

Bord Gáis
Energy Index
Understanding energy

SEPTEMBER 2015

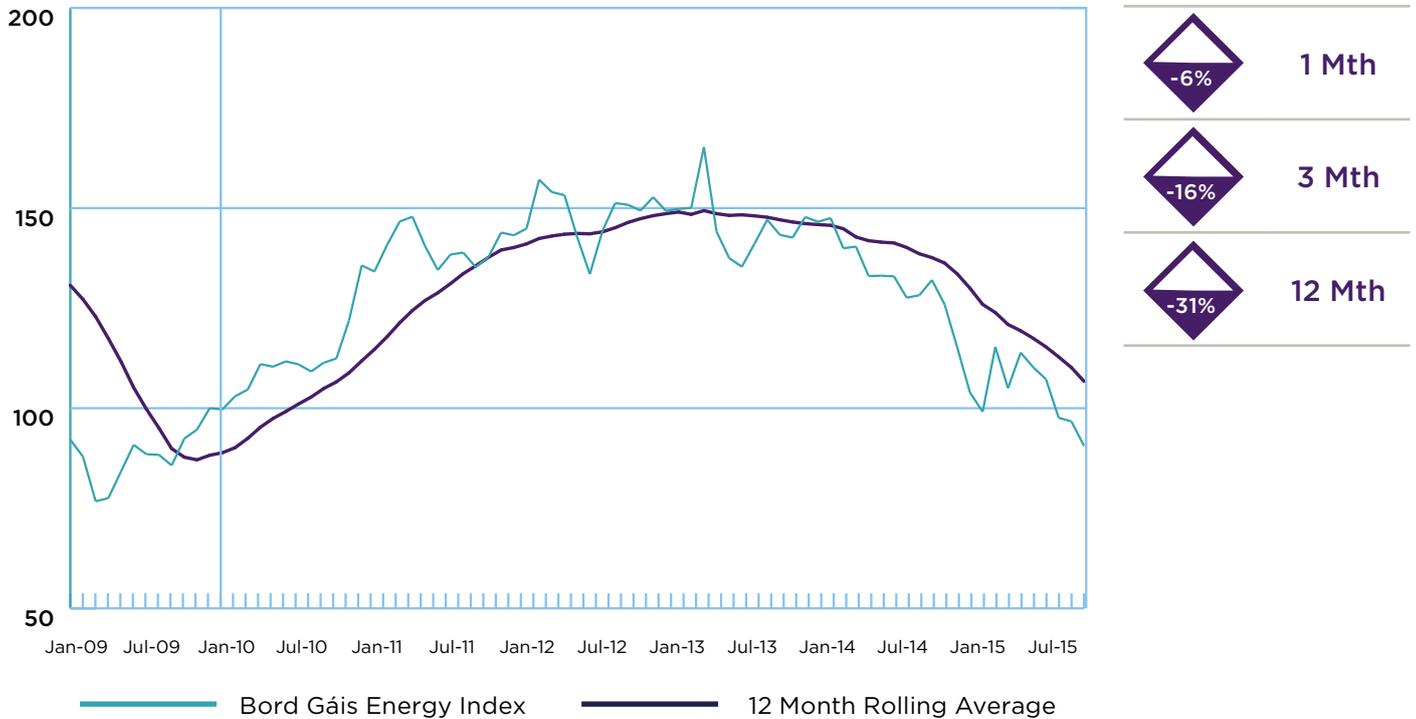
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Bord Gáis Energy Index

Commentary

Bord Gáis Energy Index (Dec 31st 2009 = 100)



Summary

The September 2015 Bord Gáis Energy Index fell by 6% month-on-month as excess global oil supplies continued to weigh on the price of a barrel of oil. At US\$48.37, the front month Brent crude oil price closed at its lowest point since March 2009.

In September 2015 the Index stood at 91, which is another record low after it was set at 100 on 31 December 2009.

(Continued overleaf)

Bord Gáis Energy Index (continued)

HOT TOPIC

DIESEL'S DIRTY SECRET

As the majority of refined crude oil is used to propel a motor, the recent emissions scandal has cast doubt over the future of the diesel engine in Europe and its refineries that have been set up to supply the massive growth in diesel demand.

The VW story unfolds

The issue over diesel engine emissions at Volkswagen, which broke in September, has sharpened the debate about the future of diesel itself.

- The roots of this can be traced to when the International Council on Clean Transportation produced a report called “Real-World Exhaust Emissions from Modern Diesel Cars” in October 2014
- This International Council found that some of the cars tested under real-world driving scenarios were producing nitrogen oxide (NOx) emissions roughly seven times the standard set by the latest Euro 6 rules
- These rules were due to come into force this September. Clearly Volkswagen was not ready and its installed device sought to produce misleading emissions results to comply with the latest Euro 6 rules. Critically the device sought to manipulate emissions results under rolling test conditions and was automatically switched off when the car hit the open road
- As the Council’s tests were real-world driving scenarios the device was not activated and the cars were exposed

The US Environmental Protection Agency issued a notice of violation of the US Clean Air Act to Volkswagen on the basis of this report.

Europe’s love of the diesel engine

Of course, in an era of rising energy costs, drivers are increasingly switching to lean burning diesel engines that gives them greater fuel economy and consequently lower CO2 output. This has been applauded in Europe.

In addition to this, and with the exception of the UK, the price of diesel fuel has been persistently lower than gasoline throughout Europe. In Germany it is currently 16% cheaper. This is what accounts for the enormous growth of diesels within the EU over the past decade, rising from 32.8% of new car registrations in 2000 to 53.6% now. Virtually all of the difference in price relates directly to fuel taxation. A key point is that the tax logic of this relates directly to the environment. Governments motivated by the issue of climate change put the emphasis on reducing CO2 and largely ignored the issue of air quality as a result. Indeed Europe-wide car scrapping schemes, introduced between 1999 and 2009, had the unintended consequence of promoting diesels because far more gasoline-fuelled models were scrapped.

Too much of a good thing?

Twenty years ago the ratio of gasoline to diesel sold in Europe was 2:1. This has now inverted to 1:2.5 and is projected (assuming the scandal changes little) to reach 1:3 by 2020. The resultant surge in diesel demand has created a potential problem of fuel supply security in the UK since 45% of its diesel is now imported due to refinery closures. Europe’s elderly refineries were designed to produce gasoline and the switch to diesel has led to closures across Europe amid the anti-CO2 governmental drive on vehicle fuels. As late as July this year traders were describing the diesel supply situation as “scarily tight”.

In addition, the Government-inspired shift into diesel Europe-wide to deal with climate change has had some unintended consequences that are now coming home in local air pollution. Before the scandal, at the local level, city Governments were starting to penalise diesel cars and attempting to reverse the trend as the impact of NOx and particles on human health is well established.

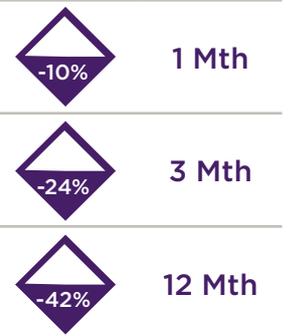
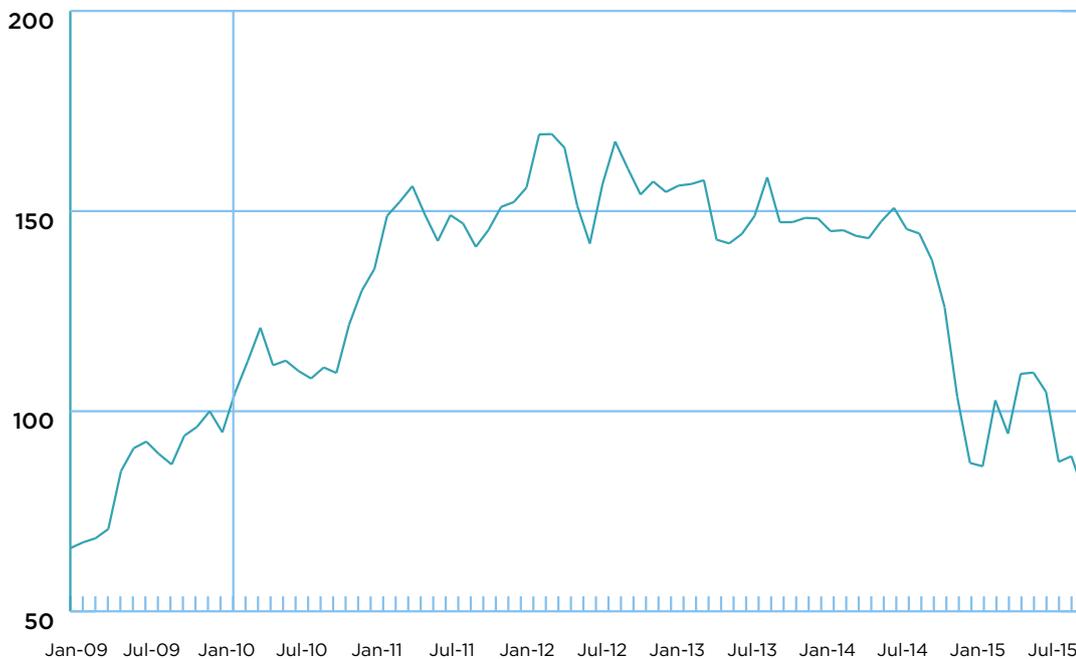
Is this the end of the road for diesel engines in Europe?

To clean the diesel engine the next step lies in combining real-world driving and the Euro 6 rules and fixing a date for compliance after which failing models are not sold. The knee-jerk environmental reaction might be to call for the scrapping of diesel engines. However, the scrapping of fuel efficient, modern, safe diesel models for environmental reasons and any subsequent surge in new gasoline driven models would have its own environmental consequences, not least in CO2 output. Vehicle manufacturing is a pretty energy intensive business and replacing the entire diesel car pool is not an environmentally acceptable option.

Bord Gáis Energy Index

Commentary

Oil Index



*Index adjusted for currency movements.

Data Source: ICE

Oil

- At the end of September the price of a barrel of oil closed at its lowest point since March 2009
- US frackers have turned the US shale industry into one of the world's swing producers who are putting a cap on prices
- The global oil supply glut continues with robust Saudi Arabian and Iraqi production

Month-on-month the front month Brent crude oil price slid from US\$54.15 to US\$48.37. At US\$48.37, the price of a barrel of oil closed at its lowest point since March 2009. At the time analysts forecasted that a drop below US\$40 was 'certainly on the cards', but this never materialised. In April 2011 oil traded above US\$125. From April 2009 oil prices commenced their slow ascent to US\$125.

In early October oil prices started to move up from the Index low of US\$48.37 on news that the supply overhang had tightened a little. In doing so the market chose to ignore the reality that a supply overhang still persists. There is also a new and interesting dynamic at play in the oil market. When US benchmark prices rise above US\$50 the frackers are quick to lock in hedges which helps them mollify creditors and keep on pumping. As a result the front month US wholesale oil price has not managed to close above US\$50 since July and this level is starting to appear like a ceiling which will suppress global prices.

With US frackers continuing to pump (only recently has US production started to decline despite the loss of more than 1,000 oil rigs since last year) strong global oil production is being supported by robust OPEC output. September production is estimated at 31.9 MMb/d as Saudi Arabia kept production in the 10.2 MMb/d range and Iraqi output, including the KRG, remained strong at around 4.3 MMb/d. Saudi Aramco made significant reductions in its formula prices to Asia (Europe was little changed and the US saw small reductions) with Arab Light's OSP reduced by \$1.70/b. The market expects all other Middle East producers to make major reductions for Asian customers. In particular the market will be watching for the Iranian OSPs in October as an indication of how strongly Iran will fight to try to recapture market share. Iran is expected to add further supply to the market next year.

In Asia and the Middle East, as well as Europe and North America, refinery maintenance is at its peak with around

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Bord Gáis Energy Index

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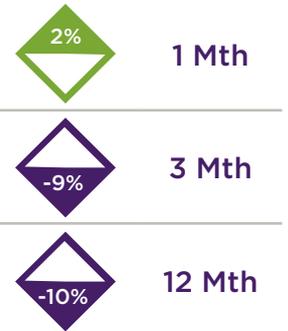
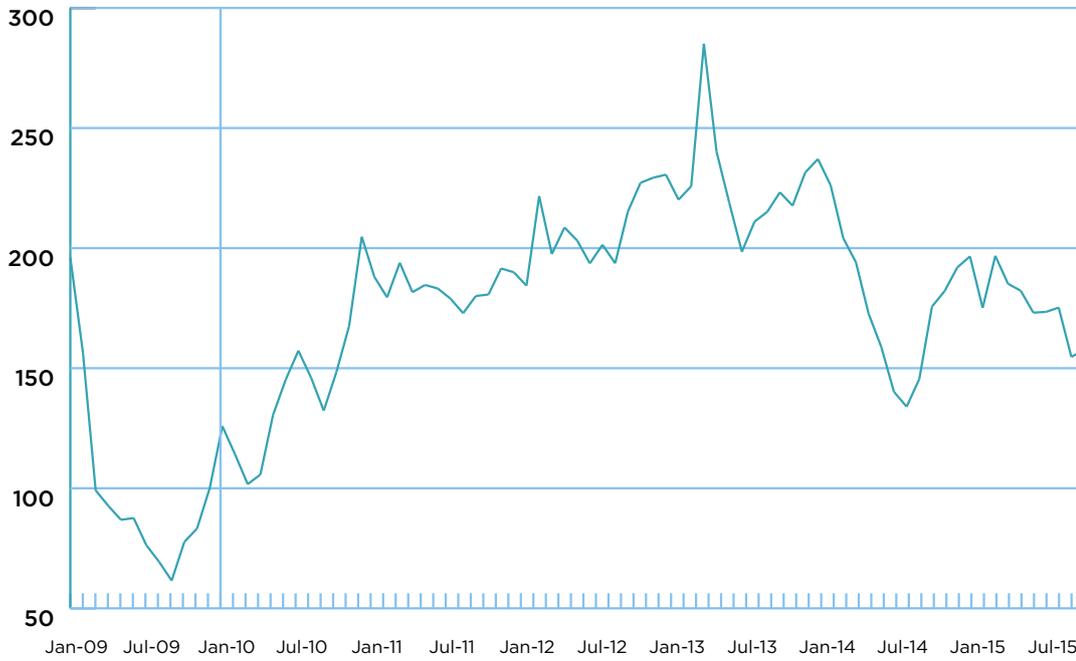
Oil (continued)

1.8 MMb/d of crude capacity shutdown. This is expected to reduce towards 1 MMb/d in November, resulting in some increased demand. However, global refinery margins are significantly reduced from the unusual highs experienced in the second and third quarters. This is particularly true in the US as a result of unseasonably high gasoline inventories post-driving season, and the tight Dated Brent-WTI differential. In fact the US gasoline crackspread has fallen from around US\$20/bbl to below US\$10/bbl. Therefore global potential for higher crude demand, caused by increased available refinery capacity, will be tempered by the lower margins resulting in lower overall refinery utilisation levels than in the second and third quarters.

Bord Gáis Energy Index

Commentary

Natural Gas Index



*Index adjusted for currency movements.

Data Source: Spectron Group

Natural Gas

- Despite ample supplies, particularly LNG gas supplies to Britain, a rise in home heating demand resulted in wholesale prompt gas prices rising 2% month-on-month
- Forward gas prices continued to soften with weaker oil prices despite threats to Groningen gas production

The average Day-ahead price for September was 40.98 p/th, which is a 2% increase in euro terms on the previous month's outturn of 39.77p/th. Demand in September averaged 190mcm over the month, 20% above the National Grid's expected seasonal norm demand for this time of year. This rise was due to a heightened demand for heating. By way of comparison, the September outturn in recent years was 48.15p in 2014, 65.64p in 2013 and 60.24p in 2012. Despite strong demand the recent bearish tone in the prompt UK gas markets continued as strong LNG deliveries persisted. Wholesale gas for Day-ahead delivery on the UK's NBP trading hub in September was some 15% cheaper than it was the previous year as the Qataris continued to use the country as a sink to offload LNG oversupply. Nine LNG tankers arrived in the UK during September, matching the total seen in August, and there were five expected in the first six days of October alone.

LNG send out averaged 37mcm this September compared to 29mcm in September 2014. High Norwegian flows in September were also recorded as maintenance on key fields was completed earlier in the summer this year. Norwegian imports were up 46% year-on-year at 1.87 Bcm. UKCS production averaged 79 mcm per day this September compared to an average of 66mcm in 2014.

Forward prices hit fresh lows in September with the winter 2015 and summer 2016 contracts trading off 1.17p and 1.19p respectively month-on-month. The fall in forward gas prices was driven largely by an accelerated fall in oil prices with the Brent benchmark down nearly US\$6 a barrel in the month, and a continued positive supply outlook. Subdued concerns over fourth quarter Russian supplies to the EU also kept downward pressure on European gas markets.

However, in early October a potential supply risk returned to the fore with news that the Dutch parliament had approved a motion calling on the Government to substantially lower gas production from the country's Groningen gas field following recent seismic activity in the area. The motion was submitted by opposition parties but endorsed

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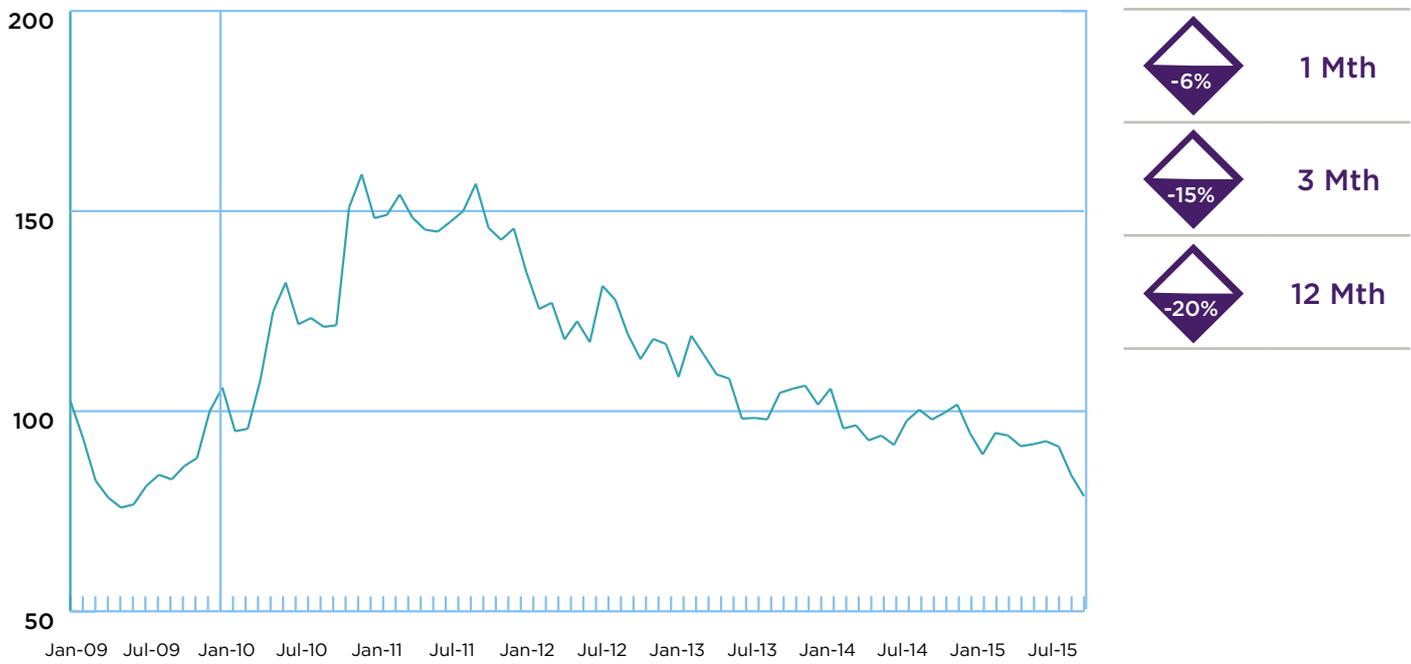
Natural Gas (continued)

by the Labour party, a junior partner in the government. Economic Affairs Minister Henk Kamp is due to decide on production levels in December. He has vowed to cut production as much as possible while still guaranteeing that homes in the Netherlands, Germany and Belgium that have long-term contracts and rely on Dutch gas are supplied during the winter. European gas prices are likely to respond to Groningen related news flow over the coming weeks and months. The UK's reliance on gas imports, which means it is vulnerable to external shocks such as a period of prolonged cold weather, reduced Groningen production and ongoing gas and territorial disputes between Russia and the Ukraine.

Bord Gáis Energy Index

Commentary

Coal Index



*Index adjusted for currency movements.

Data Source: ICE

Coal

- European coal prices continued their startling decline in September, losing US\$3.55 in the month
- The weakness in coal prices is reflective of the collapse in prices of numerous commodities in 2015
- Coal's September weakness was spurred by worries that China's economy is in a slump and continued weakness in the crude oil market

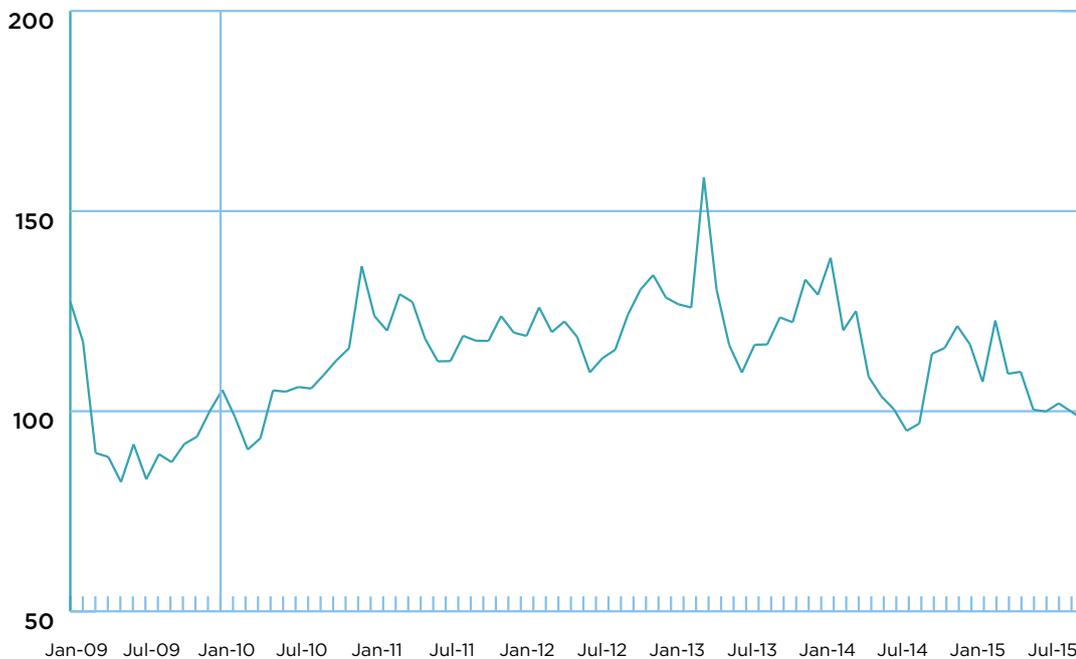
The ICE Rotterdam Monthly Coal Futures Contract continued its now startling decline in September. Having closed at the end of August at US\$54.95/mt, prices once again continued to weaken for another month to close September at US\$51.40. Indeed, on 1 October, the price closed at a record low of US\$51/mt. Spurred by worries that China's economy is in a slump and continued weakness in the crude oil market, prices continued to weaken in the month. Coal prices did rebound somewhat in early October on the news that up to 30,000 coal miners in South Africa's Limpopo and Mpumalanga coalfields stopped work after annual wage negotiations with the Chamber of Mines representing major coal mining companies came to a standstill. However, European traders are dismissive of the strike and its true impact, chiefly because South African coal doesn't price into Europe.

The weakness in coal prices is reflective of the crash in numerous commodity prices. According to Bloomberg copper is down 18% this year and the 10% drop in prices in Q3 was the biggest since the three months ended September 2011. The Bloomberg Commodity Index lost 14.5% in Q3 amid forecasts for the slowest economic growth since 1990 in China, the biggest user of energy, metals and grains. According to Bloomberg, money has flowed out of commodity funds in September with U.S. listed Exchange Traded Products losing \$522 million.

Bord Gáis Energy Index

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Electricity Index



Data Source: SEMO

Electricity

- Despite rising UK prompt gas prices, Irish wholesale prices fell month-on-month with the return of a number of coal plants from maintenance

Month-on-month the average wholesale price of electricity fell more than 2% in September. Excluding supplier capacity payments the average wholesale price for September was €48.97 compared to €50.34 in September, a fall of €1.37/MWh on the average monthly wholesale price.

In general the wholesale price of electricity can be assessed by examining three components:

- the UK wholesale cost of gas
- the European-wide price of emitting one tonne of carbon
- the clean spark (which is what in general terms a gas powered generator receives in energy payments from the market once the cost of producing a unit of electricity is deducted)

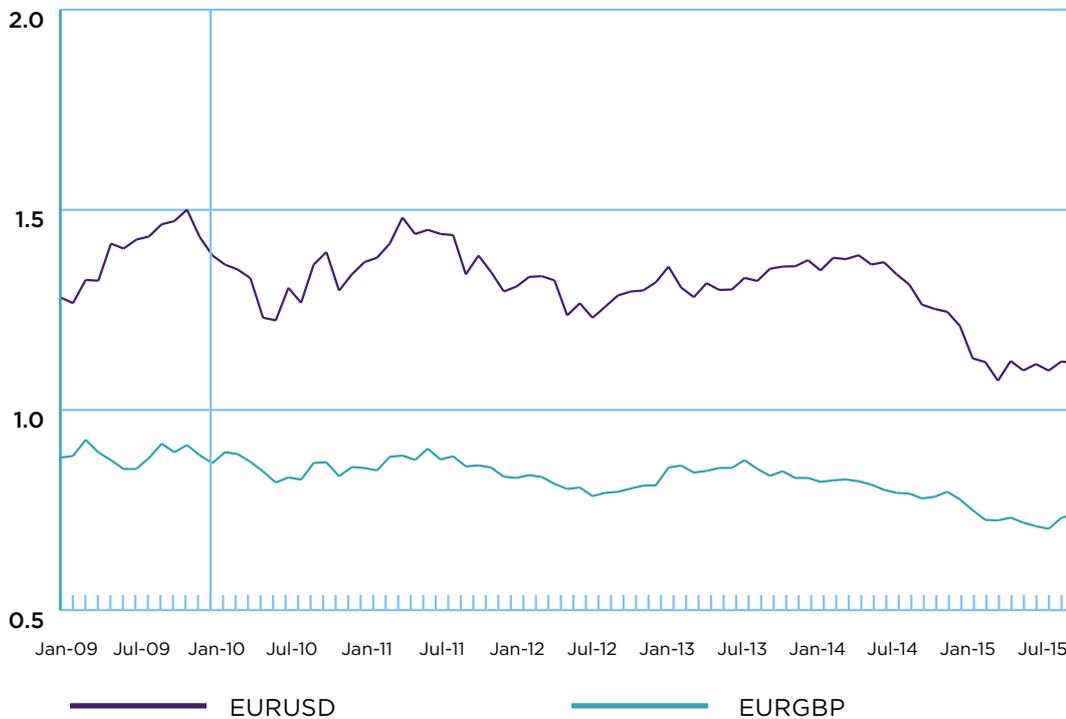
The wholesale cost of imported gas from the UK increased month-on-month by 2%. Irish wholesale power prices typically tend to rise with the cost of imported gas as it is the most significant cost in the production of electricity. However, the influence of rising wholesale gas prices was more than offset by a falling clean spark in September.

A monthly clean spark of just €6.92/MWh was recorded in the month, which is down on the €8.24/MWh observed in August (a fall of 16%). The average spark year-to-date is just over €7/MWh, which is the lowest average spark recorded for the first 9 months of any year under the current wholesale market structure. The falling spark can be attributed to the return of a number of coal plants from outages which reduced the influence of gas plants on the cost of producing electricity. Given the weak wholesale price of coal and the current cost to emit one tonne of carbon, a coal powered station has lower production costs than a gas powered one. As a result, coal plants are higher up on the production merit order despite the environmental disadvantages associated with coal powered plants who are heavy emitters of carbon.

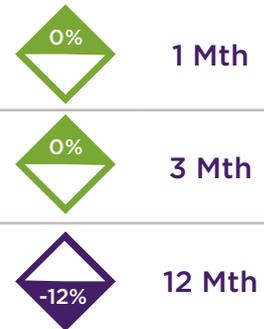
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Commentary

FX Rates



EURUSD



EURGBP



FX Rates

- During the month economic data from China suggested that the slowdown had intensified over the last 12 months. Its slowdown is pulling down global growth, trade, inflation and expectations of interest rate hikes
- These eroding rate hike expectations have weakened both the US dollar and British pound

The most significant foreign exchange event in September was the Fed's September interest rate decision. In the end the outcome was very familiar – the Fed took a 'let's wait and see' approach and rates were held where they have been since December 2008. Of rising concern amongst policy-makers is China's slowdown and the uncertain impact it has on the US economy. The dollar, which had climbed partly in anticipation of higher rates, stumbled briefly following the announced decision. The Fed's inaction has now created some uncertainty about what would prompt the American central bank to raise rates. Investors are likely to watch Chinese economic data even more closely, although many think the slowdown is not fully reflected in official numbers. The Fed essentially has two jobs (i) to ensure price stability, for which inflation of 2% on its preferred measure is the target and (ii) maximum employment. With inflation at zero and with the Fed reckoning that unemployment can fall further without causing much inflation, it's no surprise the Fed left rates on hold.

The Bank of England faces the same questions as the Fed; when to raise interest rates. In its view domestic factors like low unemployment and rising wages point to inflation picking up from its current 0%. But international forces are going in the other direction. Low energy and food prices are driven by events beyond its borders and the strength of sterling is stopping prices from rising too. Then of course there is the slow-down in China and the way it is spreading around the world. Put all that together and you have a committee in no rush to raise rates.

In early October the prospects of either US or UK rate hikes were pushed further into the future with the world's biggest economies showing further signs of slowing down. China's annual consumer-price inflation rate declined faster than expected in September to 1.6% from 2% in August. In the euro area industrial production fell by 0.5% between July and August. In America retail sales rose by a measly 0.1% in September, having been flat the month before. American government-bond yields and the dollar fell further.

Market Outlook

- Has the current 'down-cycle' come to an end with the price of Brent crude at US\$50?
- Where does the market think prices can go from here both in the short and long term?

The oil industry exhibits strong cyclical patterns that determine global supply which ultimately influence global prices. In the past couple years the world has seen strong oil supply growth in response to a prolonged period of rising or high global oil prices. This supply growth has been associated with an oil market 'up-cycle'. This 'up-cycle' has incentivised greater investment in production and a greater focus on developing and applying technologies to unlock new resources.

During this period of the cycle the oil rig count in the US hit over 1,750 amid a fracking boom. However, in time the cycle resets as the oil market becomes saturated. Once oversupplied, history has shown that prices can experience a period of falling or lower prices. These 'down-cycles' prompt cutbacks in upstream investment resulting in weaker supply growth. Given that the oil price is half of what it was a year ago the globe is in the grip of a typical 'down-cycle'. The US oil rig count has fallen more than 1,000 since last year. There are two questions being posed by the current 'down-cycle'.

The first burning question is where can prices go from here and is US\$50 the new US\$100? To answer this we should consider the cost to develop the most expensive sources of supply required to balance the market according to IHS Energy:

- At the moment oil prices are below the full-cycle cost of what IHS considers typically higher-cost projects in areas such as Venezuela, the North Sea, the US Gulf of Mexico, West Africa, and the Canadian oil sands
- Lower oil prices are prompting widespread reductions in upstream capital spending this year compared with 2014. If history is a guide the current period of lower prices will, in time, sow the seeds of the next up-cycle. IHS expects the cost of oil from some higher-cost sources to remain closer to US\$100/bbl. Thus oil prices need to be well above recent levels to justify investment in expensive, long-lived oil production projects, which IHS expect will be needed to offset field declines and to meet demand growth
- Worryingly, 2014 stands as the year with the lowest level of new conventional oil and gas discoveries outside of North America since 1952. This affirms the trend that started in 2011 of declining discovery volumes and drilling success rates. IHS projects that global demand for crude oil will increase from about 74 MMb/d in 2014 to 84 MMb/d by 2030. This will require roughly 42 MMb/d of new crude oil production to be developed in this time frame to offset field declines (about 32 MMb/d) and to meet rising demand (about 10 MMb/d). This supply growth is expected to include not only low-cost 'base-load' oil production from the Middle East and elsewhere and medium-cost oil such as tight oil from North America, but also higher-cost oil from "frontier" sources such as extra-heavy oil from Venezuela, complex deepwater and ultra-deepwater projects and tight oil from outside North America

While the era of US\$100 - US\$120 has clearly come to an end, if the world requires supplies from these 'frontier' sources in the not too distant future, the current oil price of US\$50 might look very cheap.

The other question is for how much longer will the developed world enjoy the economic benefits of lower oil prices if supply starts to wane?

In the shorter term, the International Energy Agency (IEA) in September forecasts a sharp drop in non-OPEC oil production in 2016 and five-year high oil demand in 2015. The IEA forecast for non-OPEC production echoes the point made by IHS that down-cycles prompt cutbacks in upstream investment and that these cutbacks coupled with rising demand could lead to higher prices.

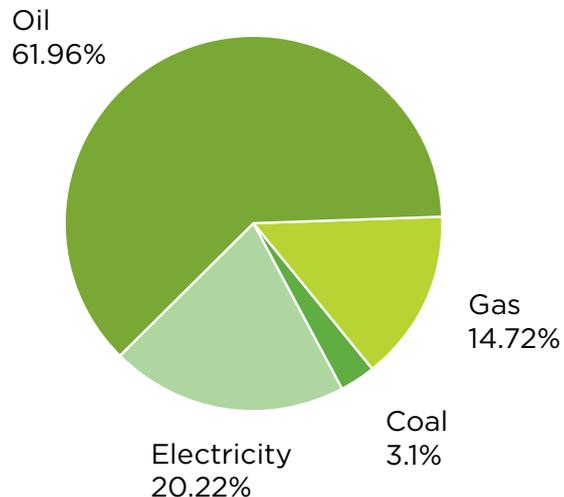
However, the future is never certain and it may be too early to call the demise of the current down cycle. According to the bank Golman Sachs 'the oil market is even more oversupplied than we had expected and we now forecast this surplus to persist in 2016...while not our base case, the potential for oil prices to fall to such levels, which we estimate near \$US20/bbl, is becoming greater as storage continues to fill'. The China factor and the potential for a hard landing, as alluded to by Goldman Sachs, has the potential to significantly influence global commodity prices in 2016 and beyond.

Bord Gáis Energy Index

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Re-weighting of Bord Gáis Energy Index

Following the SEAI's 2011 review of energy consumption in Ireland, there was a 6.4% drop in overall energy consumption. Oil continues to be the dominant energy source with most of the oil used in transport and the remainder being used for thermal energy. For the purposes of the Bord Gáis Energy Index, the total final energy consumption in Ireland fell 1,089 ktoe (toe: a tonne of oil equivalent is a unit of energy, roughly equivalent to the energy content of one tonne of crude oil) between 2009 and 2011. This fall was made up of a 1,022 ktoe drop in oil consumption (down 13.5%), a 20 ktoe drop in natural gas (down 12.6%), a 7 ktoe drop in electricity (down 0.3%) and a 40 ktoe drop in coal (down 10.98%). The Bord Gáis Energy Index has been re-weighted in January 2013 to reflect the latest consumption data. The impact has been minimal and has resulted in slight reductions in the share of oil and gas and a slight increase in the weighting of electricity in the overall Index.



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