

The European Energy Sector in the Future, stretched between Climate Change and International competition

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Plan

- Recent developments in oil and natural gas and implications for NW European energy markets
- Competitiveness and choosing new policy targets for the post 2020 period

Relatively high crude oil prices, limited access to resources and tight oil developments have created a new dynamic in the oil and oil processing industry

- **Crude oil:**

- Upstream investments have shifted to 'marginal fields' in Noord-Amerika, including the Arctic; tight oil (VS), tar sands (Canada), deep offshore (VS, Brazil, Australia), Arctic (US, Russia)

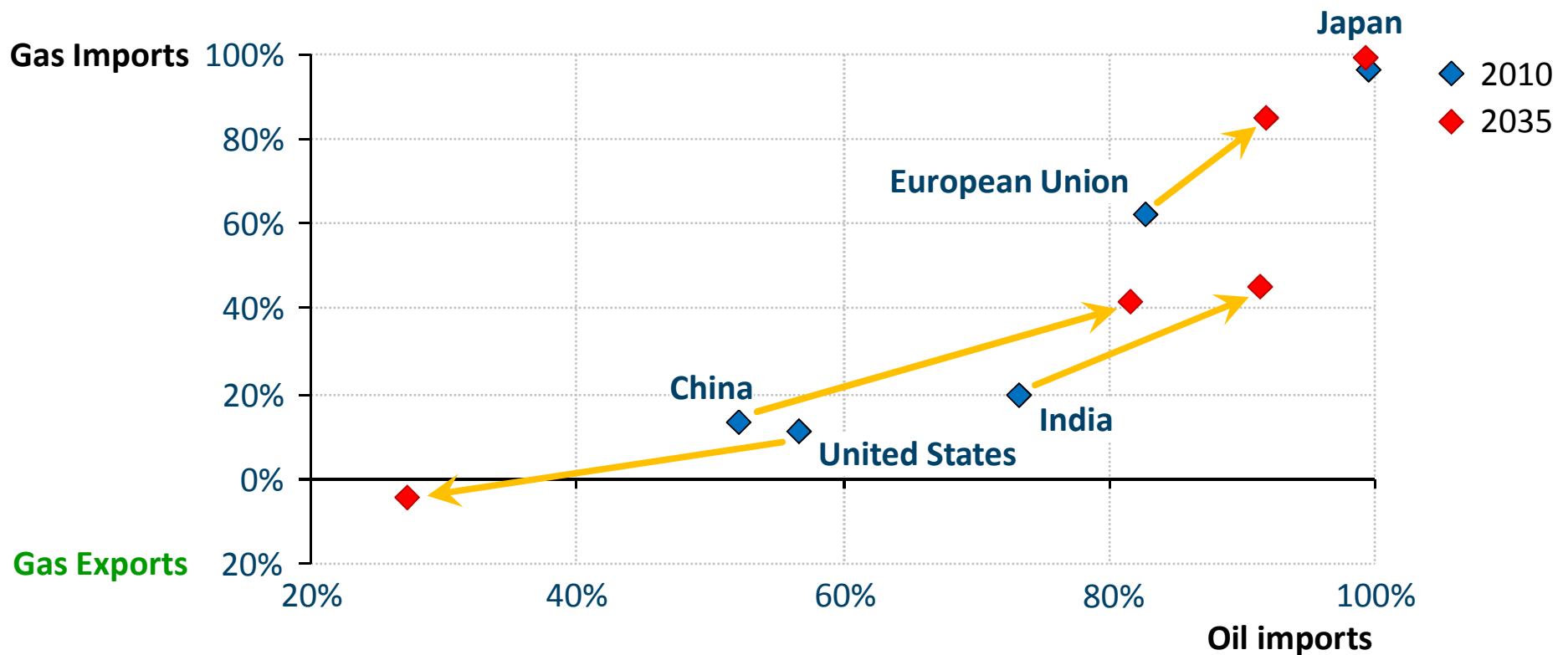
- **Implication:**

- Oil and natural gas prices are significantly lower in US than in the rest of the world. The US will, according to the IEA (WEO 2012) become a temporary net exporter in oil products (crude depends on lifting crude oil export ban) and natural gas (LNG; also depending on award of export licenses; okay for Free trade agreement partners; EU?) with a large impact on crude oil, oil products, natural gas flows in the world, potentially the geopolitical relations in the world and the competitive power of the US viz. Rest of the world including EU.
- Europe and Asia will see import-dependencies grow (Asia will rely mainly on Middle East and Australasia ; EU on West Africa and Russia) (see next slides).
- Competitive position of US improves in terms of energy costs (see next slides)

Different trends in oil & gas import dependency

Import dependency of oil and gas growing except for the US

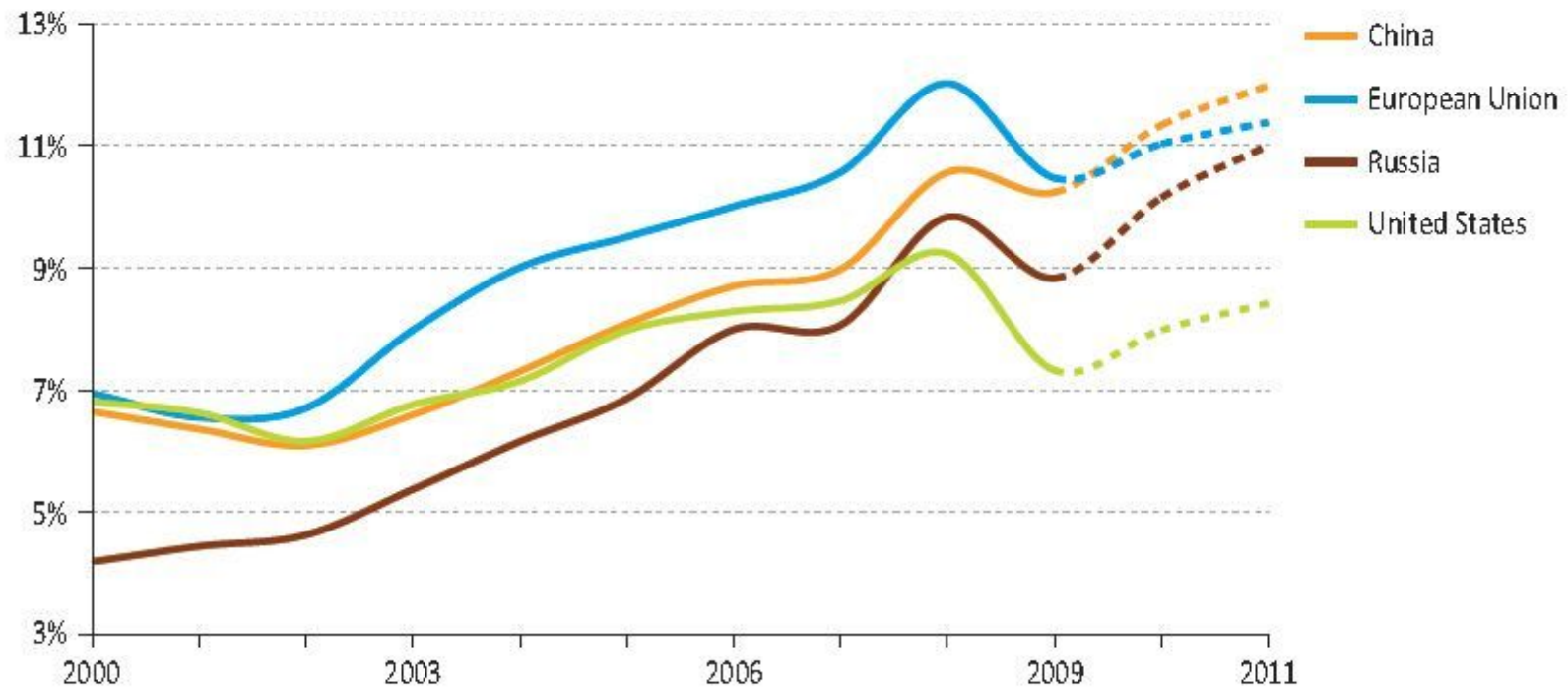
Net oil & gas import dependency in selected countries



IEA WEO 2012

Total energy costs as % of GDP diverging

Figure 7.4 • Total energy costs as a percentage of GDP



Note: 2010 data are preliminary; 2011 data are estimates.

IEA WEO 2011, p. 257

Possible implications for the European downstream (refining and petrochemical) industry

- **Europe:**
 - European downstream sector under pressure due to maturity internal market
 - Reduction of European oil product exports to US (due to maturity demand US and increase in domestic production)
 - Competition from US oil product exports in traditional export markets in North and South America
 - Difficulty competing with oil products in growth markets in Asia and Middle East due to expansion export refineries
 - Some refinery capacity for sale are picked up by national oil companies, seeking security of demand, but some are closed.
- **Dilemma's:**
 - Competitive position of chemical and petrochemical industry when refinery capacities are closed or re-kitted to storage facilities and cost of energy and feedstock increases?
 - How does that impact on the ability to blend biofuels
 - Will Europe become more dependent on oil product imports, at what price and would this require a re-formulation of Security of Supply policies?
 - Will Europe have to bear more of the costs of securing energy trading routes (oil, oil products and LNG)

Relatively high natural gas prices in the period 2003-2008 have sparked new developments

- **Gas:**
 - The development of US shale gas has upturned all market:
 - Company strategies for LNG and pipeline gas has radically changed;
 - Us has become self-sufficient and will possible become an exporter of LNG rather than an importer
 - Prices in the world have not converged but rather are diverging, also as a result of high Asian demand for gas (Fukushima), have led in the US to switching from coal to gas in power sector, making CO2 emissions decline rapidly
 - Switching from coal to gas in power has stimulated the export of coal to Europe
 - Asia is (post-Fukushima) atracting most LNG flows from Qatar, Australia, Brunei, etc.)
 - Natural gas prices in the world diverge: \$3-\$4 per mbtu in US (attractks chemical industry); \$9-12 per mbtu in Europe en \$14+ per mbtu in Asia

Trends in NW European gas and electricity market

Currently a Perfect Storm for gas in NW European market

- Economic crisis (decline of demand; see next slide); electricity sector key for gas demand
- Competition from RES which are given preferential treatment on accessing net work first
- Disappointing performance of EU ETS, making gas last in the merit order with a large competitive gap with coal
- Despite developments of spot market for gas, the divergence in world gas prices keeps LNG off the European market (also due to supply of LT gas and decline in demand), reducing the diversity of supply and reduce supply to traditional suppliers

European market not attractive to invest for



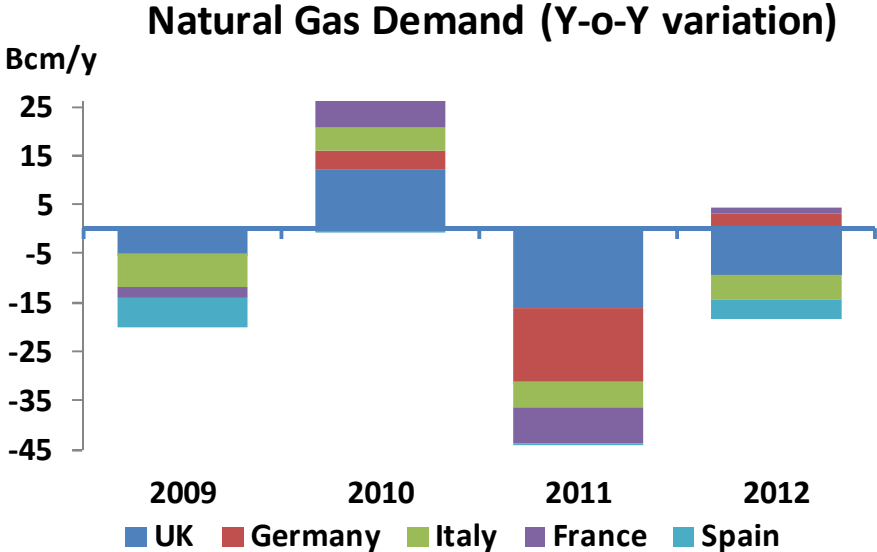
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Europe big 5*: gas demand is lower than in 2009

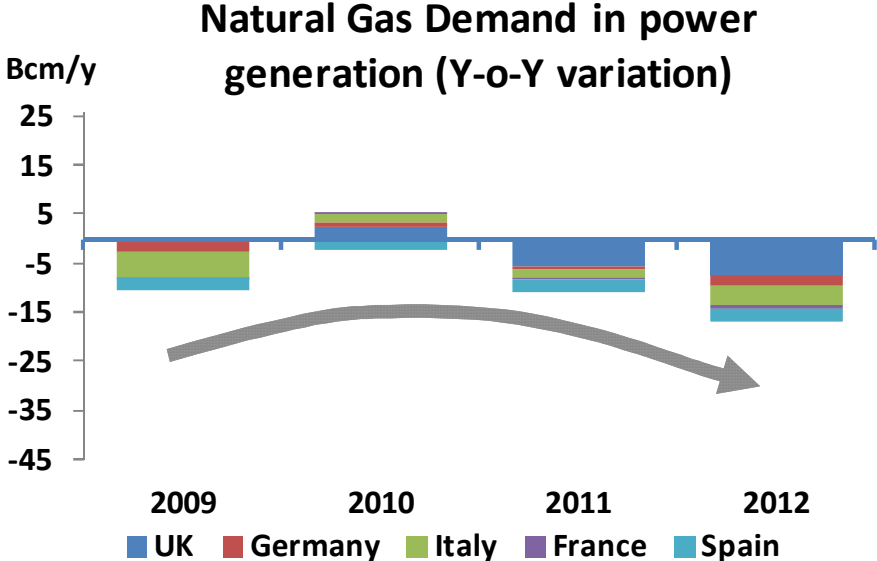
have we reached the bottom?

**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

Continuation: trends in NW European gas market

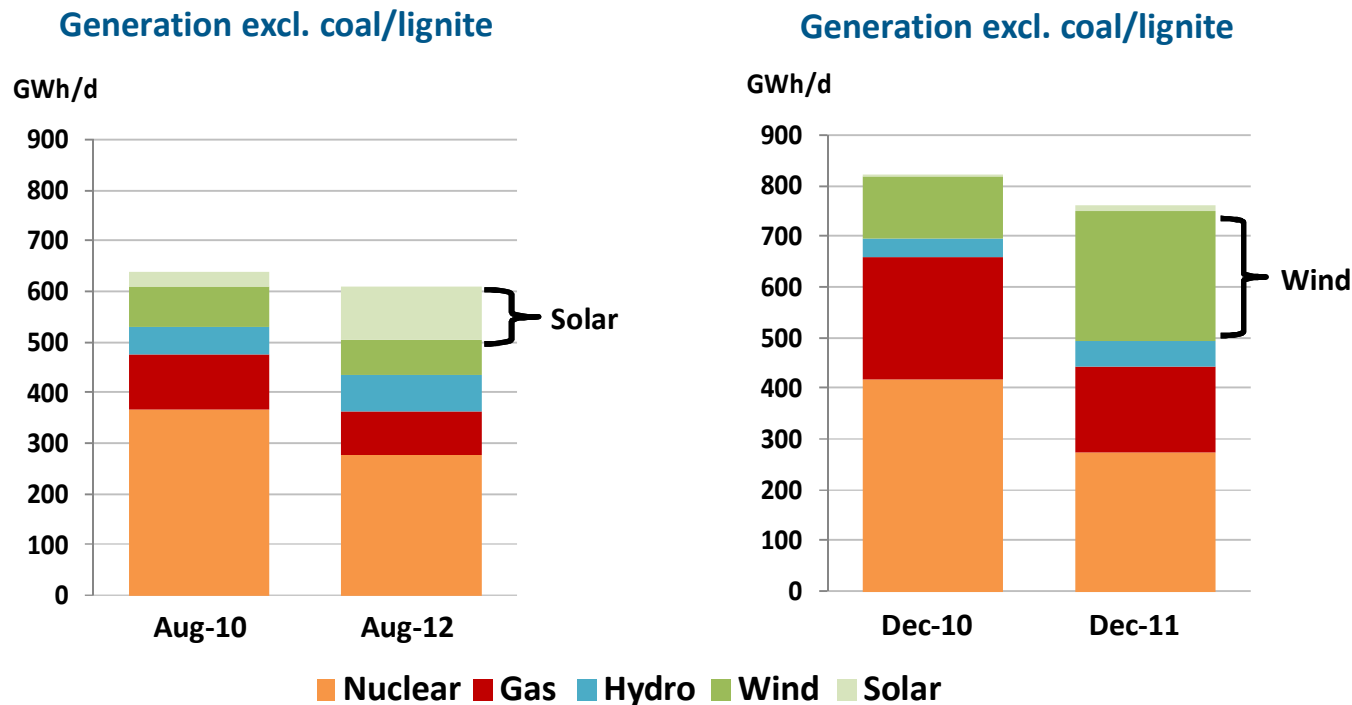
- **Future EU Concerns**

- Growth of world natural gas potential (pipeline gas, LNG, CBM, Shale) not found in considerations in EU 2020 and 2050 policy options and the political exclusion of European Shale potentials
- Europe, in the 2050 roadmap indicates a low-share for gas future which is not very stimulating for investors now, with long lead times and long amortization resulting in a policy driven stagnation/decline for gas
- Europe diverges in its energy strategy/choices from other parts of the world (US/Canada/Asia); how does this impact the geopolitical and geo-economic positioning?
- We have understood too little of the impact of renewables on a shrinking power market (renewables do not take up growth, but phase out others which creates problems due to a lack of storage and the variability of the new sources)
- Renewables have been introduced asymmetrically, not nicely distributed through our systems, requiring more transport etc. and increasing system costs for fewer players

- **EU Dilemma's**

- Competitive position viz. Climate Change; CO2 targets or renewable targets?
- Internal energy production viz. Imports;
- Market viz. Government driven policies

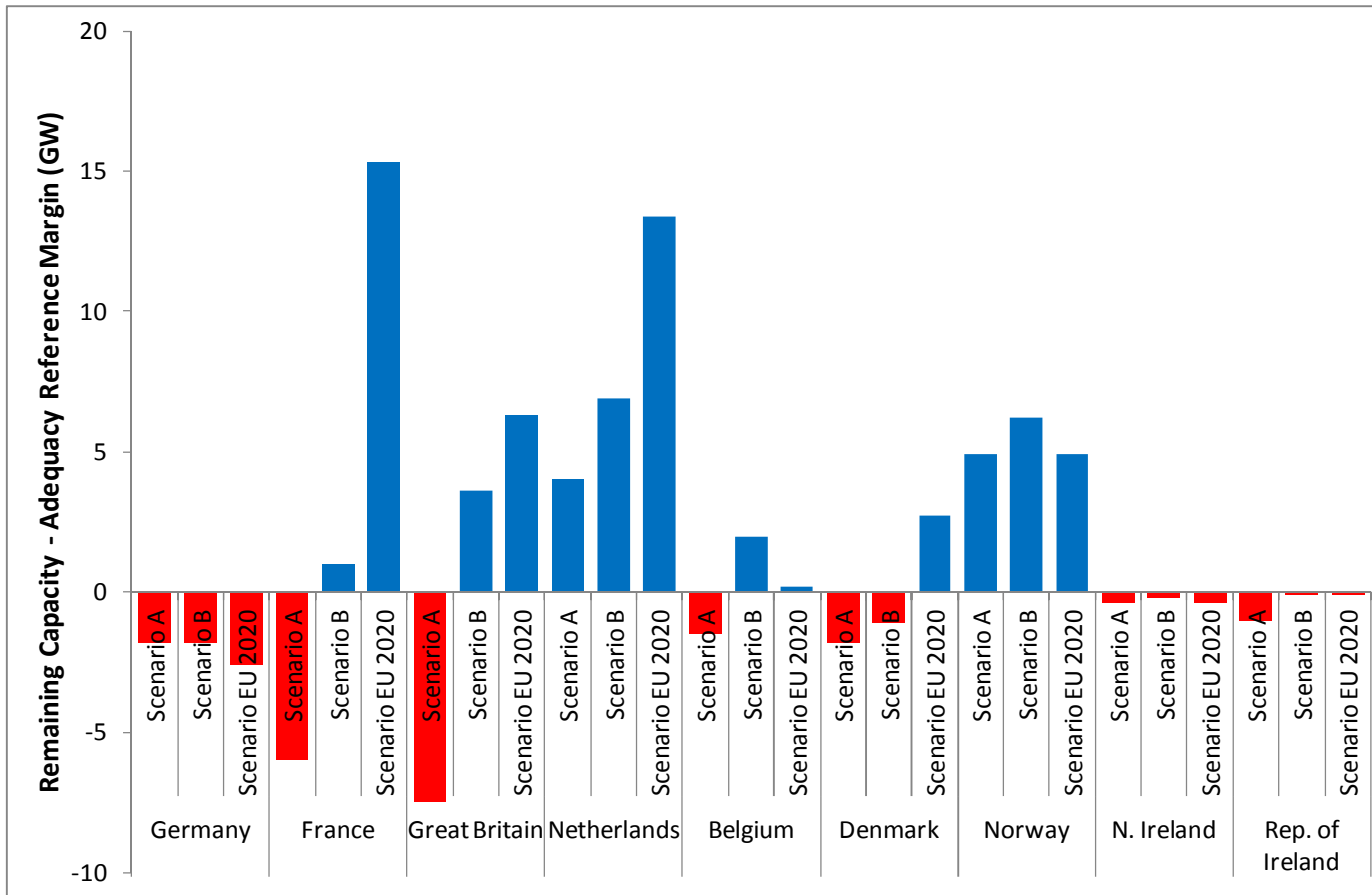
Gas demand for power generation hit by renewable energies the German example



- **Which future for gas in the European power generation mix?**
 - UK: electricity market reform, capacity mechanism to secure investments, etc.
 - France: capacity mechanism
 - Germany: strategic reserves (back up plants)
- **CO2 prices in Europe have reached very low levels (below 5€/ton)**
 - Market mechanisms no longer favour gas versus coal.
 - The UK Government has introduced a "Carbon Price Floor". Could we see the development of similar schemes in other European countries?

Source: Total

Urgency to consider new market mechanisms in the NW European countries differs considerably and are most of the time more local than member state wide problem

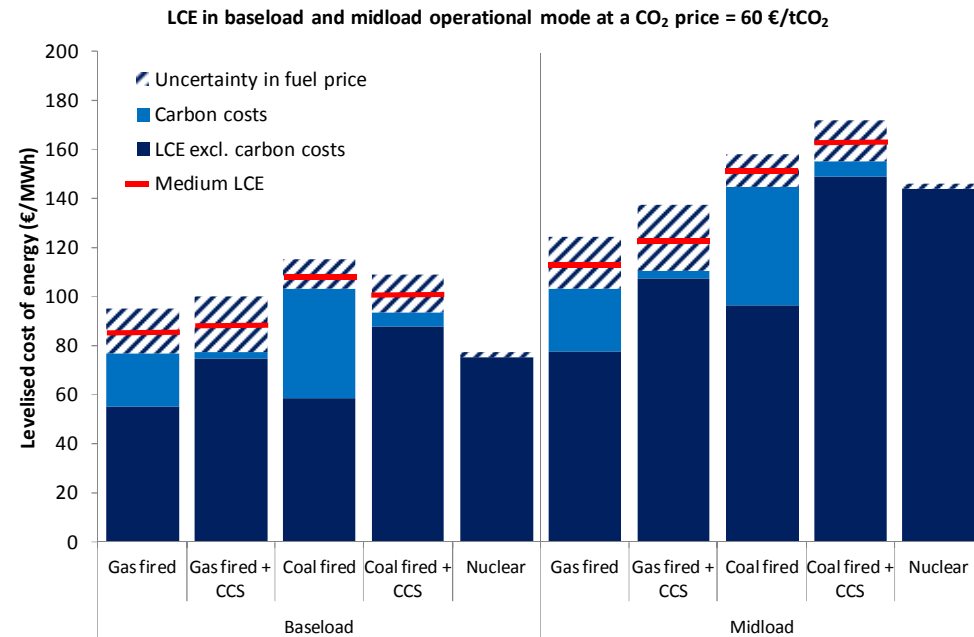


Resulting in additional uncertainties for new investments in power generation capacity

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

- Wind and solar needs both short term balancing reserve (peak generation capacity) 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, however with significantly lower running hours.

Number of running hours influences the economics of power plants considerably



Source: “Wind and Gas: Back-up or back-out, that is the question”, CIEP 2011

Policy dilemma's as a conclusion

- Competitive position viz. Climate Change
 - Can CO2 targets and renewable targets be combined in one policy?
 - How do these targets work in an internal market setting?
 - Can the EU ETS work or should another CO2 pricing mechanism be considered?
 - Do member states focus on climate change as a priority or is it a lesser priority (compared to import management; industrial policy, etc.)
 - Can the US energy revolution be replicated in Europe?
- Internal energy production viz. Imports;
 - Can Europe compete for energy with Asia?
 - Can European and Asian energy intense industry compete with US?
 - Are we willing to pay as much for SoS as Asia does?
 - Will we consider shale gas and tight oil?
 - Will EU member states choose to reduce the share of coal and nuclear? Or is it either or in the short to medium term?
- Market viz. Government driven policies:
 - Will we opt to introduce wind and solar to the market (and make them also responsible for system costs) or will we opt for taking the market out of energy when the share of renewables grow.

Thank you for your attention
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