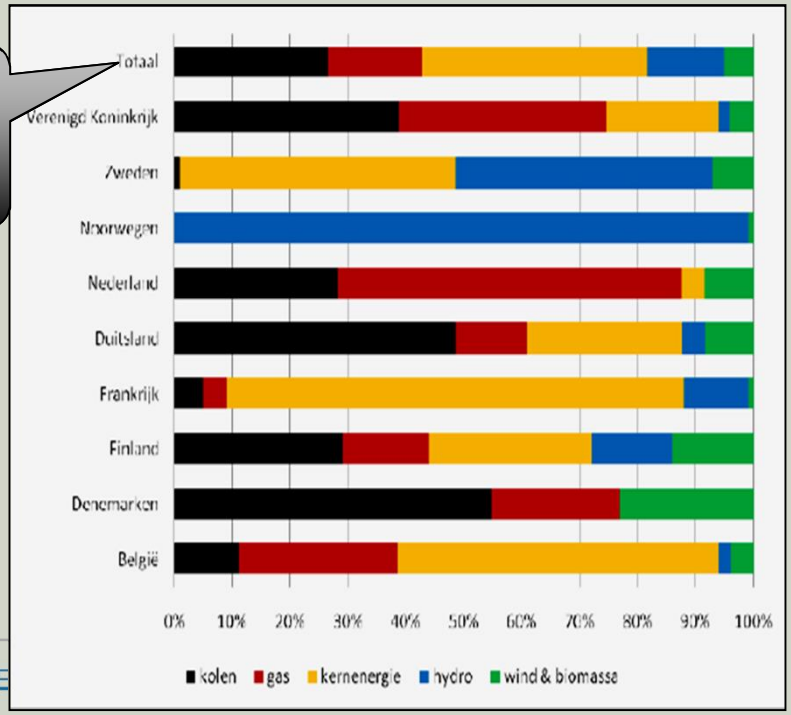
FIGURE 15: EVOLUTION OF THE GENERATION MIX (EU 2020 SCENARIO, IN GW)

How to balance the triangle?



An all EU-27 solution??

NW-EU



In a changing global environment….

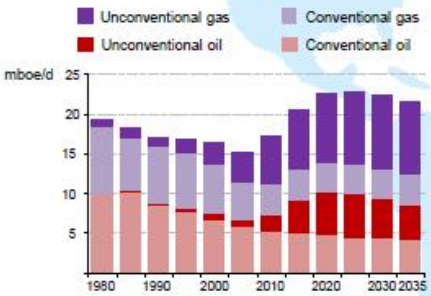
New realities in the global energy market

Impact of the financial crisis

Fall in private investment, tight financing conditions

Shale gas

US oil and gas production



Fukushima

Some countries phase out nuclear power production

Rising demand ➡ rising prices

By 2030, world economy set to double and energy demand to rise by 1/3

Presentation of J.M. Barroso to the European Council, 22 May 2013

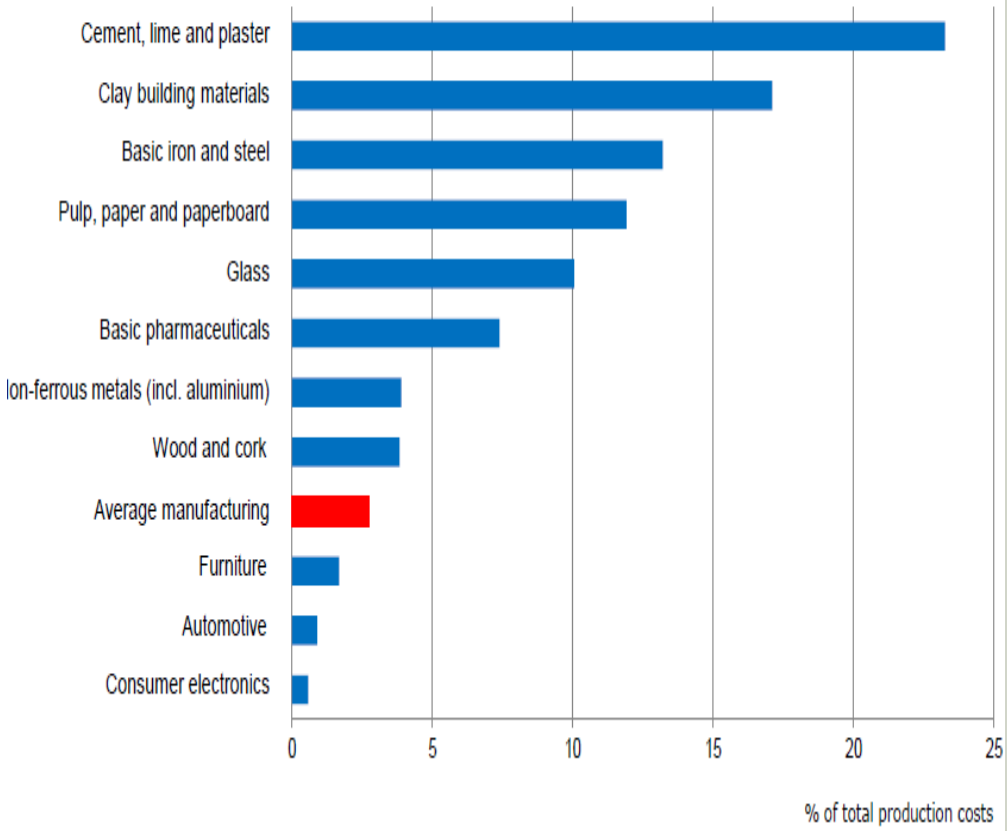
…with serious economic impact concerns

Energy-intensive industries are most exposed

Trends in energy price indexes 2005-2012

	EU	US
Gas price index Industry	↑ 35%	↓ -66%
Gas price index Households	↑ 45%	↑ 3%
Electricity price index Industry	↑ 38%	↓ -4%
Electricity price index Households	↑ 22%	↑ 8%

Share of energy in % of production costs – selected sectors in Germany (2010)



So , where to put the (EU) policy dimension ?

- **The CRM - genie seems out of the bottle ...but**
- **No need to rush into new measures:**
  - Economic slowdown
  - Aggregate of NW Europe should suffice (given sufficient interconnection)
  - Consider existing instruments (i.e. art 7 Directive)
  - Finalise implementation 3rd package
  - Consider developing CB-balancing mechanisms
- **ST concern basically about coal/gas competition……**
- **Articulate the EU –role:**
  - Assess the CB-basis
  - State aid issues
  - The PSO-issue (necessity , proportionality, transitory)
  - Develop common methodology for assessing generation adequacy

Linking "2014/15 with the post 2020 policy….

- Develop/use long term view of European energy market design & system
- Assess the issue on a CB-basis
- Study internal market implications of various mechanisms
- *Consider regional approaches*

Platforms for regional policy discussion?

Nordic Energy Research

Nordic Cooperation

Medreg/Medgrid

Danube energy project

Visegrad-4

Penta Forum and NSCOGI

BENELUX

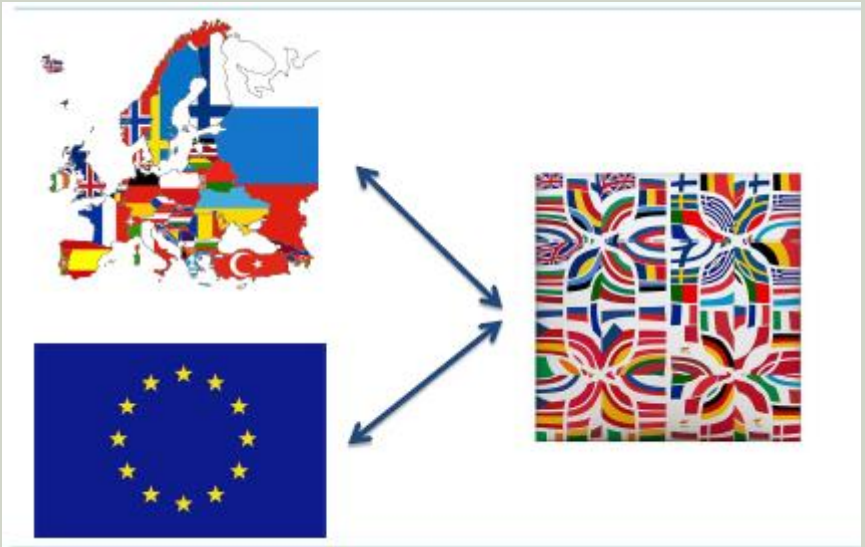
Revitalising the Penta Forum ?

- Strong political impetus; Clear goal
- Not compulsory but more than morally binding thanks to stakeholder approach
- Neutral platform & Pragmatism : top down political guidance: new impact from June 7 meeting!
- Independent secretariat (Benelux)

- NL/FRG bilateral summit 23 may;

Conclusion……..

- Regional markets, regional platforms, policies to be further debated
  - Post 2020 challenges: the low-carbon economy…..
  - Electricity market designs……
  - Gas trades, markets, hubs….



- A global EU approach still needed, but regional bottom-ups in specific implementation?
  - Schengenizing EU Energy Policy?
  - Joint project for further exploration

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Thank you for your attention

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