

What are the key factors driving EU electricity prices?

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I have been asked to give my personal view on a set of questions relating to the development of power prices in the EU. The views in this article are personal and do not necessarily represent those of UBS.

WHAT IS THE RELATIVE IMPORTANCE OF FUEL, CO₂ AND CAPITAL COSTS FOR POWER PRICES?

Most regional electricity markets are reasonably competitive and prices are determined by three factors:

- electricity is dispatched based on variable costs. These are essentially fuel and CO₂ costs and, therefore, these costs are critical.
- the supply/demand balance determines if there is a possibility to price marginal capacity above costs. If there is over-supply, prices will be at cost and if there is under-supply there is a potential for a margin above costs.
- in the long run, the full cost of new capacity, including capital costs, is important because it determines whether or not new lower cost capacity will enter the system.

In summary, electricity prices are set by short run marginal costs and the long run costs only have an indirect impact on prices.

Table 1 below gives an estimate for what the total generation cost is for new capacity as well as the operating cost for typical and existing European generation capacity **with commodity prices at current levels.**

For the main Central European market (i.e. Germany, Benelux, France etc.) the current baseload electricity price is determined mainly by coal. For UK and Southern Europe, gas has a bigger impact. Considering that coal and gas generation costs are currently very similar, it is not surprising to find that the price spreads in Europe are small. This has not always been the case. For instance, last year gas markets, such as the UK, traded at a significant premium to coal markets.

Table 1 Generation costs¹ (€/MWh)

	New plants			Old plants		
	Coal	Gas	Nuclear	Coal	Gas	Nuclear
Fuel	22.4	35.9	4.1	28.69	42.04	4.41
CO ₂	8.8	4.1	0.0	11.33	4.82	0.00
O&M	4.8	3.1	13.8	10.95	5.65	17.42
Capital costs	19.6	14.7	46.8	–	–	–
Total	55.6	57.8	64.8	50.97	52.51	21.84

Source: UBS

¹ Main assumptions: Coal price \$7/MMBTU, Uranium \$45/pound, CO₂ €12/t, ROIC (pretax) 10.5%, Investment costs: Coal €1250/kW, Gas €700/kW, Nuclear €3000/kW

MY MAIN CONCLUSIONS FROM TABLE 1 ARE AS FOLLOWS:

- movements in fuel prices, mainly coal and gas, are the most important driver of electricity prices
- in a market with a large share of coal capacity, CO₂ also has a significant impact
- capital costs have a very significant impact on nuclear new build costs and, therefore, on its competitiveness. For other technologies, movements in capital costs needs to be much higher to have a significant impact.

HOW WILL CO₂ PRICES IN ETS PHASE 2 AND 3 IMPACT POWER PRICES?

The direct power price impact from ETS is easy to estimate. CO₂ is a pure variable cost and therefore the price impact equals the product of the average emissions of the marginal generation capacity and the CO₂-price. For example:

If we assume that we have a CO₂-price of €10/MWh and for 50% of the time coal generation (on average 0.9t/MWh of emissions) and 50% of the time gas (c0.4t/MWh of emissions) then the impact on the power price should be $10 \cdot (50\% \cdot 0.9 + 50\% \cdot 0.4) = €6.5/\text{MWh}$ of power price impact. This theoretical relationship works well in practice.

With regard to views on the CO₂-price we foresee very different price dynamics in Phases 2 and 3 of ETS:

- in Phase 2 there is no need to domestically lower emissions, and any shortage can be fully met by CDM-allowances. This is due partly to the recession which has lowered emissions. We, therefore, expect the CO₂-price to be set primarily by CER development costs in the range of €10-15/t.

- However, in Phase 3 the emissions deficit increases significantly, and we foresee a 15-20% short position, pre CERs in 2013, and there will be a significant need for fuel switching. That means that the CO₂-price is likely to be determined by the relative price of coal vs. gas. At current fuel prices, this implies a carbon price in the range of €25/t, but this level has been very volatile.

There is, therefore, a positive correlation between gas prices and CO₂-prices. If the gas price increases, the CO₂-price should also increase meaning that the impact on the electricity price multiplies. Thus, emissions trading is leading to increased power price volatility.

DO CURRENT POWER PRICES REFLECT FUNDAMENTAL DEMAND AND SUPPLY CONDITIONS?

We would argue that most regional European wholesale power markets are efficient and as a consequence prices generally reflect the current supply/demand situation.

As spark and dark spreads typically are below the levels required to make new capacity investment profitable, this implies that the capacity margins are sufficient. Obviously the economic recession has further increased supply margins and thus compressed spreads. A question mark hangs over the long lead-times for investment, which means that the investment signals may come too late.

However, at this stage I remain sceptical about this argument. I think the opposite is more likely to be true. The industry is going ahead with investments, even if the market price is below what is required. This is consistent with the general experience from capital intensive industries and we have not seen many cancellations of projects due to the lower power prices, at least not from the larger utilities.



WILL GENERATION SUPPLY CAPACITY FALL SHORT OF DEMAND IE POTENTIAL OUTAGES IN THE NEXT 5/10 YEARS?

As mentioned previously, I remain sceptical on this issue. In particular, in the UK, there is a lot of capacity to be shut around 2015 due to the LCPD-directive. However, if there are emergency situations, then decisions are likely to change.

I also think that the German phase out of nuclear power will proceed slowly. At the same time, we are likely to see rapidly expanding wind power capacity and accelerated energy efficiency measures. European utilities are also moving ahead with new capacity plans, in particular concerning CCGTs. Thus, I do not see capacity as a major problem. The problem is more the EU's increasing dependency on gas as a fuel.

WHAT IMPACT WILL THE EU'S DEPENDENCY ON IMPORTED GAS FOR POWER GENERATION HAVE ON POWER PRICES?

Our analyses indicate that Europe's future dependence on gas is still underestimated. We estimate that Phase 3 of the emissions trading scheme will lead to an additional incremental need of c70 BCM pa of gas, i.e. about 15% of extra demand. This additional gas is unlikely to come from pipeline sources and this means that Europe will become increasingly dependent on imported LNG. This is likely to lead to a 30% higher gas price as LNG typically is priced at calorific equivalence to crude whereas the historic long term pipeline contracts are priced at around 70% of the implied oil price.

In addition to this, we have mentioned above the multiplier effect via the CO₂-price. If gas prices increase, with no movement in the coal price we are likely to see higher CO₂-prices. Bringing these factors together we

estimate that wholesale power prices could increase by around 40%, excluding any other upward influence on commodity prices

WHAT IS THE LIKELY IMPACT OF THE CREDIT CRUNCH/RECESSION ON SHORT AND LONGER TERM POWER PRICES?

In the near term, the credit crunch has reduced power prices for two reasons. The crunch has depressed commodities prices (lower demand, limited freight financing) and it has also lowered power demand by around 5%, thus creating an overcapacity situation, limiting spreads. This situation is likely to prevail until demand picks up.

Longer term, I think the impact will be limited. We have seen over the last months that financing is available for utilities, and in fact, interest costs are now lower than they were before, debt spreads have increased but the underlying interest rates have come down even more. The only difference we currently see is that some smaller and highly levered companies have problems with financing so that power plant investment will become even more a game for the largest utilities.

