



CIEP

Clingendael International Energy Programme

Nuclear power & the regional fuel mix

Jacques de Jong

Advancing EU Energy Objectives in East Central Europe

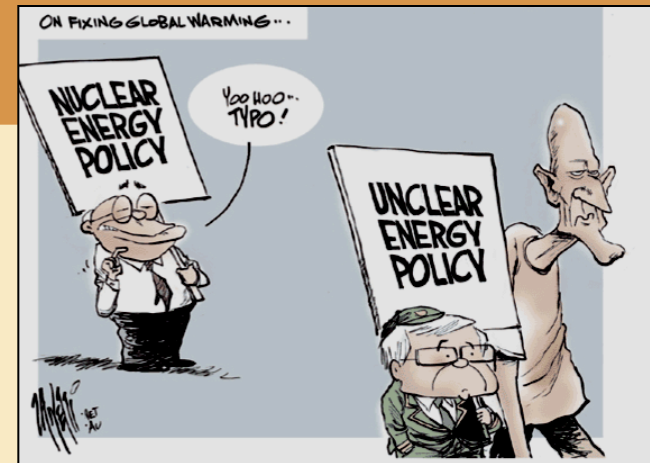
Budapest October 4-5



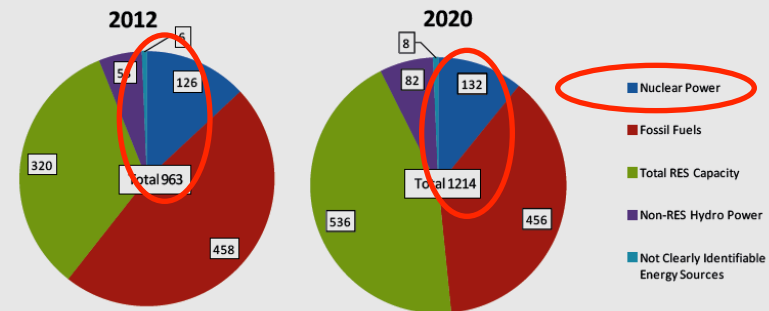
ATLANTIC COUNCIL

Content

- Nuclear in the regional fuel mix
- Grid-interactions
- EU policy approaches ?



EU NPP's many roads to 2050



Graph 1: EU decarbonisation scenarios — 2030 and 2050 range of fuel shares in pr energy consumption compared with 2005 outcome (%)

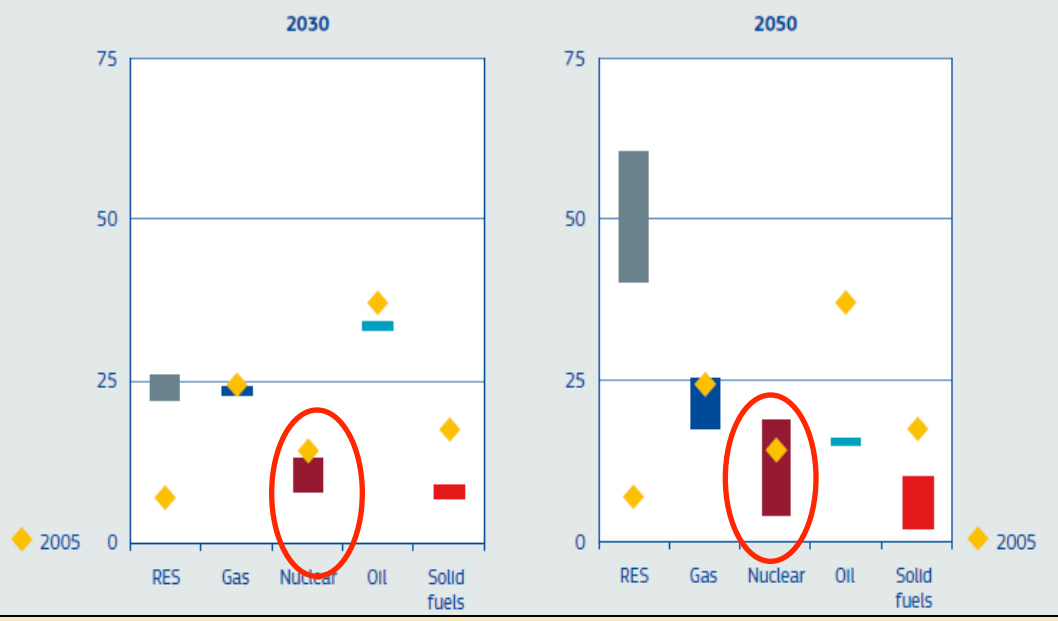
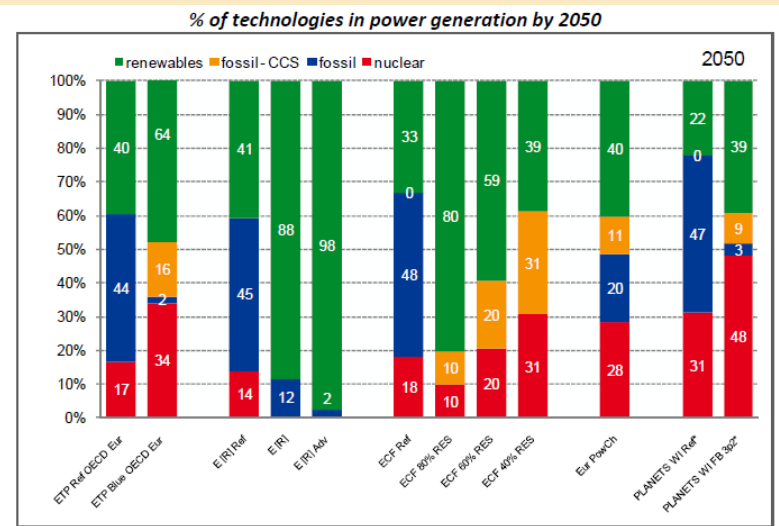


FIGURE 15: EVOLUTION OF THE GENERATION MIX (EU 2020 SCENARIO, IN GW)



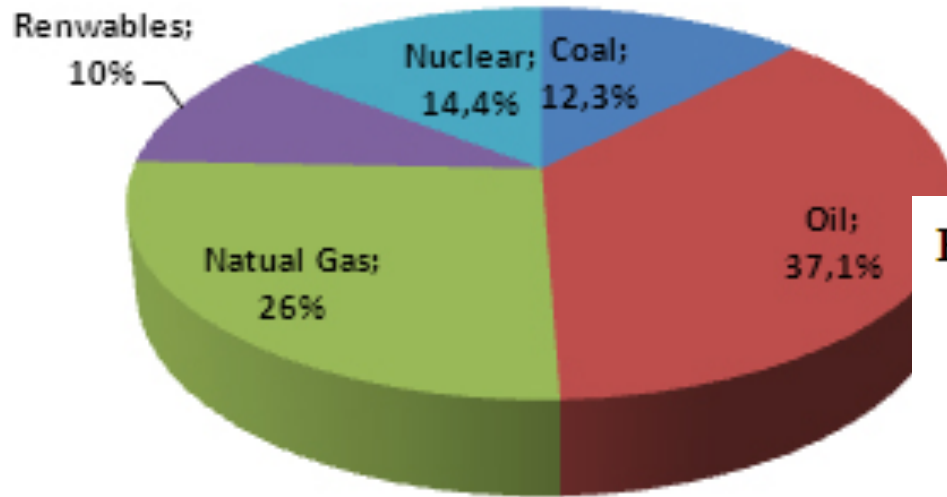
* EU-27 plus Norway, Switzerland

Prognos 2011

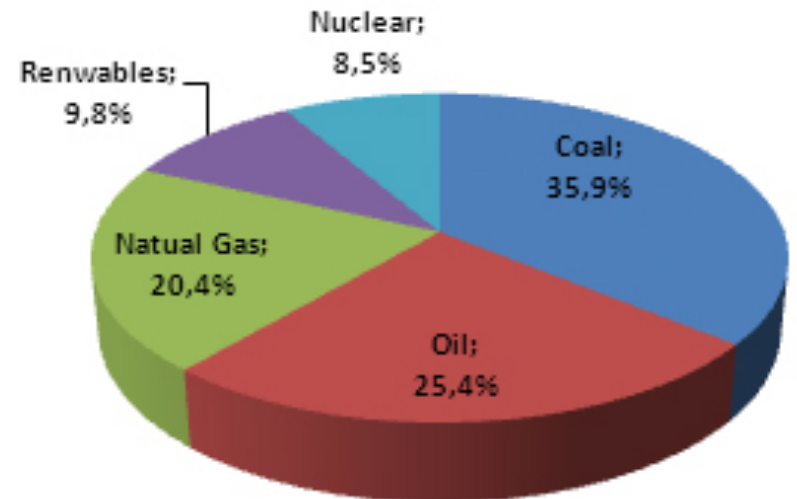
From zero to about 40 % in 2050 ?

Major differences between the East and the West: coal vs gas?

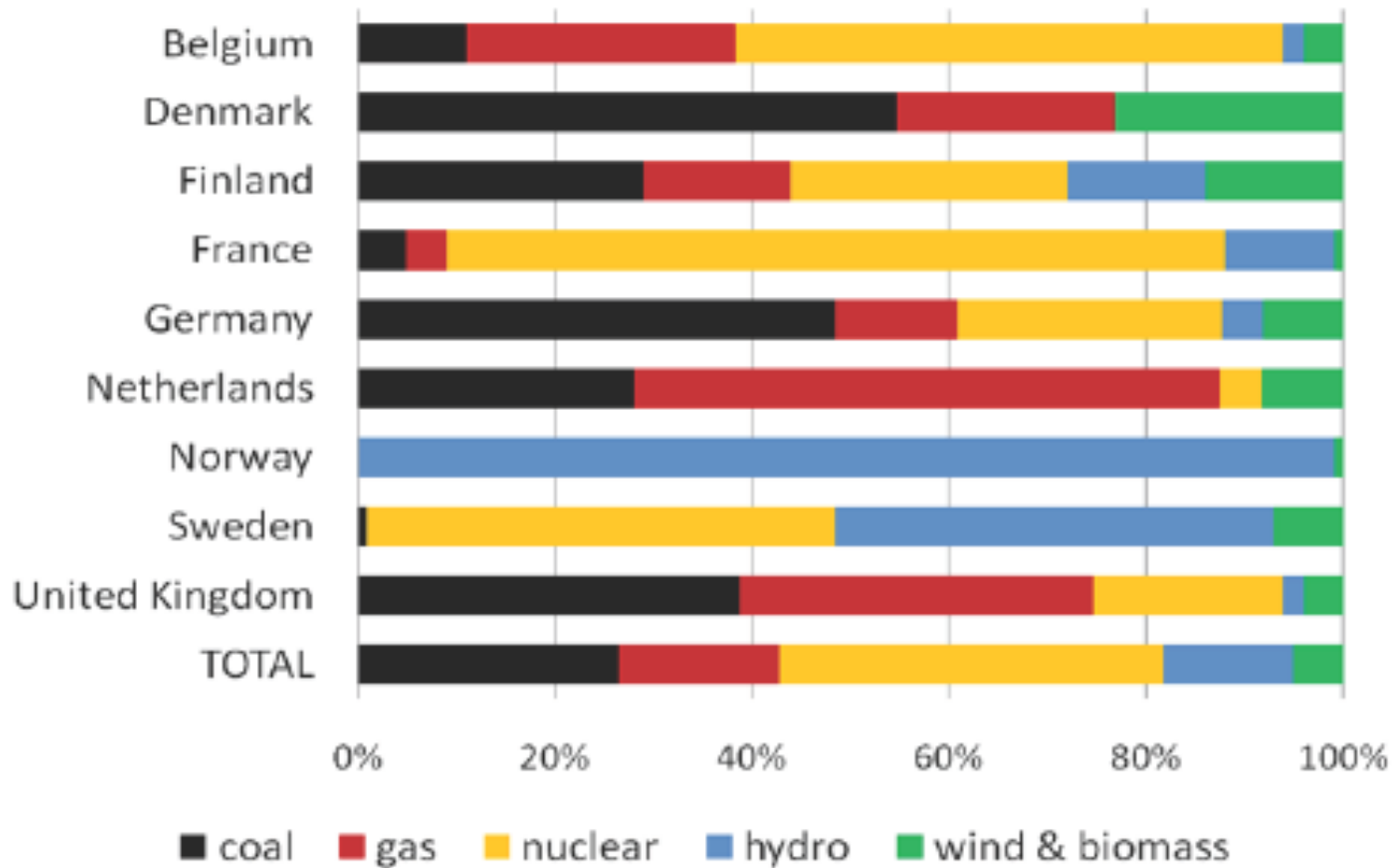
Energy Mix EU-15, 2010



Energy Mix EU-11, 2010



Fuel mix Northwest Europe



Look at the aggregate, a perfect mix?

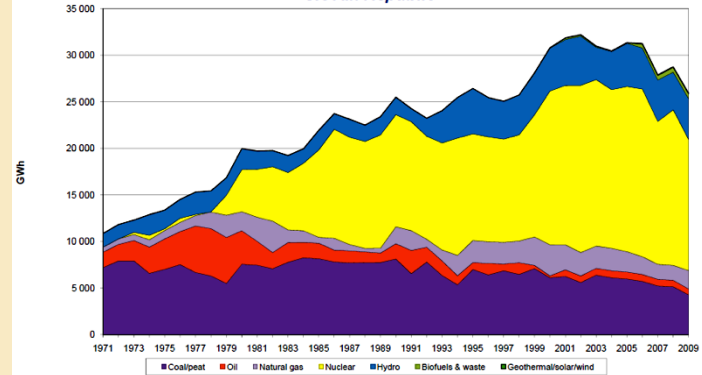
The V4 together (2009):

- Coal 65%
- Gas 7%
- Nuke 20%
- Other (incl. RES) 8%

IEA Energy Statistics

Statistics on the Web: <http://www.iea.org/stats/index.asp>

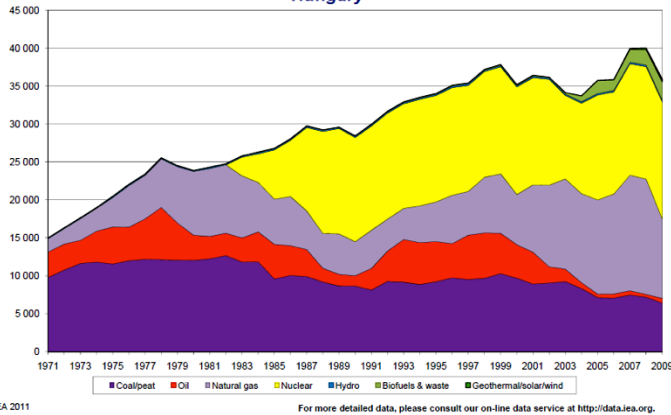
Electricity generation by fuel
Slovak Republic



IEA Energy Statistics

Statistics on the Web: <http://www.iea.org/stats/index.asp>

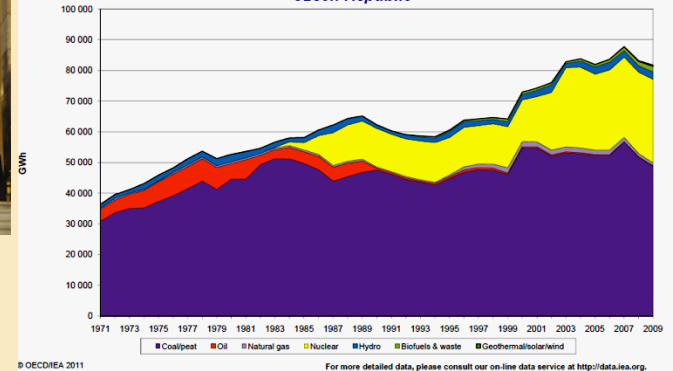
Electricity generation by fuel
Hungary



IEA Energy Statistics

Statistics on the Web: <http://www.iea.org/stats/index.asp>

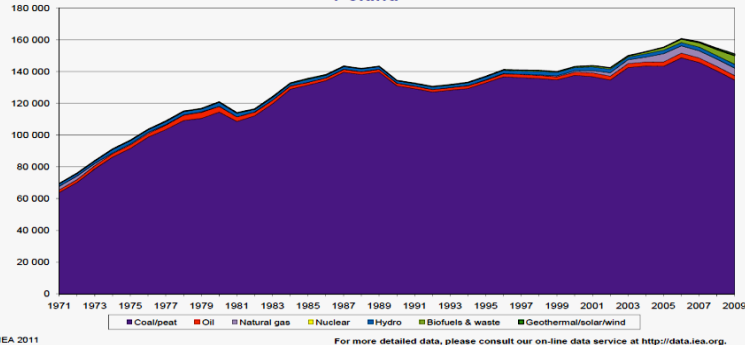
Electricity generation by fuel
Czech Republic



IEA Energy Statistics

Statistics on the Web: <http://www.iea.org/stats/index.asp>

Electricity generation by fuel
Poland



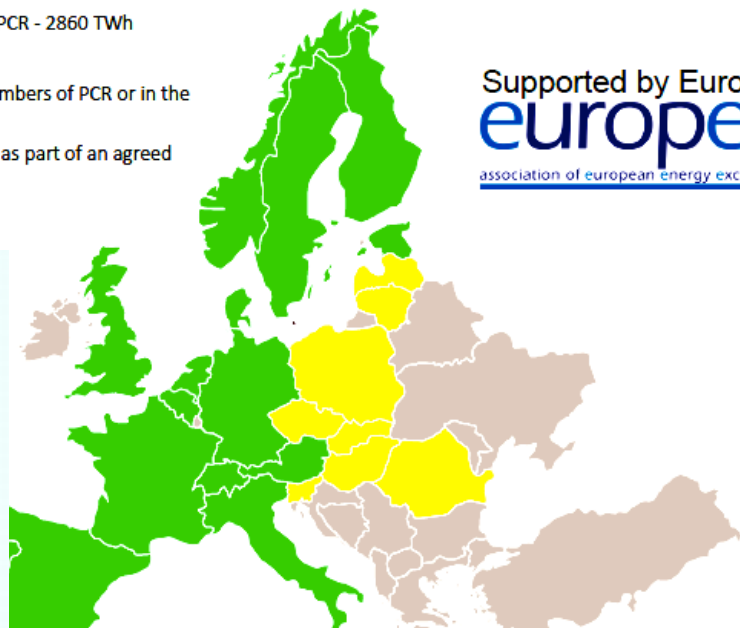
The V4 wants to move further :
less coal, no gas, but more of the
“yellow cake fuel” ?

(regional) market integration



Development of the Price Coupling of Regions (PCR) Initiative

- Markets initially included in PCR - 2860 TWh
- Markets either associate members of PCR or in the process of joining PCR
- Markets that could join next as part of an agreed European roadmap



Supported by Europex
europex
 association of european energy exchanges

Towards the Internal Electricity Market

Project milestones	2011		2012				2013				2014			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
NWE Price Coupling (CWE, NE, GB borders)						✓								
Integration of SWE borders						*	▨	✓						
Integration of CEE borders						*	▨	▨	▨	▨	▨	▨	▨	▨
Integration of CSE borders														✓
Integration of remaining Baltic borders														✓
Integration of remaining FUI borders														✓
Single European Price Coupling (EPC)														★
Integration of ECRB	Integration of ECRB not later than 2015 ⇨													

* MIBEL, Hungary, Slovakia, and the Czech Republic are willing and committed to join EPC by end of 2012

More cross border power flows..... and unsecure situations due to loop flows.

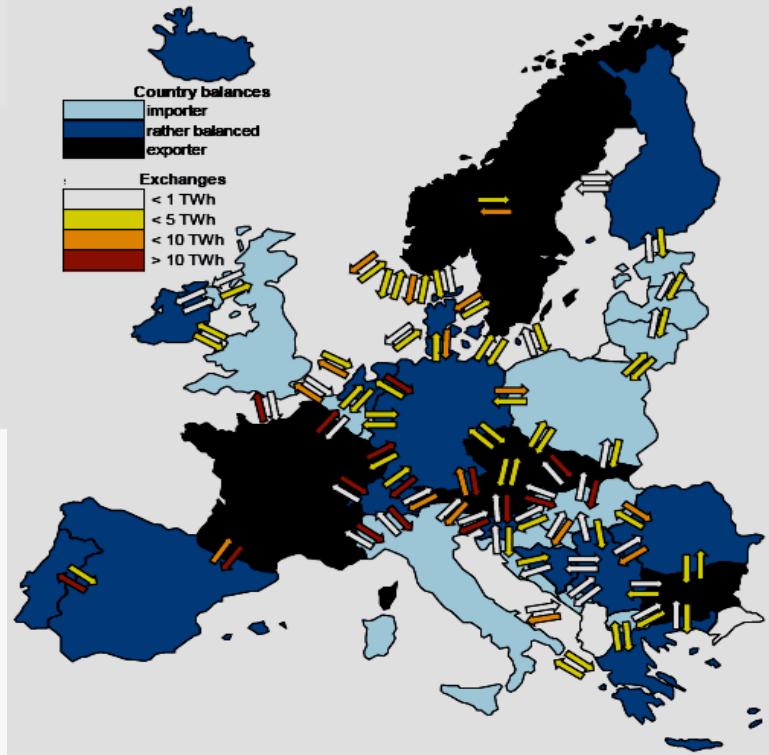


FIGURE 16: POWER EXCHANGES PATTERNS¹⁸ IN 2020 AMONG ENTSO-E COUNTRIES

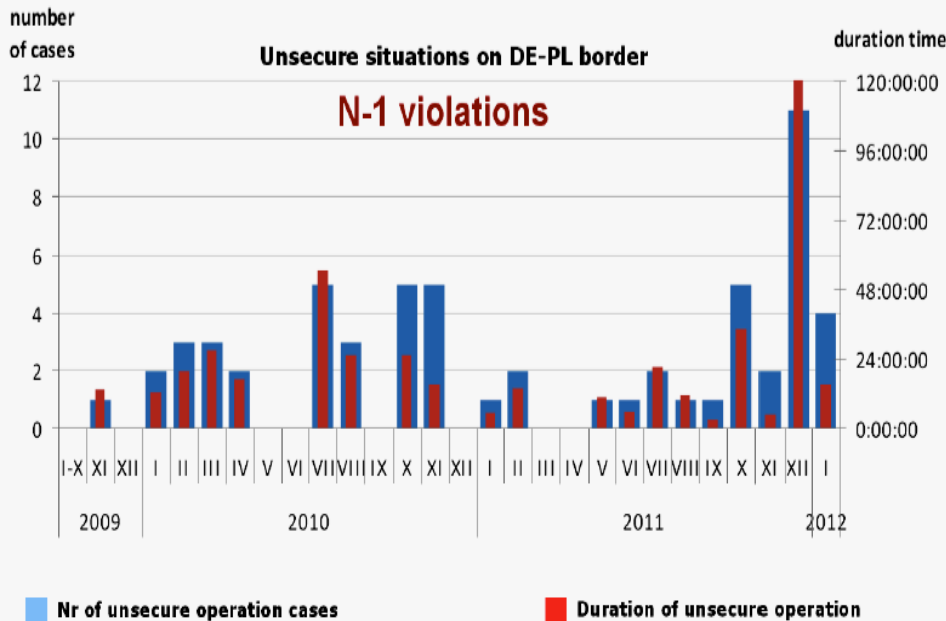
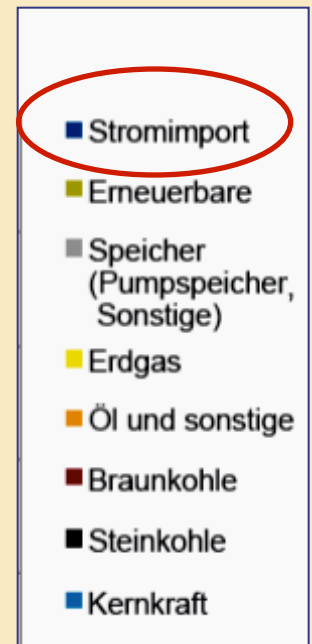
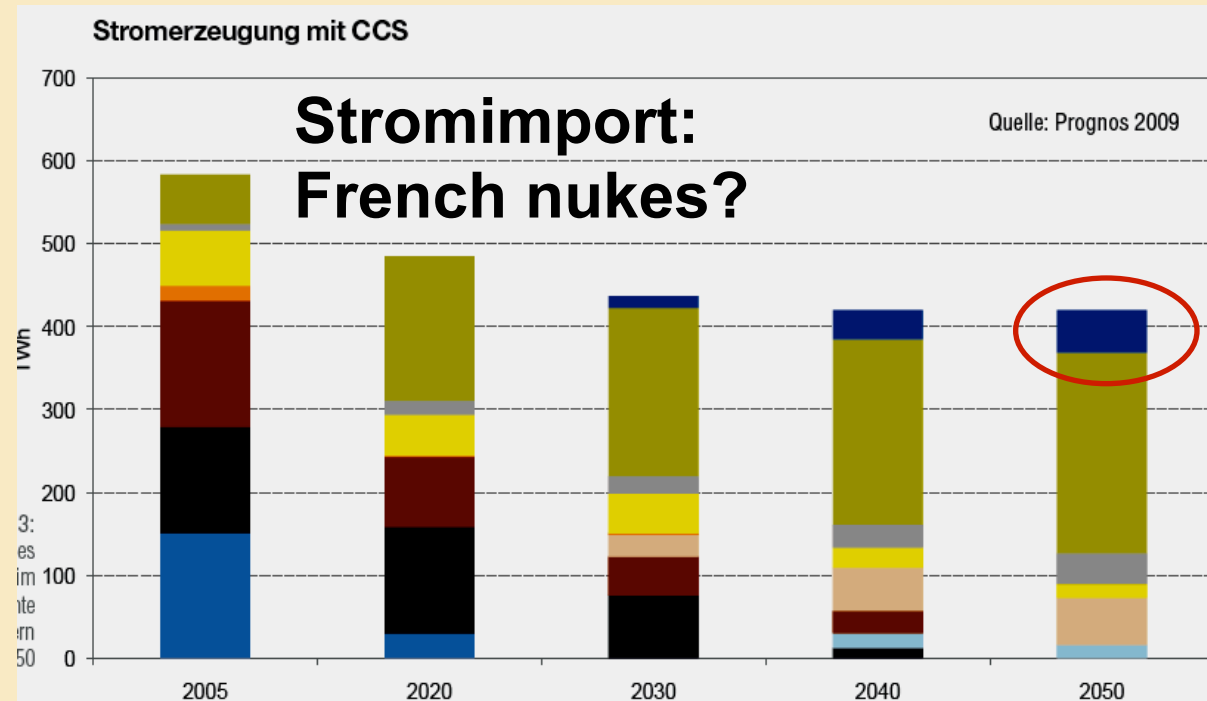


Figure 2. Unsecure situation in the Polish grid caused by unplanned power flows

Source: Position of ČEPS, MAVIR, PSE Operator and SEPS regarding the issue of Bidding Zones Definition, March 2012, p. 26.

The German case....

Stromerzeugung



- Continuing Kohlepfennig?
- Export wind-impacts?
- More Russian gas?
- BW Biedermeier-country?*

* thanks to RWE's Stefan Judisch

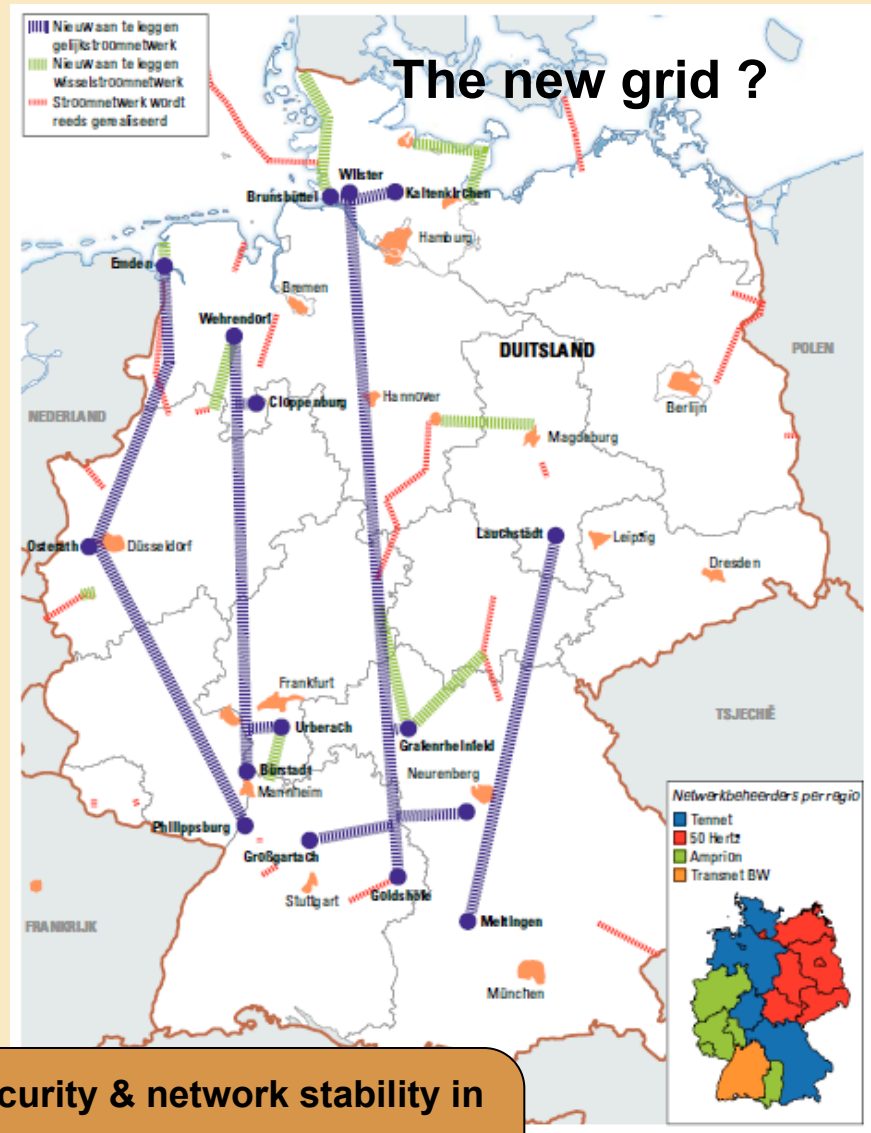


German grids....

average dispatch changes compared to status quo
C. v. Hirschhausen et. al TU Dresden



The nuclear phase out



The new grid ?

No immediate impact next 3-7 years for supply security & network stability in Central Europe. But,

- (1) more transparency needed (full unbundling?) and
- (2) (much) more regional TSO coordination: the need for a regional ISO.....



European Union: mixed policies

Yes, continue (still):

Fr, FI, UK, SE, SK, SI, BG, CZ, RO, HU

To the exit...D, B, Sp (?)

Maybe new: *NL, PL, Baltics*

No, thanks: *DK, AT, PT, IE, Gr, It, LU, CY, MT*

- which role for nuclear energy in the *Roadmap 2050*?
- which *structural grid changes*?
power development, development of renewables, expected vs. allowed nuclear share, grid management and stabilization, capital cost, etc.
- which *financing*?
maintain close cooperation, and share analysis on perspective of nuclear, with investors and financing community
input to the multi-annual EU financial framework?
- *licensing + design approval harmonization*
- *efficiency of Export Control*



A European Strategy?



- Considerable uncertainties
- Market model unclear ?
 - ETS, CO2-price
 - Procedural uncertainties?
 - Strengthening safety oversight?
 - HLW-issues

EU stress Test?

Fuel cycle

- Funding rules for back-end & decommissioning
- Final disposal/ regional options?
- Non-proliferation & fuel assurances

Investment climate

- Regulatory risks & issues
 - Harmonised safety approaches
 - Insurance licensing delays
 - Financial Government Guarantees
- Marketmodel
 - Capacity markets?
- Carbon pricing?
 - Strict ETS
 - Floors or ceilings

Most issues relevant as well for RES



A regional Implementation?



CIEP

Clingendael International Energy Programme

Thank you for your attention.

www.clingendael.nl/ciep