

Background Paper

The Crisis of the Electricity Markets in Europe: Problems and Consequences

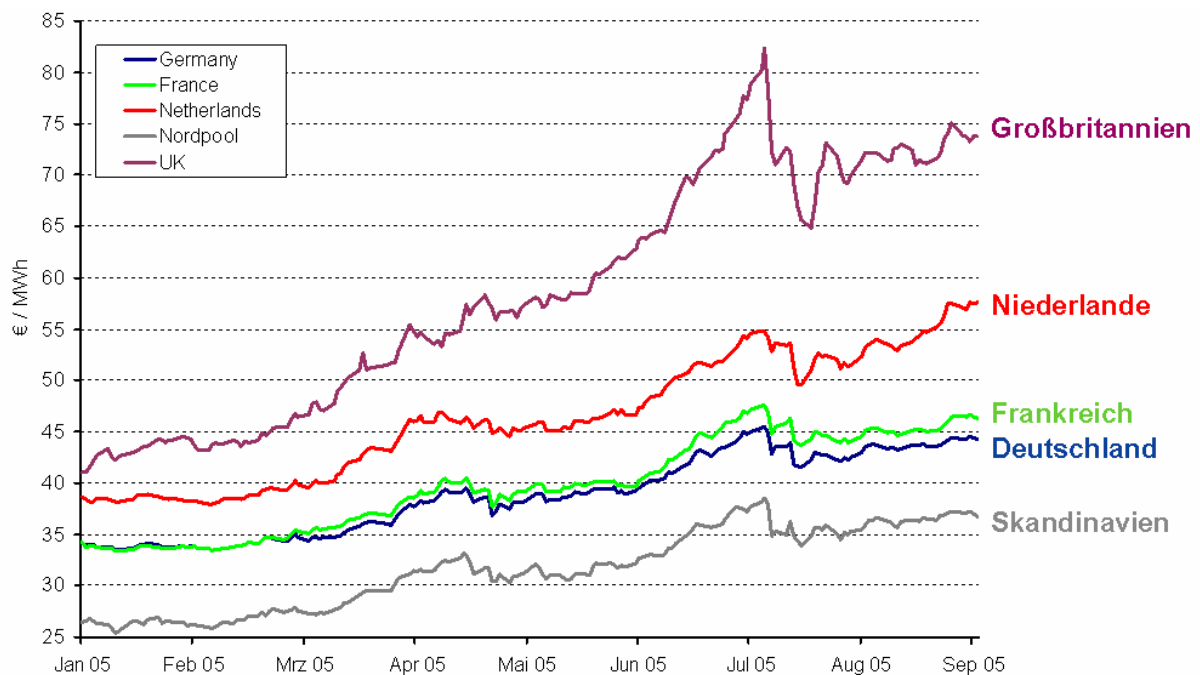
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1. Irritating Price Development at the European Power Exchanges and Wholesale Markets

During the year 2005 the prices at the different European Power Exchanges haven risen remarkably. The following chart shows the development for the corresponding wholesale prices for selected countries.

Chart 1: European Wholesale Prices for Electricity to be delivered in 2006



Source: RWE 2005

Since the beginning of the year, the price increases in Germany and France are around **30%**, in the Netherlands and Scandinavia nearly **50%** and in the UK more than **80%** (future markets). The price increases in the spot markets are even larger.

The different development in these countries or country groups might be an indicator that arbitrage trading between them is still limited because of limited interconnection capacities. On the contrary the nearly identical price development in Germany and France might be an indicator that the arbitrage trade between both countries is working well.

Note: Traders use price differences between countries to buy and sell electricity. If transactions are feasible and done continuously, the price differences will vanish. Using price differences for transactions is called arbitrage.

The price development in the UK deserves a special look because it reflects two aspects which cannot be transferred to continental Europe:

- There is nearly no connection between the UK transmission network and the other European transmission networks. Therefore the UK system is close to a stand-alone system and is not influenced by the developments in the rest of Europe.
- The majority of plants in the UK is gas fired and relatively new, and the gas comes mostly from the British gas fields in the North Sea. The prices of the North Sea gas however differ from the gas prices from e.g. Russia and are more volatile.

Therefore the price development of the electricity prices in the UK wholesale market has to be treated separately.

Is the price increase as shown above an indicator that functioning electricity wholesale markets in Europe reflect changing market conditions and thus bring supply and demand to an unbiased market equilibrium ? Or is it an indicator that these markets are captured by large players who use their oligopolistic price setting opportunities ?

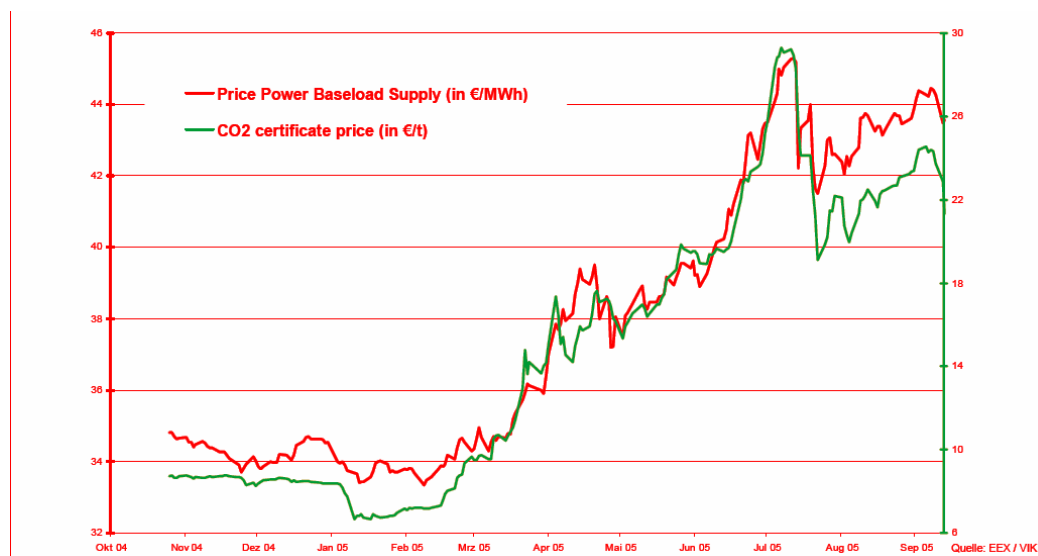
Below we will concentrate on the German and the French electricity sector as the largest sectors with the most powerful players in Europe to answer these questions.

2. The main problems

Economic theory suggests that electricity prices on spot markets reflect the marginal cost of the marginal generation plant, that is the plant that is needed to generate the last kWh to meet demand. The marginal cost of a plant are mainly fuel cost, personell expenditures and O+M (operating and management) cost; they do not include the capital cost for the investment. In Europe marginal plants are usually (hard) coal and gas fired plants, and the marginal cost are dominated by the prices for coal and gas.

Since the beginning of the year plants have to have enough CO2 certificates to be allowed to run, and although most of the certificates have been given to the plant operators for free, the marginal cost argument from economic theory does apply here as well: the price of all CO2-certificates will be determined by the marginal plant that has to pay for them.

This is the key argument to understand the electricity price development on wholesale markets in 2005. The price for CO2 certificates is now fully included in the electricity prices as the following chart shows:



Source: WVM 2005

So the biggest share of the electricity price increase in 2005 can be explained through including the CO2 certificate price, the rest because of the increase of gas prices.¹

¹ Gas prices in Germany (fob) have risen more than 20% during 2005.

2.1 The problem of windfall profits

Competition never starts on a green lawn, but has always a prehistory. As we have seen above, the electricity price reflects the variable cost of coal and gas fired plants because these are the marginal plants.

Nuclear and lignite plants have much less variable cost than coal and gas fired plants, but much more capital cost.² So one could argue that the electricity prices reflecting those high variable cost give the nuclear and lignite plant owners the opportunity to recover their capital cost.

Beside the argument that according to marginal cost theory capital cost can never be recovered in short-term markets – i.e. that wholesale electricity prices will always reflect only the variable cost of the marginal plant - the actual situation in Germany and France is quite different: by far the largest share of the existing nuclear and lignite plants is already depreciated (20 y depreciation period), so there are nearly no capital cost for the plant owners any more. And there are no cost for CO₂ certificates because nuclear plants hardly have any CO₂ emissions, and the existing lignite plants in Germany have got them for free (“grandfathering”).

Because of this situation one can consider the extra profits that nuclear and lignite plant owners earn right now as **windfall profits** (or “stranded benefits”³): the difference between the market prices and their average generation cost is the premium for the incumbents with depreciated plants in their plant portfolio when competition in generation started.

An indication of high windfall profits give the following figures provided by the large German generators to the financial community in 2005:

- Within the first nine months the operating result of RWE in the generation section has increased by 24%. The EBIT (earnings before interest and taxes) increased by 4% to a total of 4,7 Bill. €.
- Within the first nine months the EBIT of EON increased by 7% to a total of 5,5 Bill. €. More of half of it stems from the electricity business.
- Within the first nine months the operating result of EnBW in the generation section has increased by 13%. The EBIT increased by 19,1% to a total of 1,05 Bill. €.
- Within the first nine months Vattenfall Europe has increased its EBIT by 25%.

The following table gives a rough calculation of the current and future windfall profits of the nuclear and lignite plant owners in Germany and France. The figures are calculated on the basis of a database which includes every single lignite and nuclear power plant in Germany and France.

² Lignite plants are more expensive than hard coal plants because they need more technologies to meet the environmental requirements.

³ As opposed to “stranded cost” which have often been claimed in the transition process to liberalization.

Table 1: Windfall profits for nuclear and lignite plant owners in Germany and France in Bill. €

	EnBW; EON, RWE, Vattenfall Europe	EDF	Sum
2005			
Nuclear	2,2	5,0	7,2
Lignite	1,0	-	1,0
2006			
Nuclear	3,0	8,0	11,0
Lignite	2,0	-	2,0
Sum	8,2	13,0	21,2

Assumptions:

- Germany: Generation in 2005 has been sold in 2004 at the EEX Leipzig for the baseload future year average price / Generation in 2006 will be sold this year at the EEX for the baseload future year average price
- France: Generation in 2005 has been sold in 2004 at Pownext Paris for the baseload future settlement price at the end of the month (average price of the year) / Generation in 2006 will be sold this year at Pownext for the baseload future settlement price at the end of the month (average price of the year)
- Depreciation period for all plants: 20 years
- The shares of generation in case of common plants are attributed according the shares of load

Example of calculation: Lignite Plants from RWE in 2004

average generation cost	ct/kWh	
* fuel cost	1,10	
* other variable cost	1,10	
* capital cost	0,10	
sum	2,30	
Generation 2005 (estimated)	GWh	
* Gross Generation	70.000	
* Net Generation (6,5% own need)	65.450	
Generation Cost 2005	1.505.350.000	Euro
	ct/kWh	
Average Baseload Future 2004	3,30	
Revenues Electricity Sales	2.159.850.000	Euro
Windfall-Profit	654.500.000	Euro

If one assumes that the total generation of 2005 was already sold in 2004 at the average baseload future price, the windfall profit sums up to more than 650 Mio. € in 2005. If parts of the generation of 2005 have been sold this year, the profits would be even higher.

Although not yet all contracts with industrial customers and suppliers are based on the wholesale market price, at least in Germany this share is approaching 100% in 2005. Therefore the above figures might give an impression of the magnitude of windfall profits we have to face in the following years.

So we have to expect in the following years a redistribution of money from private, commercial and industrial customers in Germany and France to the large electricity generators in the magnitude of 20 billion Euro per year because of windfall profits. This is beside the distributional problem also a problem for the whole economy because of the corresponding loss of purchasing power with respect to the end-use customers. Presumably large parts of these windfall profits will never reach domestic markets but will be invested in other countries (e.g. in East Europe).

And there is another problem with this huge amount of windfall profits: the five large utilities can use the money strategically to further distort the markets:

- further increasing concentration in generation in Europe; mainly the East European countries will be easy victims because they lack capital
- increased structural integration in the electricity sectors through ongoing acquisition of retail companies which are often in fact vertical integrated distribution companies; this will lead to even more “vertical foreclosure” and to less liquidity in the wholesale markets
- increased acquisitions in the gas market which could distort the level playing field between centralised and decentralised generation (mainly on gas basis) even more, leaving the decision about the future generation system in the hand of the incumbent generation oligopolies.

2.2 The problem of market concentration

The French generation market cannot actually be called a market: with a share of more than 75% of both total generation capacity and generated electricity the EDF is the monopolistic incumbent tolerating some small new market participants for reasons of political appeasement. As a remedy in the context of a merger EDF was recently forced to a capacity release program which will result in auctions to sell virtual generation capacity of a total of 6.000 MW within the next five years. This is less than 10% of the total nuclear capacity of EDF.

Germany is one of the few states where market concentration in generation has increased since the beginning of liberalisation (Matthes 2005). Right now the four large oligopolies (RWE, EON, Vattenfall and EnBW) have together a share of more than 90% of generation capacity, and two of them (RWE, EON) with a share of more than 60% have been called a market-dominant duopoly by the German Competition Agency (Bundeskartellamt).

The problems associated with a high market concentration in the generation market are evident:

- high market barriers for new entrants because of often high network connection costs, scarcity of suitable sites, lack of trust in the power exchange prices and the wholesale

market, high risks associated with volatile wholesale markets, high transaction costs because of intransparencies etc.

- market power to withdraw liquidity from the wholesale market and to sign long term power purchase agreements with large customers which makes it even more volatile
- market power to influence the spot market and thus the future markets and the wholesale prices⁴
- market power to negotiate long term bilateral contracts with large industrial customers in order to stabilize their comfortable situation in the generation market and to prevent new entrants from market access.

These problems will even be worse if there is no strict unbundling of interests between generation and transmission. In this case the TSO will hardly act against the interests of the generation sister which is part of the same company.⁵

3. Consequences

The most urgent problem seems to be the huge amount of windfall profits for the large electricity generators especially in Germany and France in the following years. These windfall profits will also apply to countries like Belgium, the Netherlands, Luxemburg, Austria – just to mention the most evident ones.

The solution could be a

(1) Tax on windfall profits

Although this problem has to be solved at the national level through a special tax it might be helpful to start a European initiative to address this problem at the EU level.

A good example of this tax is the windfall tax introduced in the UK in 1997 in order to cut the huge profits of generation and distribution companies after privatization and liberalisation.

The windfall tax could be shaped similar to the tax some Democratic senators in the US have launched recently to cut the windfall profits of the oil companies. As soon as the wholesale price exceeds a certain level, the generation company has to pay a tax on the amount of sold electricity that relies on the wholesale price.

To solve the problem of concentration in the generation market, at least the following measures seem to be necessary:

(2) Market Share Limitation

No generation company within the EU is allowed to own or control more than 20% of each national electricity generation market. This means that they should neither be allowed to build new plants if they already exceed this threshold nor to import capacity from abroad or to take over capacity from other companies. For the special situation in France one has to find a separate solution.

(3) Power Release Programs or Divestiture

Those generation companies who exceed currently the 20% threshold should be forced to

⁴ In Germany e.g. since 2001 the difference between wholesale prices and short term marginal costs has increased significantly which could possibly be attributed to increasing exercise of market power.

⁵ An example of this is the balancing market in Germany where the TSOs try to prevent newcomers from market access by a lot of difficult market barriers.

auction rights for dispatchable energy/=virtual power plants). These auctions can be avoided through voluntarily divestitures.

(4) **Limitation of vertical integration of generation and supply**

Rigorous application and possibly enforcement of competition rules – including merger rules - both at the European and the national level is necessary to stop further concentration in the electricity sector. Mergers between large national companies should be considered as relevant for the European level and decided by the European Commission. A case like the planned Spanish Gas Natural/ENDESA merger should never be allowed to happen.

(5) **Ownership Unbundling between Generation and Transmission**

A strict unbundling of interests requires an unbundling of ownership. In half of the EU member states the transmission network is unbundled in this way from all other functions, but not in Germany and France where this would be essential for the neutrality of the TSO.

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