AMCOR

Europe

Energy Bulletin n°3

December 2006
(written in November)

CONTENTS

Market news

Europe in general:

Market transparency

Energy price increases over the last years are partly blamed on the lack of transparency of the energy markets. As answer to the criticism, the industry body (Eurelectric) has announced a step forward in the move towards providing greater transparency in Europe's electricity markets. Following a German initiative earlier this year where 4 generators began to disclose generation data, Benelux and France are to do the same. Meanwhile, the European Commission (EC) will bring together regulators, electricity companies, transmission system operators (TSOs), traders and power exchanges to discuss further ways of improving the market.

Kyoto

The EU countries have reaffirmed their will to pursue the reduction of their CO2 emissions after that Canada said it would not respect phase 2 of the Kyoto protocol (2008 -2012) and would not support any proloungation post 2012 (proloungation that was discussed but not agreed at the recent Nairobi conference). Note that the Québec province has desolidarized from the Canadian government on this issue.

New guidelines for Trans-European energy networks

New guidelines for Trans-European energy networks have been adopted by the European Commission (EC) aiming at boosting the construction of connections. They provide the framework for increased coordination, exchange of information and the possibility of the appointment of a European coordinator. They also reflect the 3 main objectives of the European energy policy: sustainability, competitiveness and security of supply.

Energy savings

EU energy dependence rose to **56%!** mainly due to natural gas imports. The EC is apparently preparing a directive aiming at reducing the EU consumption by 20% before 2020.

Black-out(s)

Power outages occurred on 4 November in most European countries, following overload problems in Germany. A total black-out was avoided but barely. Investments will follow (which will drive our costs up). Nevertheless, E.ON Net considers that it was due to a “human” mistake. Note that most Amcor sites haven’t been touched.

United Kingdom:

Nuclear renaissance!.....?

The rumour was announced in the Energy Bulletin n°2, this time it’s decided. UK is going to build nuclear power plants, so has announced Tony Blair during the summer. The problem (and it is not a little one) is that the British government is counting on private capital to fund the project. To give you an idea, the plants that France intends to build will cost more than 3 billion €…

Energy hitting the manufacturing sector

The UK manufacturing sector has been hit hard by the rise in energy prices. The latest labour market statistics to March 2006 reveal that there are now over a 100,000 fewer jobs than a year earlier while over 250,000 jobs have been lost compared to two years ago. While manufacturing output prices rose at a rate of 2.8% during the 12 months to July, prices paid by manufacturers for raw materials including energy rose by nearly 10%. Manufacturers, unable to pass all costs on to the customers, have tried to absorb them.

Gas network reinforcement

The following projects are important not only for gas but also for electricity…

➔ Dutch Interconnector

The Company building the Dutch Interconnector to the UK (BBL) expects its 230 km undersea gas pipeline to become operational in January 07 (with gas flowing to the UK from the Netherlands). The company is a partnership between E.ON Ruhrgas Transport, Fluxys and Gasunie.

➔ Norway/UK: Langeled

The first Norwegian gas flew through the new Langeled pipe to the UK's Easington terminal (east coast) at the end of September.

Kyoto

➔ the price of British CO2

British power plants buy CO2 allowances on the European CO2 markets but next to these ones, there is a separate "British" CO2 market reserved for companies like Amcor trying to reduce their CO2 emissions by improving e.g. their energy efficiency. British CO2 has (so far) been cheaper than European CO2 but environmentalists are calling the British government for tougher rules in order to increase the CO2 price, which will prompt industrial companies to make more than they do now.

➔ Offshore wind farms

The first annual reports for North Hoyle and Scroby Sands offshore wind farms were released in August. Good generation levels were reported. These farms are important for the UK carbon policy.

➔ Wicks urges "cultural revolution"

Malcolm Wicks, the energy minister, said that a "cultural revolution" was necessary to change the way consumers treat energy in order to substantially reduce carbon emissions. This would also include SME's and the public sector. He also said that the current trading arrangements were like a "toddler learning to walk" but was unable to comment on further developments.

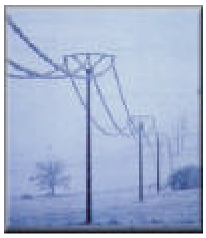
➔ Stern report

The Stern report, an independent review on Climate Change (and the cost of inaction) commissioned by the Chancellor of the Exchequer is now available. If you are interested, you can ask it to Ernie McKeen or myself.

➔ Centrica invests in new coal plant

Centrica, announced a 1 billion £ investment for an 800 MW plant using "clean coal" technology. The new plant will produce a third of the carbon of a conventional coal plant. This will be achieved by capturing 85% of carbon emissions and pumping it into the North Sea for storage. Furthermore, the technology also allows the station to run on natural gas or biofuels. Assuming planning consent, construction would start in 2009 enabling the station to be commissioned in 2012 or 2013.

Winter outlook



A statement from Ofgem (the British regulator) warns against complacency despite the timely arrival of new infrastructure and expected full storage. Ofgem says that the key question remains whether the links with the continent and Norway would be fully utilised and how cold the winter would be (even if October and November have been particularly mild). It contends that there is very little information about gas demand, supply and storage on the continent despite moves towards greater transparency.

Gas transportation charges to increase

➔Transmission

Entry charges will increase from zero to 0.0164 p/kWh. Exit charges will increase by 8.6%.

➔Distribution

There is a wide variation in the revised charges for low pressure networks with a 19.7% increase from the North West network and the 12.1% reduction in London. East England and West Midlands will see their distribution charges increase by 12.3% and 12.2% respectively. Scotia Gas Networks increases its charges by 5% to 6.3%. Wales and West Utilities apply a 4% increase while Northern Gas Networks reduces the charges by 1%.

Iberdrola considers taking over Scottish Power

Iberdrola (Spain), has announced takeover negotiations with Scottish Power (SP). Other companies have been linked to SP including EDF and RWE, and last year SP rejected a bid approach of 570 p per share from E.ON. Iberdrola is rumoured to want to split the company (into renewable energy assets, transmission and distribution networks, supply business and US/ Canadian business) but analysts believe that the offer of 800 p a share is still overvalued.

British Energy (BE) – nuclear outages

BE's generating capacity was severely hindered and its stocks plunged when unsafe conditions forced it to take some of its generating capacity offline. More severe than expected cracks in the boiler mechanism were found after an inspection. CFO Billingham said the plants would be back on-line "in a few months".

Germany:

Nuclear

German Chancellor Merkel: "Nuclear remains phased out!"

E-ON Mitte's Grid Charges reduced by regulator

Controversy over German grid charges continues. The consumer group VIK has been lobbying against the charges citing the 5000% difference between prices as evidence that most efficient networks can free ride on the least efficient. It has also been arguing that investment in the networks has decreased. The FNA (Federal Network Agency) has ordered Mitte to reduce its charges by 14% to customers in its networks which cover southern parts of Lower Saxony and Eastern Westphalia with approxamtely 2 million customers.

Gas import contracts extended

E.ON, and Russian energy giant Gazprom, have extended existing long term gas import contracts for another 15 years. The German border with the Czech Republic will be the main delivery point during 2020 to 2035 and additional volume will flow through the North European gas pipeline on the German Baltic coast from 2010/11 onwards. Pricing could take the form of some kind of oil linkage which means that prices relate to the price of competing alternatives such as gas oil. Unlike the UK where the structural transition to gas importer has led to significant price volatility, a lagged link to oil appears relatively more stable. However, an oil link does not take into account seasonality, a point raised by the EC.

New coal plant for Vattenfall

Vattenfall is to invest 1.7 billion € in a new 1640 MW coal fired plant, due to be operational by 2012. A number of other generation projects are in the pipeline for Germany though if the government retains the power for local authorities to accept or reject applications for price increases beyond July 2007 there may be some hesitance in proceeding with new build.

63% of environmental budget for renewables

The Environment Minister has announced that 63% of its 456 M€ 2007 annual budget is to be spent on renewable energy. This certainly reflects Germany's commitment to climate protection and the phasing out of nuclear power plants. Germany's power mix is currently made up by 48.9% Coal and lignite, 27.5% Nuclear and 10% Natural gas with around 13% being made up with hydro, wind, oil, diesel and other forms of generation such as solar and waste.

France:

Nuclear

Areva (a world expert company in nuclear technology) could face huge losses related to the Finnish nuclear projects.

Controversial electricity tariff proposed

Industrial electricity consumers in France will soon probably be able to opt for a cheaper tariff if the Energy Bill successfully negotiates its way through the National Assembly and EC. This bill would allow those consumers who previously entered the free market and subsequently paid higher energy costs to switch back to a cheaper regulated tariff for a maximum period of two years. The new tariff should not be 25% more expensive than the existing regulated tariffs – Tarifs Vert, Jaune, Bleu – and related costs for shippers would be borne by EdF and Suez and which are thought may amount to some 300 – 400 M€. This concerns Amcor PET sites but not Amcor Flexibles (Food + Healthcare + Rentsch) which stayed in the "old" regulated market.

Suez/GDF Merger

The merger between Gaz de France (GDF) and Suez has been postposed by a few months because of juridical issues raised bu the Unions. Nevertheless, competition authorities have approved the merger with some conditions. One of them, imposed by the European Commission (EC), is for Suez to resell among others its Belgian gas subsidiary Distrigas and to allocate part of its nuclear power park to two competitors. The EC has also allowed the French government to keep a 34% 'golden share' in the company. This merger was promoted by the French government trying to protect its energy champion Suez from a hostile bid from Italian ENEL…

François Pinault

…Billionaire François Pinault who at some point agreed to assist ENEL in its take-over bid has now changed its strategy. He is trying to buy the water and environmental activities of Suez which refused it so far.

Spain:

Regulated tariff

After an increase of the regulated tariff by 6% in July 06, a new increase in December 06 or January 07 is now expected.

E.ON successfully appeals regulators conditions for merger with Endesa

A long and controversial merger investigation has ended with Spain's Energy Ministry overruling the regulator CNE. After the EC had cleared the merger, the Spanish regulator imposed 19 conditions to clear the deal and hence reduce the impact of the merger on the competitiveness of the Spanish market. The most important condition imposed a limited divestment of generation capacity, effectively breaking the company up. E.ON has successfully appealed the regulators decision.

Iberdrola and wind

Iberdrola and Gamesa have signed a Wind deal worth over 2300 M€, to be implemented between 2007 and 2009. Iberdrola is to purchase wind generators totalling 2700 MW. As such, Gamesa is providing the power company with machines for its wind farm developments in Spain, the rest of Europe, the United States and Mexico. The deal includes a purchase of wind farm assets with some 500 MW of power that Gamesa will bring into production before the end of 2009. Of these, 300 MW are firmly committed while the remaining 200 MW will be on a preferential basis.

Renewables Venture

Union Fenosa (together with ENEL) unveiled plans to increase their renewable energy capacity by developping 20 wind farms (600 MW in total), biomass and solar thermoelectric plants (50-100 MW in total) in Extremadura. Their goal is to have a 1600MW renewables capacity by 2010. It will cost in excess of 700 M€. Currently they have a 900 MW renewables capacity (wind, cogeneration and incineration). They are also building wind farms (116MW) and have an additional 180 MW at an advanced stage of permission in Castilla-La Mancha and Andalucia. This announcement ties in with Spain's energy plan to have 12.1% of primary energy consumption met by renewable sources in 2010. The plan desires a large increase in wind power from a 8155 MW capacity in 2004 to a 20155 MW capacity.

Spanish giant
ACS, banks and authorities are still working on a possible merger between Iberdrola, Union Fenosa (+ Gas Natural?), that would create a Spanish energy giant.

5000 MW of new generation capacity for Endesa
Spain's largest electricity company Endesa has planned to increase its generating capacity from 6259 MW to 11400 MW. The company who also has a share of the Latin American, Portuguese and European energy markets intends to build 14 new Combined Cycle Gas Turbine plants by 2009. 62% of the new capacity is intended for Spain with 17% going to Latin America and the rest in Europe (France or Italy). The need for new generating capacity especially in Spain was noticed when spells of harsh summer and winter weather since 2003 caused electricity prices to rise considerably. Endesa has estimated the total cost at around 2600 M€.

Russia:

Gazprom and Sonatrach Agreement
Russia's Gazprom and the Algerian state-owned energy company, Sonatrach, have agreed a Memorandum of Understanding allowing for: 'deeper cooperation between the companies, identifying, among other things, the following major directions of further joint businesses in the oil and gas sector: geological exploration, production, transmission, gas transmission and distribution network development, asset swaps, natural gas and oil processing and marketing in Algeria, Russia and third countries.'

Gazprom in asset swap
Gazprom has signed a framework agreement on the exchange of assets with E.ON. E.ON is to acquire 25% less one share of the Siberian gas field "Yuzho Russkoye", while Gazprom is acquiring nearly 50% in Hungarian subsidiaries of E.ON. In addition, E.ON and Gazprom are expected to collaborate on gas-fired power projects in Europe.

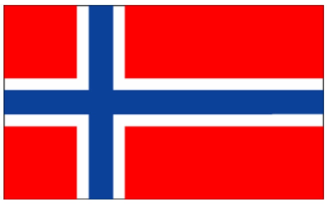
Italy:

AEM's merger
Northern Italian (Lombardy) electricity is set to be dominated by the merger of AEM Milan's energy company with its near neighbour in Bresca. The combined utility will be worth 6 billion €. Antonio Catricala, the chairman of the Italian competition authority, said that he was in favour of utilities merging.

Scandinavia:

Nordpool: Intraday trading market launched between Nordpool and Germany
Nordpool spot's intra-day trading system Elbas was successfully launched in the German KONTEK bidding area on 25 September. In the first week of operation 1914 MWh were traded within Nord Pool Spot's German bidding area KONTEK. This volume increased to 2812 MWh in the second week of operation.

Norsk Hydro and Statoil
Norsk Hydro and Statoil (the 2 most valuable listed companies in Norway) were rumoured to discuss about a possible merger but Statoil's CEO (Helge Lund) said that this was pure speculation.



General information about the market mechanisms

In November, German electricity hit 2436 €/MWh for one hour, how can it be?

Note that 2436 €/MWh is **50 times higher** than what we are used to see. To understand how it's possible, let's remind the definitions of the forward and the spot prices introduced in the Energy Bulletin n°1.

"…

Forward price (also called "price on the curve"):

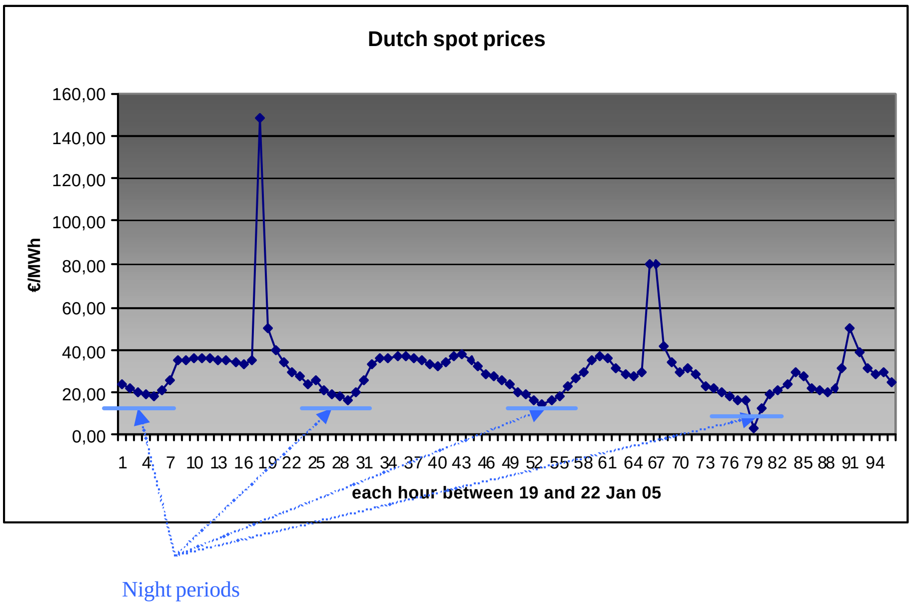
Price at a certain time for energy to be delivered over a period further ahead, this period being generally one month, quarter or year in particular. For example:

- *on 18-10-2005, the forward price for the delivery of electricity in the UK over January 06 was 60.10 £/MWh.*
- *on the same day (18-10-2005), the forward price for the delivery of electricity in the UK over February 06 was 58.65 £/MWh.*
- *the day after (19-10-2005), the prices above had increased by 1.0% and 1.1% respectively.*

Something happening today can impact either the spot prices or the forward prices OR both. For example: (1) an unplanned outage of a few days will impact the spot prices but not the forward prices, (2) an official decision of a producer to build a power plant will impact the forward prices (covering periods after the start-up of the power plant) but not the spot prices till then, (3) a terrorist attack against Saudi Arabia shall impact both spot and forward prices.

Spot price (also called "price on the prompt"):

Price at a certain time for delivery very soon after, usually one particular hour of the next day. Spot prices tend to be more expensive during the day compared to the night and more expensive during the winter compared to the summer[1]. Example: Dutch spot prices for each hour from 19 January 05 to 22 January 05:



…."

The price of 2436 €/MWh observed in Germany was a spot price. This huge price was only applicable during one hour. Demand was stable on that day but supply was very tight because of uncoordinated maintenance.

By their nature, spot prices have bigger ranges than forward prices but as already mentioned, they are also more predictable. To some extent, one can consider that one forward price is actually the average of the expected spot prices over the corresponding period.

Note that this price of 2436 €/MWh hasn't impacted the German sites of Amcor.

[1] *except in very hot countries were demand increases a lot in the summer because of the air conditioning.*

In October, UK gas prices were negative for a few hours, what does it mean?

It means that the seller pays the buyer to take the gas… To understand how it's possible, one must introduce the notion of balancing:

> *Any energy supplier must balance its portfolio: if he (or she) sells x MW over a certain period, he (or she) must inject x MW in the network (over the same period). If it is not the case, this supplier will have to pay **a penalty** for the difference, which is called balancing power.*

What happened in the UK is that some suppliers were too long for a specific period and they were desperate to get rid of their gas to avoid these penalties.

Companies like Amcor cannot profit directly from such prices because these markets are reserved to traders. Anyway, these negative prices were not only valid for a few hours but they were concerning just a few days ahead (in other words, these prices were spot prices while industrial companies are by nature more interested in prices over longer periods). Nevertheless, we profited indirectly fom them because the day ahead prices (that we used) were also very good.

Remarks:

- The definition of balancing varies a bit in each country. Some define the balancing power as the difference between the forecast consumption and the actual consumption but the idea remains the same.
- Some suppliers use 3rd parties to balance their portfolio but usually they do it themselves.

The question marks about the liberalization of the energy markets

Who decided to liberalize the European energy market?

The EU did, through a Directive called 96/92/CEE. The main defenders were the UK and Benelux. This decision was in line with agreements made with the WTO.

What was the goal?

The goal was to reduce the prices by creating competition. Big companies like Solvay or BASF have by the way lobbied strongly for that.

What were the direct consequences?

1. Unbundling of the network and generation activities. In the past, the networks were often owned by one or more incumbents who had their local monopoly. To make sure that new entrants could use existing networks, these incumbents were forced to sell their networks and/or to create "independent" network operators (example: in 1999, EDF and RTE were accountably separeted).
2. Creation of trading activities. In the past, most suppliers had their own power plants, but suddenly a number of new companies who had no power plants entered the market, in order to buy and sell electricity.
3. Change of the role of the regulator. Indeed, even in liberalized markets (also called deregulated markets), one still needs a regulator. Its role is to:
   - Fix the transmission and distribution tariffs (or to propose it to the decision makers).
   - Give or revoke licenses to traders and suppliers.
   - Make sure that the market is working properly.
   - Act as an Onbudsman in case of disputes.
   - …

What is the present level of liberalization (electricity)?

It depends not only on the country but also on the voltage level. In most countries, the high voltage network where big companies are connected was liberalized first. In many countries, the low voltage network (where your house is connected) is not liberalized or just recently. The level of liberalization of the Medium Voltage (MV) network were sites of Amcor are typically connected is the following:

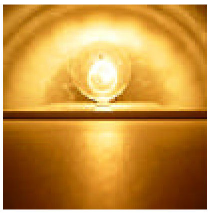
Country	Level of liberalization	Comment
UK	Fully liberalized	
Benelux	Fully liberalized	
France	Coexistence of a free market and a regulated market	…see in “Market news” above, a 3rd market will appear soon but only for two years
Germany	Fully liberalized	
Spain	Coexistence of a free market and a regulated market	The regulated market should stop in 2009.
Switzerland	Not applicable (but traders can import/export electricity)	Switzerland is not in the EU.
Scandinavia	Fully liberalized	
Poland	Partly liberalized	The unbundling between the suppliers and the distribution network operators is very low.

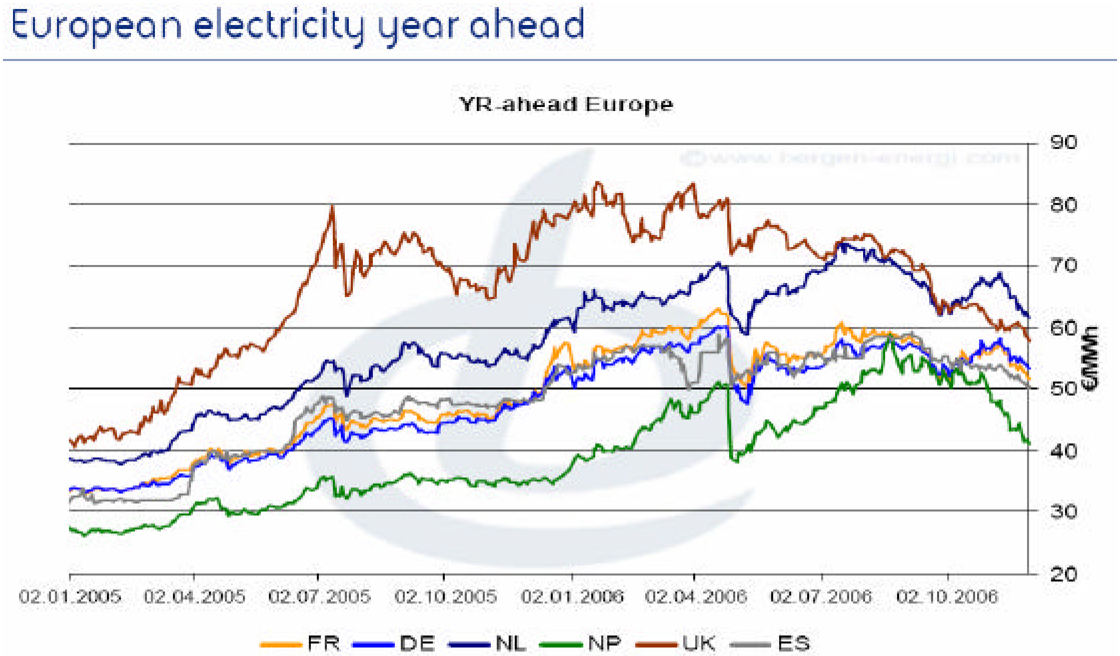
Does liberalization work?

You can answer this question yourself…The market is mostly free, we can choose our supplier but there is not a lot of competition... so the abovementioned goal of reducing the prices has been missed. Anyway nothing is black or white but note that in California they even had rotating black-outs.

Market price information

Electricity:



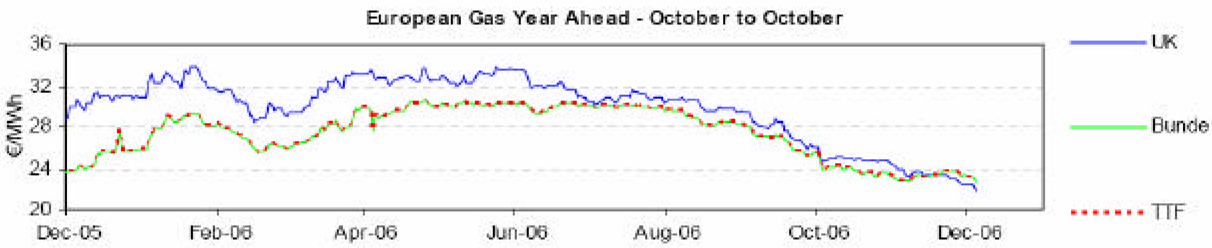


Note : the prices above are for baseload (i.e. for a flat supply) and for commodity only. These are forward prices, 'NP' means Nordpool (Scandinavia), 'DE' means Germany.

Versatile trends have been observed in the electricity market over the last 6 months.

- Prices in the UK have decreased by 19% on the back of oil and gas.
- Prices in Scandinavia have increased a lot due to a worrying hydro deficit although the situation is getting much better now.
- Prices in France and Germany have remained quite stable. Local demand was lower than expected but prices were buoyed by Scandinavia.
- Prices in Spain were the most stable with only marginal effects following the situation in Scandinavia.
- For the first time in years, Dutch prices were higher than UK prices. This is not really justified by supply and demand fundamentals, which means that speculators are very active (probably because of the opening of a new power exchange linking Benelux to France).

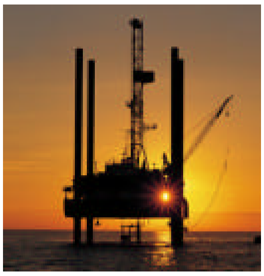
Gas:



Note : the prices above are for commodity only. These are forward prices . Bunde means Germany, TTF means the Netherlands.

Prices decreased progressively from July on, first on the back of low demand and afterwards on the back of oil. As one can clearly observed, the recent and future gas reinforcement projects in the UK have allowed the UK prices to come back in line with the continental ones. This has also a positive effect on electricity as the UK electricity sector depends a lot on gas.

Oil:



The oil price has decreased steeply by more than 20% over the last 3 months but remains at a relatively high level of ~60$/bbl. The decrease was mainly due to:

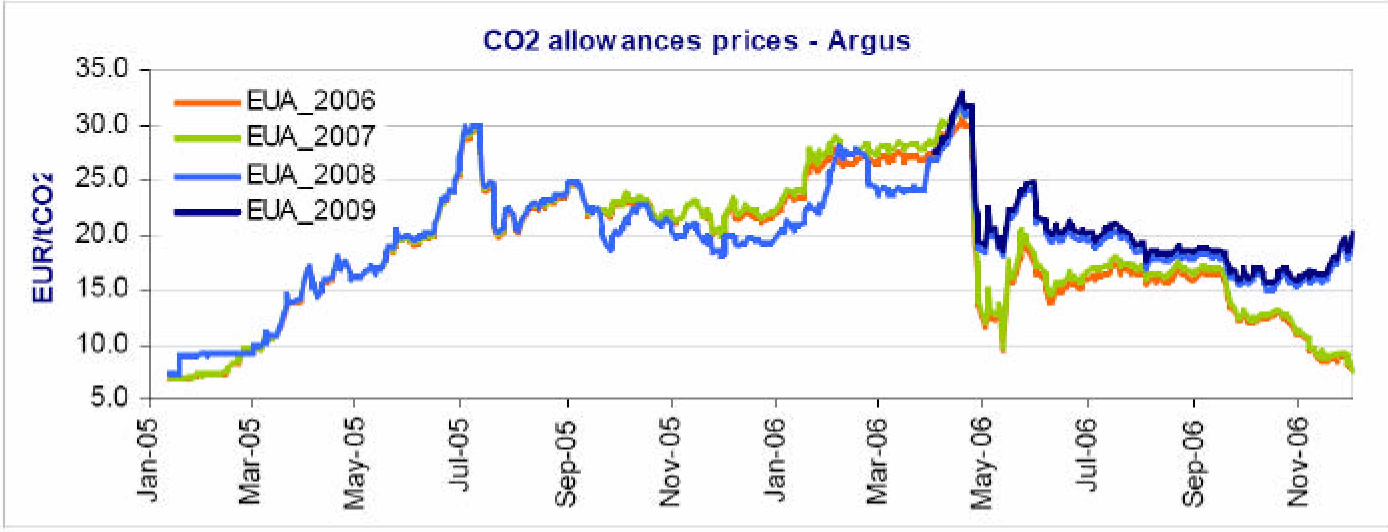
- eased tension between Iran and the US (despite the test launch of long-range missiles)
- absence of hurricanes despite the fact that an active hurricane season was expected
- less severe than expected problems at Prudhoe Bay (Alaska)
- good stocks in the US
- stop-losses by speculative traders realizing that supply was sufficient to meet demand (a lot of banks announced that they expect losses in their utilities divisions this year).

The OPEC is now trying to protect the 60$/bbl level by reducing the production. Although these countries have less power than in the past, the best estimate now is that the oil price will indeed stay at that sort of level. Actually, during the last days of November it is actually increasing (close to 65 $/bbl) due to a high demand in the States.

For the future…

- According to IEA, global oil demand increase will slow down in 2007 (+1.5%).
- In Louisana, a giant oil reserve has been found by Chevron (could be as big as 50% of the present US reserves).
- Total will drill 110 wells in 2007.
- Lukoil will invest 75 billion $ in exploration till 2016.

CO2 allowances (Kyoto protocol):



CO_2 allowances (which are tradable rights to emit CO_2) have a direct impact on the energy price as electricity producers must buy such allowances to produce more electricity. Moreover, it prompts them to run with gas power plants that emit less CO_2 than coal fired power plants, which in turn increases the gas price.

The mini-crash of May, reported in the previous Energy Bulletin left a lot of traders and consumers with a bad taste in the mouth. From May till September, CO_2 allowances continued to decrease as the coal price increased. Afterwards, surplusses from Poland coming on the market pushed prices down again.

On 29 November, allocation cuts for the period 2008-2012 (i.e. the 2nd phase of Kyoto) were made public. On average 7% cuts were imposed by the EC but the annoucement didn't include all the European countries (Poland and France, which are important actors, were missing).

Price forecasts:

In January 07, the Financial Controllers will receive for each site the following 5 values:

- the expected electricity consumption (in MWh) for FY0708
- the expected natural gas consumption (in MWh) for FY0708
- the expected delivered electricity price (in €/MWh) for FY0708
- the expected delivered natural gas price (in €/MWh) for FY0708
- the expected total of other energy spends if applicable (e.g. fuel oil, LPG, other gasses than natural gas...) for FY0708

They are all invited to liaise with me if they disagree with any of the assumptions. Expected film, preform and carton production will obviously impact the expected consumptions.

Best Practices

Cooling and Chilling:

Cooling and chilling play an important part in the energy consumed by ancillaries. It is therefore important to pay attention to these systems. The following guidelines should be considered:

- Where possible, cooling with water is more energy efficient than cooling with air (provided that you recover the water as opposed to sending it to the sewage). Of course, there are costs associated with water treatment, so a trade-off must be found.
- If (despite the previous recommendation) you still use air for cooling purposes, then where possible, use cooling with air blown by a fan which is more energy efficient than using compressed air.
- If (despite the previous recommendation) you still use compressed air for cooling purposes, use well-designed nozzles. They save up to 50% of the flow compared to naked ends.
- Match your needs but don't overkill! Adjust (increase) the temperature set point of each cooled or chilled item if it is acceptable for the process. If the needs are very different, use two different networks (one at x °C, the other at y °C). This best practice is already used by Amcor PET for the chilling of the moulds and the cooling of the oil but most Amcor Flexibles sites only use one network.
- Rationalize your cold network(s). Heat exchangers generate losses. If you can get rid of one heat exchanger in the network, do it. Excess heat exchangers are often found where companies have grown progressively and have added heat exchangers one by one… but it's perhaps time to rethink the cold network(s) as a whole.
- In cold countries (UK, Scandinavia, Switzerland…), if you use an old chiller, it could be interesting to use:
  - a dry cooler or
  - a cooling tower or
  - an adiabatic cooler

  instead of the chiller when (and only when) the ambiant temperature is low enough. It is not difficult to foresee an automatic support (total or not) from the chiller(s) when the temperature rises too much.

Exchange of best practices:

As mentioned in the previous Energy Bulletin, AFE sites will soon receive a target to improve their enegy efficiency. Initially the goal was to improve the specific electricity consumption by 10% over 5 years but the target finally retained will high probably be 6% over 3 years. Three pilot sites have been selected for this project. For the first one, the potential savings are higher than 6%, for the second one, they should be close to 6% and for the last one it is still under investigation.

Written by Raphael Herte in Nov 06