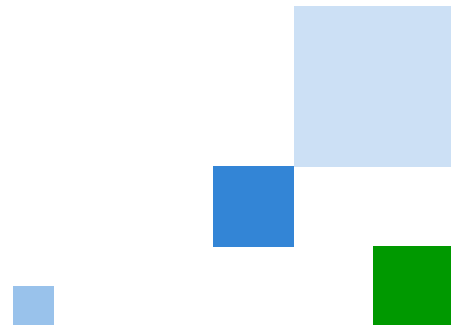


# How market mechanisms work to facilitate competitive prices and security of supply

**General overview of the European commodity markets**

Stefan Judisch  
Managing Director  
RWE Trading GmbH



# Agenda

- About markets, trading and traders
- Price and investment signals
- Pan-European convergence of the power markets
- Security of supply – an issue of diversity ?
- What can politicians do to support the liberalization ?

# Liberalization - the function of wholesale markets

- Liberalization or de-regulation of any market is meant to squeeze out the inefficiency of any (government) managed business or installed monopoly and aims at supporting economic growth
- As soon as a (free) market is formed, its participants are guided by the function of supply and demand which leads to the market (clearing) prices
- The determination of the “correct” price for a good (or commodity) is thus transferred from a single organization, the control agency, to the complex interdependencies of the underlying fundamental factors and the expectations of the participants in the respective market
- The market price will determine the following:
  - allocation of the resources to the highest bidders (vs. potential rationalization in case of scarcity)
  - the way ahead, indicated by producer’s surplus (e.g. investment decisions)
  - innovation, as higher efficiency leads to higher producer’s surplus
- As a final consequence, the market price acts as the focal point of - and the steering instrument for - all involved parties across the entire value chain
- But there is no “free lunch”: liberalization of any market means bringing price risk and the responsibility of managing this risk to all producers and consumers

I would rather be exposed to the inconveniences attending too much liberty, than to those attending too small a degree of it

Thomas Jefferson (1743 – 1826)

# Applied theory: European electricity market liberalization

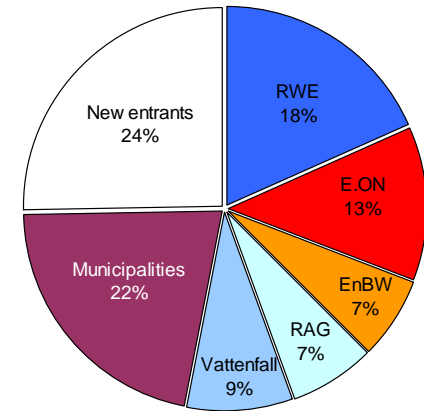
- In the “spirit of Thomas Jefferson”, the European Commission is seeking to create a competitive energy market for the European Union
- The goal of the market liberalization is maximum security of supply at lowest possible cost to consumers, the national economies and the environment
- How electricity markets are “special”:
  - The supply and demand of electricity varies from hour to hour, day to day and season to season. Since, in addition, electricity cannot be stored, there is always going to be higher volatility compared to other (commodity) markets
  - Electricity generation and transmission capacity is often highly constrained, since building new capacities is expensive and time-consuming because of long permit and investment cycles
- Thus, the European energy wholesale markets and their cross commodity and multi-national interdependencies are the central driver for such competitive, pan-European energy market as they will trigger the most efficient operation of generation and distribution assets across the member states

# The liberalized pan-European electricity market

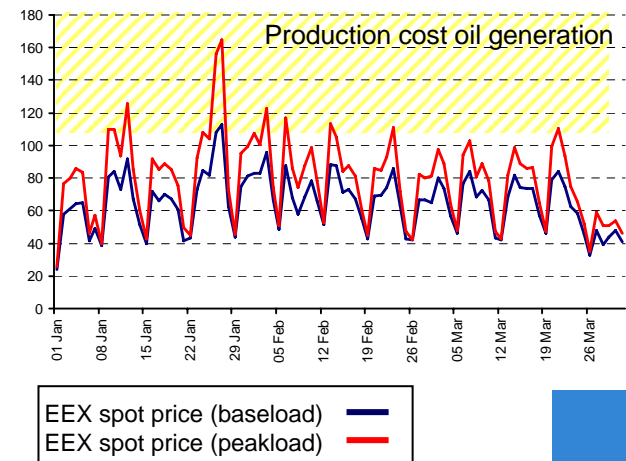
Regardless of the special circumstances in the electricity market, the opening and liberalization of the market leads to immediate as well as and long term benefits. Among the efficiency gains are:

- One combined European generation reserve compares to many domestic ones
- Investment signals are given to the incumbents and new entrants, when the market price proves economically viable for new builds (as it currently does)
  - Example: 24% of the announced new-build capacity will be build by new entrants (details follow later in the presentation)
- Pan-European steering of the assets can not be achieved by a (non-existent) European dispatch system, but only by setting the right (price) signals to the individual assets owners
  - Example: during January 2006, formerly mothballed Italian oil power production units set the (marginal) European power price

Example 1: New builds by owner



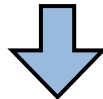
Example 2: Italian oil units set EEX price



# Why are traders necessary for the wholesale markets?

Unlike purely speculative traded markets (such as e.g. bond and stock markets) the energy markets have “natural” participants. The power generators are “naturally long” whereas the sales divisions are the “natural shorts”. So why do we need (speculative) traders ?

- The task of energy traders is similar to the classic core functions of trading in other liberalized markets
  - bringing together buyers and sellers
  - providing risk capital
  - providing price signals to direct the flow of goods/capital
- Modern technology (such as electronic trading platforms) has revolutionized the pooling of buyers and sellers in one market place. Thus, providing risk capital to the market is the remaining core function of a trader in a liberalized market



Although information flows have increased, buyers and sellers will not come together without proprietary traders who are willing to take the respective risk positions into their books.

# Further benefits of a wide variety of market participants

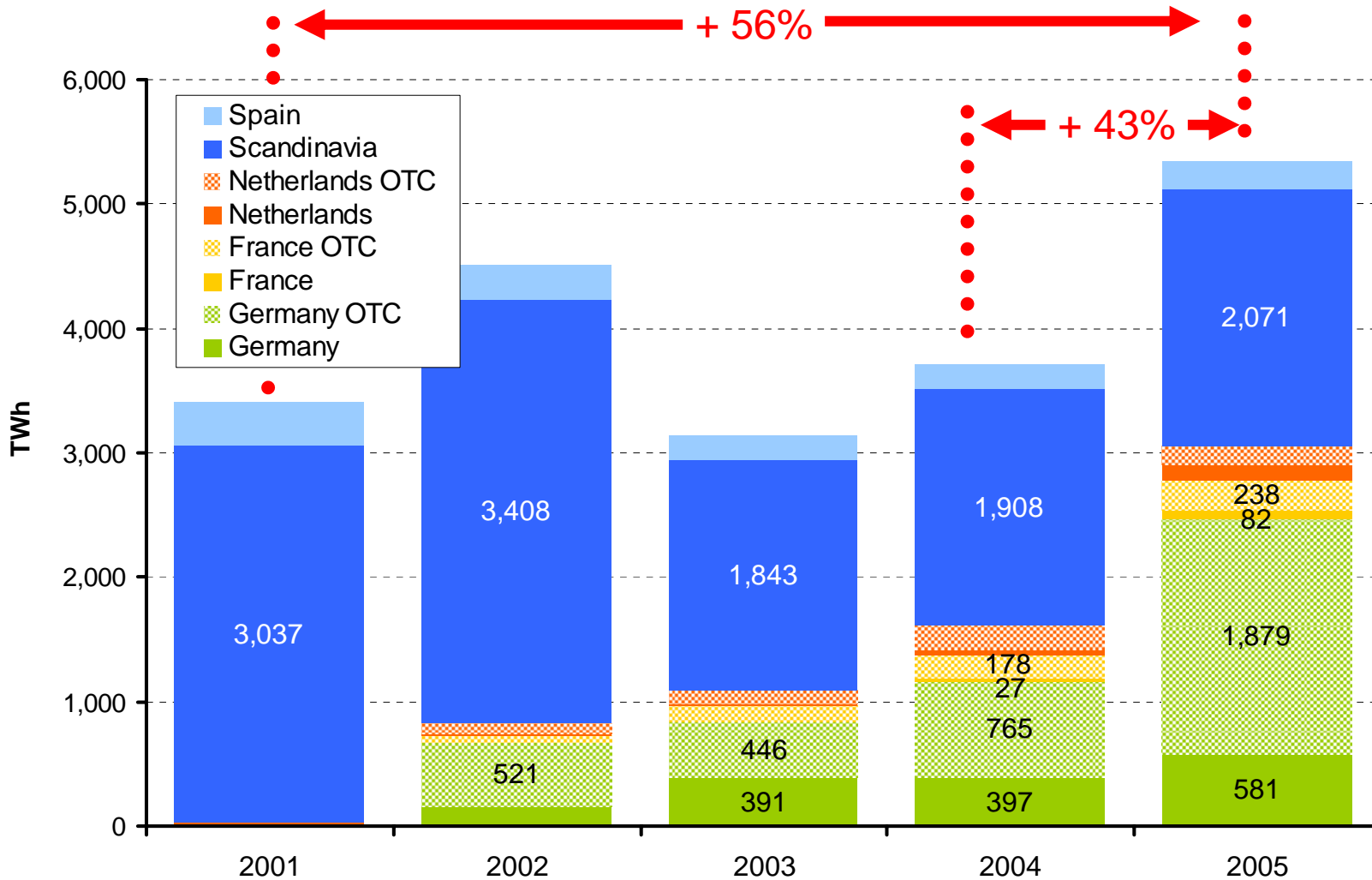
Any “natural” and any purely speculative market participant brings much benefit to markets in terms of:

- risk capital (natural & speculator)
- liquidity (natural & speculator)
- derivatives know-how (mainly speculator)
- risk measurement (natural & speculator)
- risk management (mainly speculator)
- customer oriented working habits (mainly speculator)

Without access to physical production, transmission or storage capacities (either directly or indirectly) speculators (such as financial players) are confined to their core business or risk management and proprietary trading and will not be attracted to the physical parts of the business. Without their involvement, no mature trading and investment environment will evolve (for comparison please recognise that banks and other financial investors are owners of large pieces of generation assets in the USA)

# Continental European power market: trading volume

With the exception of Nordpool, liquidity increased in all markets



# Agenda

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Energy market prices are determined on the basis  
of fundamental factors:

low supply at a given demand

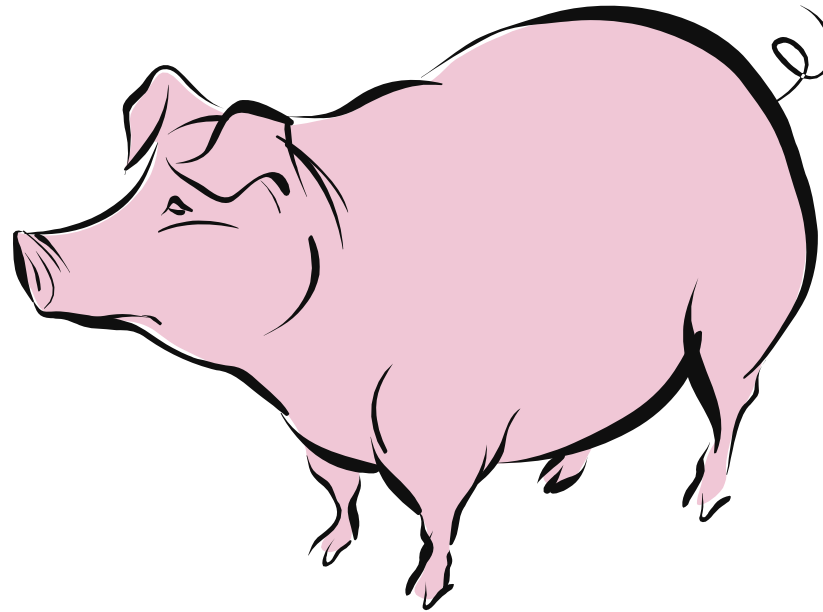
leads to rising prices,

whereas prices will fall in a situation of

high supply at given demand !

Yes, you are right in thinking, that this statement is tedious and rusty, but you are about to find out, how such simple statement also is the driver of today's energy markets !

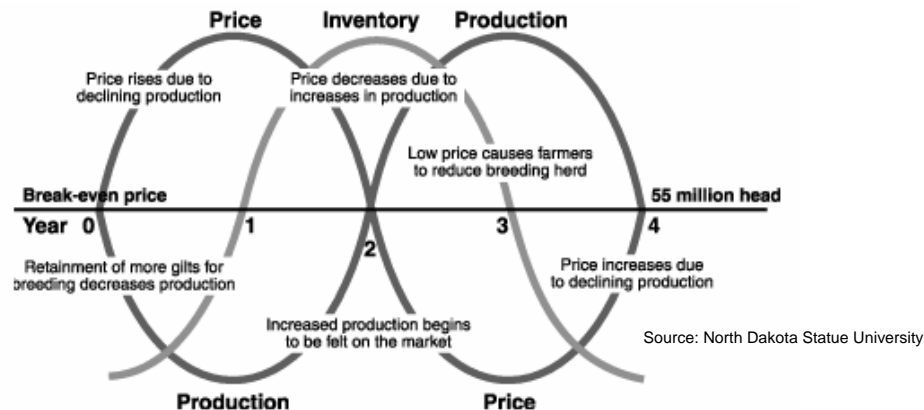
# Why pork can tell us much about the determination of prices on energy markets ...



(This time I am not referring to the former German Minister for Consumer Protection, who stated that farmers will be the oil sheikhs of tomorrow)\*

# The economics of Energy markets: hog cycles

- Due to time lags in the production, hog producers make future production decisions, before the fundamental supply and demand factors for the subsequent period are available ( → so do power plant operators and e.g. upstream gas, coal and oil companies)
- Thus, the supply of pork (as well as energy) at a particular time is depended on the price of earlier periods
- The imbalances, caused by lags between supply and demand, are the cause for (large) price swings on the respective market



The same type of mechanism that influenced the pork market in the 1930's\* is at work in the energy markets today !

- Market prices for electricity established on Europe's power exchanges correspond to the marginal cost of the last power plant that is required in order to satisfy demand (compares to classic economic theory of the marginal price\*)
- In such an event, changes in the price of gas – which may be directly or indirectly linked to the price of oil - have a direct impact on the general price of electricity if a gas fired power plant is necessary to produce the last required MWh
- This can result in a situation where – as described before – an oil power plant in Italy becomes the marginal plant and thus determines the market price for power in North West Continental Europe
- Whether new investments today and in the future will be made in coal-fired or gas- power plants depends decisively on how the complex network of relationships between the price of oil, the (global?!) price of gas, the price of coal, the price of CO<sub>2</sub> and the type of allocation procedure for emissions allowances will develop

\* as based on theories of Smith, Ricardo, Walras, et al

## Example: UK gas price ...

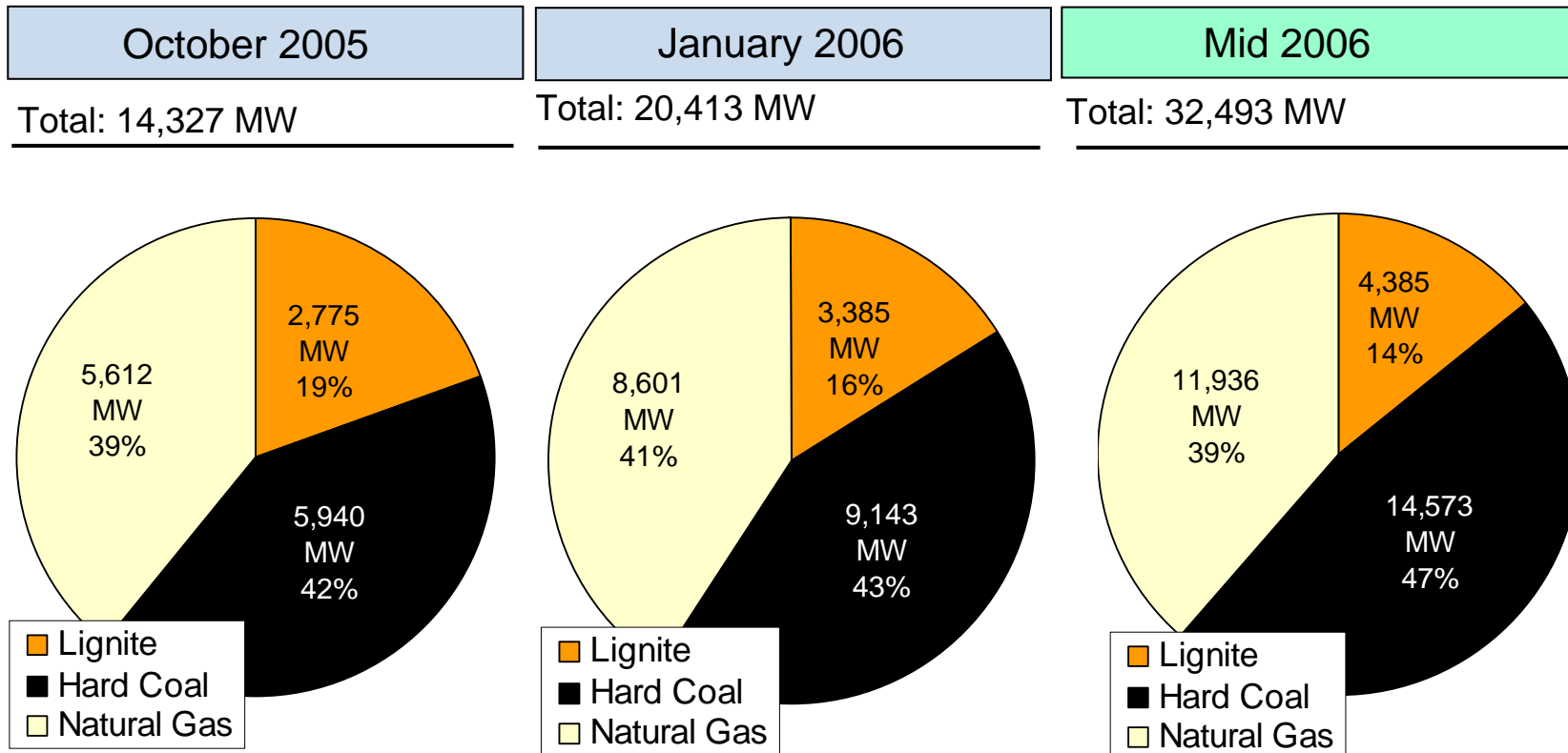
The UK gas price (NBP front month) has risen to ca. 240% of its October 2005 level during November and December of 2005



# ... and what this means for new builds in Germany



New builds are popular – investment is announced by the big, the small and some new players. About 32,500 MW of new capacity has been announced for the German market alone.\* Hard coal units are expected to make up 47% of the new builds, up from 42% in October of last year. The high gas prices, which are a result of a high oil price, are the reason for the “renaissance of the coal”



\*Source: RWE Trading analysis of public announcements of any new build for Germany. New build includes “upgrading” activities and de-mothballing of theoretically available units for permanent use. Lignite, Hard Coal and Natural Gas plants only.

# Agenda

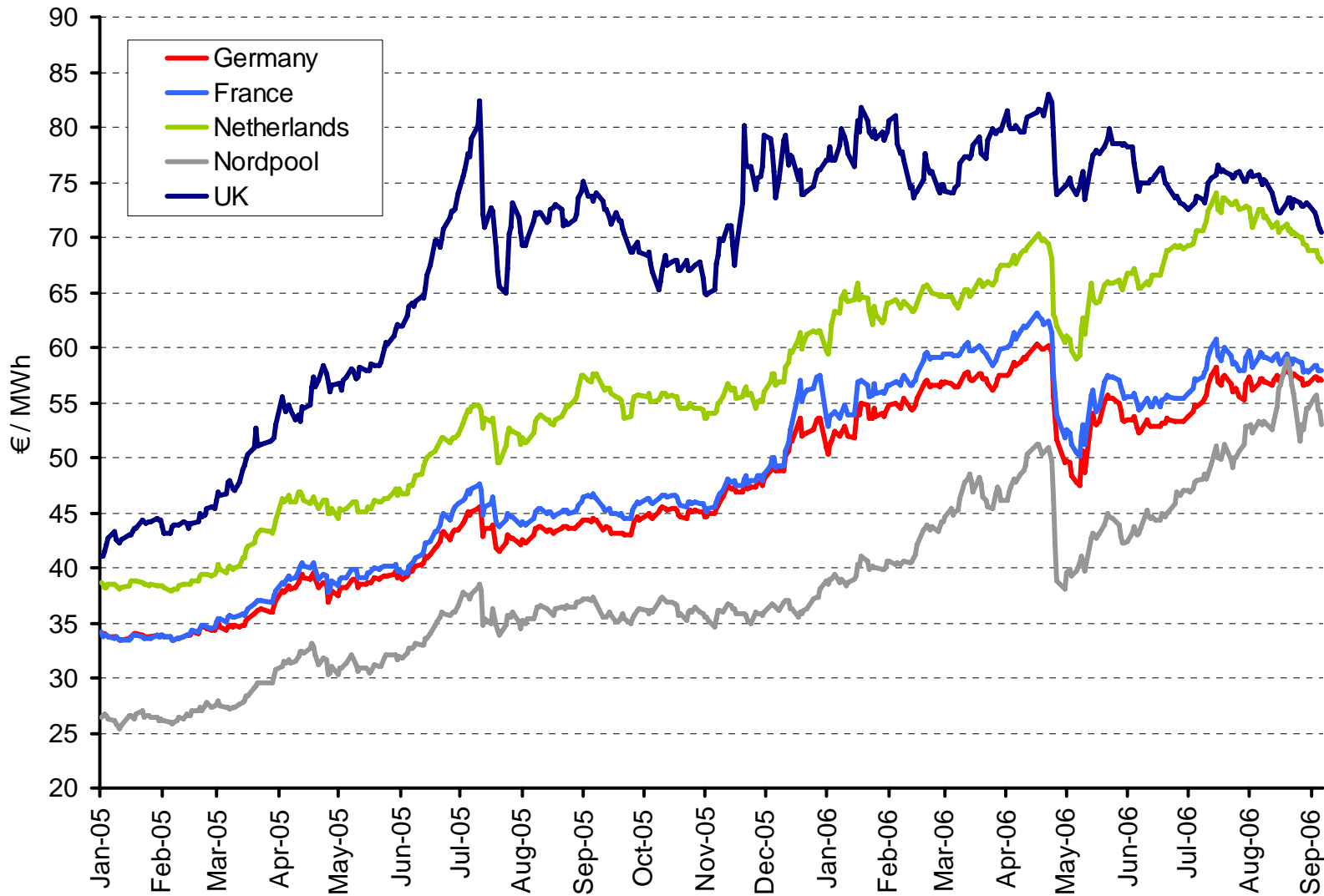
- About markets, trading and traders
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## Focal point of the liberalized market: We need functioning wholesale trading markets

Status quo: we can already see the effects of the market liberalization across Europe. Price moves in the individual countries are almost parallel – on the individual and fundamentally justified levels (see details on next slide)

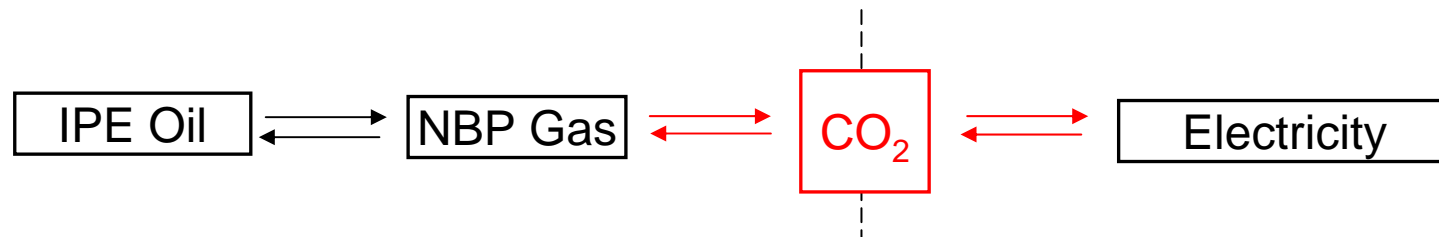
- Main drivers of this "Europeanization-process" include:
  - CO<sub>2</sub> emission certificates are traded on pan-European level and are fungible (nearly) without constraint and transmission cost in Europe
  - Improved allocation of cross border capacity and high utilization of the maximum possible nominations (where market forces are allowed to work)
  - European involvement of the national utilities
  
- Politics as well as end-users demand for increased competition on the markets to evolve. But without liquid and reliable wholesale trading, the level of competition can not increase. The pan-European character of wholesale energy trading has the most positive effect on competition – based on a European and a national level

# Development of the forward calendar year price for baseload electricity in absolute terms



# European energy markets are undergoing major changes: convergence of the markets

- Before the emergence of the emissions trading market scheme, many of the European energy commodity markets had weak or non-existent cross relationships
- Although some correlation could be observed between NBP Gas , IPE Oil and the UK electricity market, neither Nordpool nor German power were linked to NBP or IPE Oil. A very weak link could be observed between the UK and French power market (Interconnector)
- The pan-European Emissions Trading Scheme (CO<sub>2</sub> market mechanism) has formed the link between power markets and gas / oil markets, correlations have drastically increased (see next slides)
- “Fuel switching behaviour” (of the electricity generators) is thus the key driver in this changing market



# Evidence for our theory

Correlation and volatility changes on the power trading markets are a result of carbon trading:

- Shortly after gas prices for the UK plummeted in mid July 2005 by roughly 32 % within a matter of days, the same move could (to almost the exact same extent) be observed on the CO<sub>2</sub> emissions market
- Long term power prices reacted promptly and fell by almost 9 - 12% in all European power markets for no other apparent reason than the falling gas and CO<sub>2</sub> prices\*

Correlation 2004**				
	France	Nordpool	Holland	UK
Germany	<b>0.912</b>	0.581	0.772	0.776
France		0.691	0.879	0.894
Nordpool			0.552	0.611
Netherlands				<b>0.909</b>

Correlation 2005**				
	France	Nordpool	Holland	UK
Germany	<b>0.994</b>	<b>0.940</b>	<b>0.974</b>	<b>0.939</b>
France		<b>0.961</b>	<b>0.984</b>	<b>0.960</b>
Nordpool			<b>0.974</b>	<b>0.964</b>
Netherlands				<b>0.956</b>

\* strongest reaction on Nordpool with ~ -12% , NL, F and D ~ -9%

\*\* correlations above 90% are marked in red

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# History excursion: security of supply as an issue of diversity



HMS Dreadnought: Coal and oil fired vessel, gave its name to an entire type of vessels (1906-1923)



HMS Hood (1916): oil powered "super-dreadnought", strongest battleship engine of its time (sunk 1941 by the SMS Bismarck)



SMS Scharnhorst (1906): coal fired German vessel that was sunk by the faster "Invincible class" dual fuel "Dreadnoughts" in 1914

## From coal powered to oil powered vessels

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- The shift of the Royal Navy's fuel source from coal to oil was intended to make the fleet faster than its German counterpart
- But the switch also meant that the Royal Navy would no longer rely on coal from nearby Wales but on insecure oil supplies from what was then Persia (and is now Iran)
- In 1912, the United States delivered 62% of the global oil demand, Russia and Mexico delivered 19% and 5%.
- In 1913, the British government bought the majority in the Anglo-Persian Oil Company, later to be known as BP. Oil became the focal point in Britain's strategic interests
- Thus, energy security became a question of national strategy. Churchill's response was that "safety and certainty in oil," he said, "lie in variety and variety alone."

## The importance of Churchill's decision for modern wholesale markets: natural gas

- Since Churchill's decision, energy security has repeatedly emerged as an issue of great importance, and it is so once again in the light of today's "pricing" issues
- More LNG imports will be one answer of the market to gas price spikes as seen in the UK this past winter
- The flow of LNG to meet gas demand will be determined by liquid and deep wholesale gas price benchmarks like "Henry Hub" or "NBP"
- Where these wholesale price benchmarks do not exist, gas producers are hesitant to supply "merchant LNG" because prices are not transparent
- Therefore, a "liquidity"-risk for buyers evolves if they do not have access to the retail market
- In a global market competing for gas, the best way to achieve security of supply is to create liquid wholesale markets and let them work

# LNG – or: the global gas molecule

## ATLANTIC ARBITRAGE

December was a good illustration of LNG's ability to respond to price signals. Spot activity appears to suggest that LNG can respond to price signals with a two- to three-week time lag. Market players reacted to the elevated price levels of late November in the United Kingdom with a sense of urgency. The

## Mexican LNG purchasing plan

Mexico's ministry of energy is brokering an agreement between state oil company Pemex, state utility Federal Electricity Commission and private companies for a consortium to buy LNG, it was reported this week.

## Poland and GDF set for deal

Polish gas group PGNiG expects to sign soon a letter of intent with Gaz de France to cooperate on building a regasification terminal, the Polish group said in a report this week.

## Porters 'line up supply'

Porters supply source that will have the most intermediate-term impact on US market will be LNG, consultants Energy Ventures Analysis of Virginia said this week. Currently it appears that 16 out of the 90 terminal proposals in North America will be constructed, the group said in a report.

The increase in global LNG capacity will result in higher levels of LNG imports into United States and a fuller utilization of regas capacity in Northwestern Europe. Sustained levels of gas storage will also provide psychological relief as we pass the winter midpoint. The start-up of major new tranches of LNG capacity has eroded the shipping surplus, and inspections and repairs to some operating ships may even place the shipping market under a constraint. Shipping will remain tight through to spring before switching back to significant surplus.

## Commercial Services Company, Ltd.

December 05' Marks Highest European LNG Import Month to Date  
European LNG imports during December 2005 top historical charts with over 3.8 millions tons landing on European soil. Egyptian supply alone consisted of 926,000mt, more than double that of the previous month. Nigerian volumes were also up sharply in December, coming in at just over 1 million tons. A rise in Trinidad sourced cargoes added an incremental 169,000mt in December. On a country-by-country basis, big increases were felt in Belgium (up 227,000mt from the prior month), France (up 235,000mt from the prior month), Spain (up 250,000mt from prior month) and, of course, the UK (up 113,000mt from the prior month). The primary drivers for the strong European demand remain a function of low hydro levels in Spain, strong demand in France (balancing inventories and rerouting pipeline gas) and overall gas shortages in the UK.

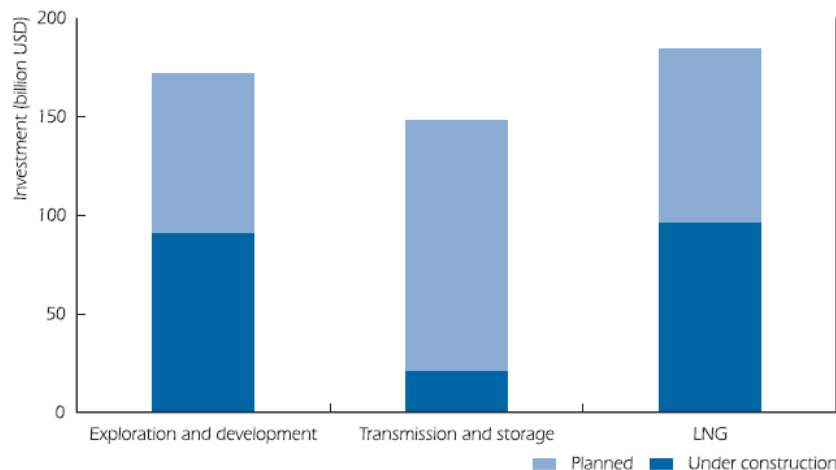
# European gas business becomes increasingly exposed to global competition

- The interaction of pipeline gas with LNG binds the main gas regions (USA, Asia, Europe) together and lets them enter global competition. Thus, what is true for other globally competing industries, is true for the energy business:

**Consolidation in the European gas business will continue to create a sustainable European gas industry within a global competition framework.**

**Regional oligopolies need (to learn) to operate in a competitive environment.**

- As an example for the globalization of the industry, Alexej Miller of Gazprom recently stated: “Gazprom has the free choice to supply other [than European] interested parties such as North America and China“\*



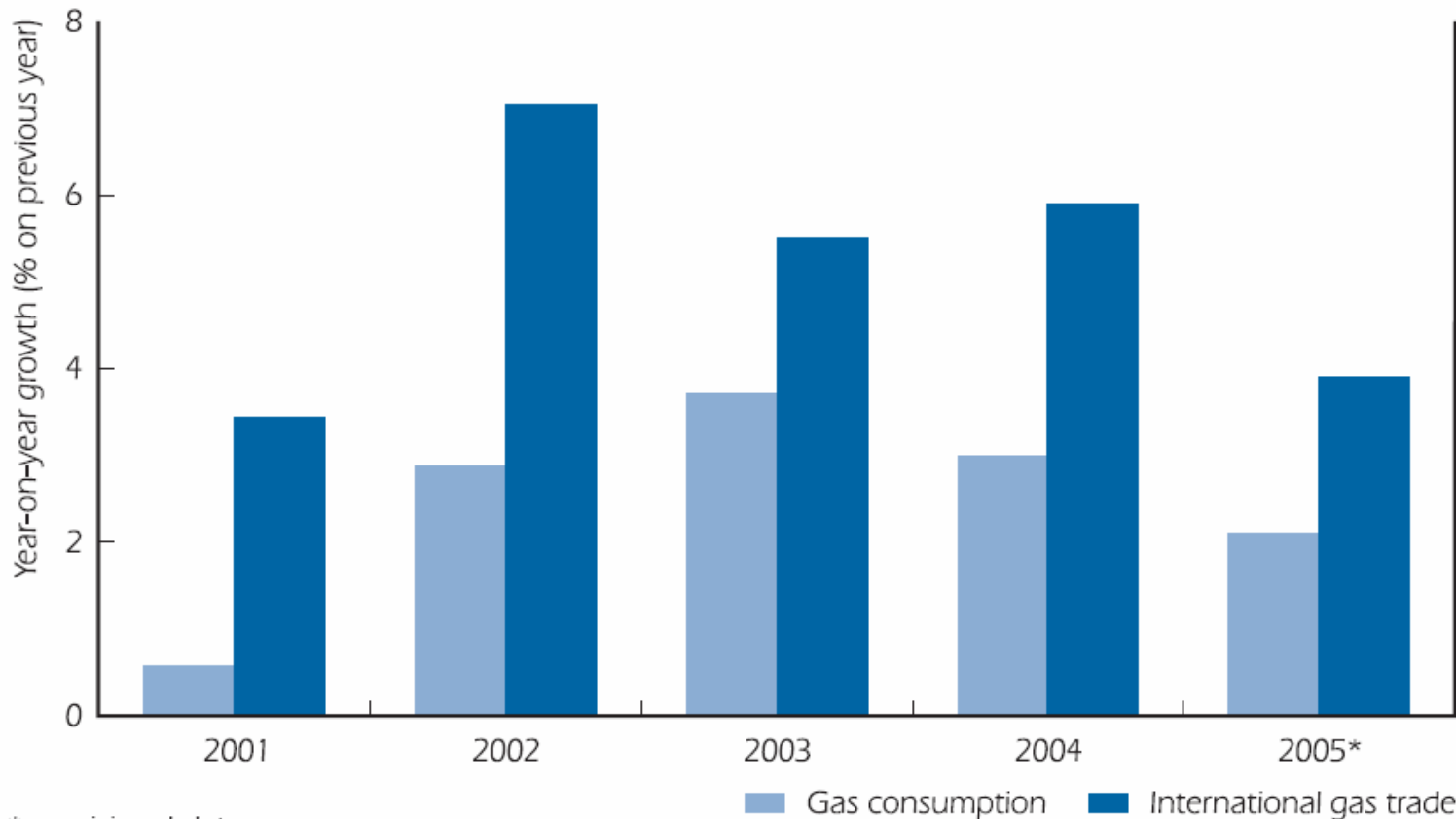
Investments in the Gas market prove his point: the emphasis in gas infrastructure clearly lies in globally flexible LNG supplies, not in pipeline bound transmission

# Market forces and political pressure

- Commercial rationale in a globalizing world and (local) European politics are currently opposing forces:
  - Regulatory pressure is build up on the downstream business by e.g. the German cartel-office who wants to separate players as far as possible (see recent E.ON-Ruhrgas trial)
  - Companies are seeking for increased vertical integration (e.g. Gazprom) and international mergers (e.g. GdF and Camfin)
- The “bright” future of european gas market competition (down to an end customer level) will not be achieved with political protectionism and/or non-market conform, politically motivated, intervention
- European governments must accept that there are global market forces which lead to concentration; to prevent non-competitive behaviour the need to support liquid wholesale markets
  - The political focus needs to shift accordingly
  - Any other way to foster competition is slower and less effective

# The market is where the future is

Europe needs liquid trading hubs with non-discriminatory gas infrastructure access to foster competition and ensure security of supply! Seen in a global context, the year on year growth rates prove this statement correct: during the past five years, international gas trading has grown faster than gas consumption



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... and what we  
**observe** today:



## **“Wisdom” 1: A scrutinising regulatory regime and framework will remove old incumbent oligopolies**

- There is strong regulation in Spain and other European countries, but these are markets with no competition but with arbitrary, politically-motivated market intervention
- On the other hand: the so-far unregulated German market acts as the liquidity pool for Europe’s wholesale power activities. The existence of the German power wholesale market was even acknowledged in the EU Commission Sector Inquiry
- This statement is not based on pure assumption, but valid data: RWE Trading as well as third party studies show: Germany has seen the strongest increase in traded volumes (+112%\*) and – with the exception of the UK, the traded market volumes across all European wholesale markets show a positive overall trend (+43%\* / +20%\*\*)
- We do not mean to say that everything is perfect in Germany, but it proves that regulation per se does not guarantee competitive markets. Quite often the opposite is true, with regulators having repeatedly destroyed markets by politically motivated (price) intervention (e.g. Spain, Italy, Poland) or threads of intervention like recently seen in Germany



**Conclusion 1: Regulation must not be confused with liberalization**

\* Source: RWE Trading. All Exchange based and OTC based spot market, Future, Clearing and Forward Volumes for 2005 in Scandinavia, NL, F, A, E, D

\*\* Source: prospex research, includes UK data which is not part of the RWE Trading data

# The “wisdoms” of successful liberalization (2/4)

## “Wisdom” 2: Full transparency at all levels and at all times will automatically lead to an efficient market

- NordPool is seen as the benchmark setter for transparency, but, along with the UK, is at the same time a prime example of a wholesale power market with declining liquidity in recent years. On the other hand, Germany and France, both markets that are publicly denounced as opaque – have seen the steepest increase in traded volumes (details on next page)
- In Germany, all active market participants have the ability to obtain all essential information. Examples for this reach from real-time plant data (available from private information providers) to planned generation data (publicly available free of charge on the EEX website)
- The so called “big four”<sup>\*</sup> have launched a transparency initiative for German generation data. Others (incl. Stadtwerke) currently refuse to contribute. And in order for the picture to be complete, the demand side data must also be published
- Transparency will not create a market - but it can certainly help to increase liquidity. The question is: Where are the data of those market participants inside and outside of Germany which have called for transparency in the first place?



Conclusion 2: Transparency is an important ingredient,  
but not the main dish

## **“Wisdom” 3: Congestions at cross-border points must be eliminated for wholesale markets to function**

- Cross-border congestion inhibits the smooth-functioning of wholesale markets
- A closer look at how congestion is managed reveals that not all market participants are in favour of full liberalisation
- Thus it is not the congestion itself that hinders wholesale market development, but the allocation of the capacities on these limited interconnectors is the main issue
- Although some cross-border capacity is offered to all interested market participants via auctions, other capacities are allocated through biased, non-competitive procedures and/or legacy contracts
- This reveals the variety of (partly conflicting) interests of the participants and demonstrates that trading companies are the only ones with a vital interest in an unbiased form of access



Conclusion 3: Convergence of markets is inhibited by biased allocation of cross border capacity

# The “wisdoms” of successful liberalization (4/4)

## **“Wisdom” 4: New entrants must be incentivated to enter the market and stop the monopolistic old incumbent regime**

- Up to 2012, more than half of the announced new build capacity in Germany will be build by new entrants
- The market price signals and maturity of the German wholesale power market have encouraged the new entrants to invest in power station projects
- But these investments will only happen if the investors see a good chance to earn an appropriate return on their investment. If (clean) spark/dark spreads were to fall, the investment from new entrants and incumbents will be cancelled or postponed (→ see details on next page)
- If the hourly power market price does not reflect the cost of production in the marginal plant the only way to guarantee long-term security of supply would be to return power generation to the public sector. We all know that this will lead to a high degree of inefficiency with huge economic waste
- Thus the only way to attract new entrants to build an asset base is to allow liquid, deep and long-dated wholesale markets to provide economic price signals and hedging of risk. This is also the reason why most new builds of any open market are announced in Germany



Conclusion 4: New entrants will only build new power plants if it makes economic sense (which is determined by wholesale markets)

## Conclusions from our observation

- The early euphoria of energy market liberalisation has vanished in light of rising energy prices, which were caused by global competition for scarce energy resources. But the market found rising prices to be a requirement to trigger renewal of capacity (power generation, gas storage, transmission lines, gas pipelines etc.) Consequently the next round of substantial asset investment is now underway
- Politicians who demand more competition but intervene when prices rise – as we have seen recently in Italy and Spain – destroy markets, disable competition and are a threat to security of supply → black-outs are looming (see Spain)
- Being a politician is not easy these days, as various consumer groups have made loud requests for government intervention:
- From the publication of the EU 2005 CO<sub>2</sub> emission data we can conclude that industrial emitters hold back certificates and therefore are responsible of keeping CO<sub>2</sub> and power prices on high levels. They call for government intervention while “stealing” and then call “catch the thief” to distract from their own deed
- In most markets we see very low switching of retail customers although there is choice and the ability to switch. There is significant price competition in the regional markets. Example: a typical household in Essen can pay anywhere between €0.18 and €0.23 per KWh\* and may thus save approximately €190 p.a. Nevertheless switching occurs in very limited parts of the customer base and the call for government intervention is bold again

# Summary of the findings

- The Energy markets are in a hog cycle, currently we see a phase of rising demand, rather high prices and the first announcements for new supply
- The European wholesale energy markets have evolved beyond their „childhood“ and have reached a mature state
- „Change“ is a stable process on energy markets and as any other market, going through different times in terms of volatility and prices is natural
- Electricity market liberalization is somewhat ahead of gas market liberalization, but we already see successful completion of the first steps on the gas side
- The north-western European countries are (as a general tendency) ahead of the current state of liberalization in the southern countries
- The EU must find a consolidated, common approach to energy market setup as only a consistent and unified, pan-European approach will lead to fully prospering markets
- Legislative burden must be reduced to a “need to have” basis while at the same time a fair and reliable political and regulatory framework for the market must be guaranteed by legislators
- Every new piece of legislation and regulation should be tested on its contribution to or its hindrance of achieving the Lisbon agenda

# What we have so far learned today...

- Markets have worked for thousands of years across the globe – they also work in European energy markets
- One must be aware of the fact that nobody is bigger than the market
  - most traders and most politicians recognise that this is true
  - inexperienced or dumb traders and politicians think they are different and therefore bigger than the market

Thank you for your attention !