

2013 Energy Outlook

Brent oil to average \$110/bbl, touch \$120/bbl in 2013

Looking into 2013 we see a sluggish US economy, recession in Europe and relatively healthy EM growth, coupled with some geopolitical risk and large monetary expansion from the Fed. Against the backdrop, global oil demand should expand by just 945 thousand b/d. We expect Brent crude oil prices to average \$110/bbl in 2013, not far from this year's average. Moreover, as monetary pressures build, we believe Brent crude oil prices could touch \$120/bbl next year. Oil prices could move even higher if economic growth exceeds our expectations but we see a cap for Brent at around \$140/bbl.

Seaborne crude oil, LNG supplies to remain tight

On the energy supply side, global oil and natural gas output remains tight. We expect non-OPEC production outside North America to contract by 180 thousand b/d in 2013 due to North Sea declines and stagnation elsewhere. Meanwhile, US and Canadian oil output should grow by 880 thousand b/d next year, resulting in a contrasting outlook for seaborne Brent and landlocked WTI crude oil prices. A return of Iran's idled oil output, or a further loss, could be the biggest swing factor for Brent. In addition, we see upside pressure on spot LNG prices due to a tight supply situation and firm demand arising from Japanese nuclear outages. In sum, European and Asian natural gas benchmarks should remain well supported.

Surging US shale oil output creates risk of \$50 WTI

North America's energy supplies are surging while the rest of the world continues to fight for scarce molecules of oil and gas. On our estimates, onshore US crude oil output now vastly exceeds previous growth rates in liquids and nat gas, particularly in Lower 48 states. With profitability for US domestic oil producers very high and no change in sight to US rules preventing crude oil exports, we expect WTI prices to continue to lag international prices. Indeed, we see a risk of WTI temporarily falling to \$50/bbl over the next 24 months to force a slowdown in supply growth or a change in crude oil export rules.

US nat gas steady, seaborne coal on downward path

As downside risks to WTI grow, we still see US nat gas production costs well anchored at between \$3 and \$4.50/MMBtu next year. Similarly, 9 bcf/d of coal-to-gas switching capacity suggests a mid-price range of \$3 to \$4.50/MMBtu. As such, we maintain our \$3.75/MMBtu forecast for 2013 and introduce a 2014 forecast of \$4.20/MMBtu. Still, any temporary dip in WTI oil prices could lead to a corresponding rebound in US nat gas prices, as associated nat gas output falls. Even then, any nat gas price spike should be temporary as long-run supply/demand dynamics point to a tight price range. We see a downward path for global thermal coal prices and maintain our 2013 average Newcastle forecast of \$95/mt. We believe that India presents the main upside risk to our seaborne coal price view.

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Refer to important disclosures on page 61 to 62. Link to Definitions on page 60.

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Table 1: BofA Merrill Lynch Commodity Research Themes and Outlook

	View	Recent report links
Macro outlook	<ul style="list-style-type: none"> For 2013, we see a sluggish US economy, a recessionary environment in Europe and relatively healthy EM growth, coupled with some geopolitical risk and monetary expansion from the Fed. The US fiscal cliff is a major concern in 1H13. However, we see large-scale Fed easing and a constrained environment for crude oil and nat gas supplies lending support to prices. The Eurozone will remain in recession in 2013, partly due to unaffordable energy import costs. With EMs again contributing the most to global GDP growth, energy demand should remain supported, particularly for transportation fuels. 	<ul style="list-style-type: none"> "2013 Energy Outlook", Energy Strategist, 30 Nov 2012
WTI and Brent crude oil	<ul style="list-style-type: none"> In addition to moderately improving global oil demand growth, we expect a modest improvement in non-OPEC supply and limited spare capacity within OPEC for 2013. We forecast average Brent crude oil prices of \$110/bbl for 2013 and \$112/bbl for 2014. As monetary pressures build, we see Brent touching \$120/bbl in the next six months. The biggest swing factor for Brent could be the return or further loss of Iran's idled oil output. Still, we see a natural cap to Brent prices of \$140/bbl in 2013, the point at which energy as a share of GDP reaches 9%. For WTI, surging shale oil output combined with infrastructure and export constraints could isolate North American crude markets. We see WTI crude oil prices averaging \$90/bbl in 2013, and \$92/bbl in 2014. We see risk of WTI falling to \$50/bbl over the next 24 months to force a slowdown in supply growth or a change in crude oil export rules. 	<ul style="list-style-type: none"> "Light sweet light for America", 12 Nov 12 "Fed fuel", 28 Sep 12
Atlantic Basin petroleum products	<ul style="list-style-type: none"> Product markets will likely be experience temporary tightness in 2013 as demand growth and low inventories leave markets vulnerable to price spikes. We see spike risk in heating oil cracks given Europe's structural diesel deficit, strong EM demand and elevated utilization rates. We have turned less negative on gasoline given supply rationalizations and we view the HO premium to RBOB next summer as lofty. For residual fuel oil, we do not expect utilization rates to improve in 2013 as demand is likely to decline globally. 	<ul style="list-style-type: none"> "Spike risk in heat cracks", 26 Oct 2012 "Crunch-time for diesel in Europe" 21 Sep 2012
US natural gas	<ul style="list-style-type: none"> We see little upside to US natural gas forward prices in 2013 as supply remains too high, demand contracts and inventories stay elevated. We forecast average US Henry Hub natural gas prices of \$3.75/MMBtu, followed by \$4.20/MMBtu in 2014. Prices should trade between \$3 and \$4.50/MMBtu over the next two years given well-anchored supply costs and coal-to-gas switching capacity. Ethane prices remain challenged as output expands faster than cracking capacity, while propane could fare better on export capacity expansions. 	<ul style="list-style-type: none"> "Propane over ethane", 19 Oct 2012 "Nat gas normalizing," 8 Oct
UK natural gas	<ul style="list-style-type: none"> Due to sharply declining domestic production, UK nat gas prices are more exposed to occasional Norway supply problems and tight global LNG markets. We see upside to winter 2013/2014 NBP prices with the forced retirement of non-compliant coal-fired power generation capacity. 	<ul style="list-style-type: none"> "UK nat gas to benefit from coal retirement", 2 Nov 12
LNG	<ul style="list-style-type: none"> Global LNG prices will likely be supported in 2013 due to a lack of major new supply additions and continued strength in Asian demand given ongoing Japanese nuclear outages and the significant build-out of regasification capacity throughout the region. Japan remains a key risk. More nuclear restarts by summer 2013 and the revival of thermal coal plants could slow LNG demand growth. 	<ul style="list-style-type: none"> "Summer lull in LNG", 19 Jun 2012
Thermal coal	<ul style="list-style-type: none"> Seaborne thermal coal continues to battle with heavy physical oversupply while a steep contango is delaying much-needed output cuts. We see thermal coal prices on a downward path, albeit a slow grinding one. We forecast average 2013 Newcastle prices of \$95/mt. 	<ul style="list-style-type: none"> "A gloomy outlook for coal", 12 Oct 2012

Table 2: BofA Merrill Lynch Commodity Price Forecasts (period averages)

	units	4Q12F	2012F	1Q13F	2Q13F	3Q13F	4Q13F	2013F	2014F
WTI Crude Oil	(\$/bbl)	89.00	94.00	90.00	89.00	89.00	92.00	90.00	92.00
Brent Crude Oil	(\$/bbl)	111.00	112.00	108.00	110.00	110.00	112.00	110.00	112.00
USGC No. 2 HO Cracks to Brent Crude Oil	(\$/bbl)	18.50	15.50	19.00	12.50	14.00	19.00	16.13	
US RBOB Cracks to Brent Crude Oil	(\$/bbl)	4.00	9.92	5.00	12.50	7.50	1.00	6.50	
USGC 1% Residual Cracks to Brent Crude Oil	(\$/bbl)	(14.50)	(8.61)	(11.00)	(11.75)	(13.75)	(14.00)	(12.63)	
NWE 0.2% Gasoil Cracks to Brent Crude Oil	(\$/bbl)	18.50	16.40	19.00	13.50	14.50	19.00	16.50	
NWE Prem. Gasoline Cracks to Brent Crude Oil	(\$/bbl)	5.00	9.35	3.00	10.00	8.00	1.00	5.50	
NWE 1% Residual Cracks to Brent Crude Oil	(\$/bbl)	(16.00)	(8.61)	(13.00)	(12.00)	(12.00)	(9.00)	(11.50)	
US Natural Gas	(\$/MMBtu)	3.60	2.84	3.60	3.40	3.70	4.30	3.75	4.20
Thermal coal, Newcastle FOB	(\$/t)	85	96	95	90	96	99	95	100
Aluminium	\$/t	2,000	2,018	2,100	2,250	2,100	2,000	2,113	1,975
Copper	\$/t	7,950	7,957	8,100	8,300	8,500	7,750	8,163	7,500
Lead	\$/t	2,200	2,060	2,250	2,300	2,550	2,400	2,375	2,750
Nickel	\$/t	16,750	17,459	17,500	18,000	18,500	17,500	17,875	18,000
Zinc	\$/t	1,950	1,946	2,100	2,150	2,350	2,200	2,200	2,250
Gold	\$/oz	1,750	1,680	1,760	1,850	1,660	1,950	1,810	2,040
Silver	\$/oz	33.00	31.24	35.10	34.10	37.10	38.00	36.08	32.20
Platinum	\$/oz	1,650	1,561	1,650	1,800	1,650	1,850	1,738	1,850
Palladium	\$/oz	650	641	650	750	675	800	719	800

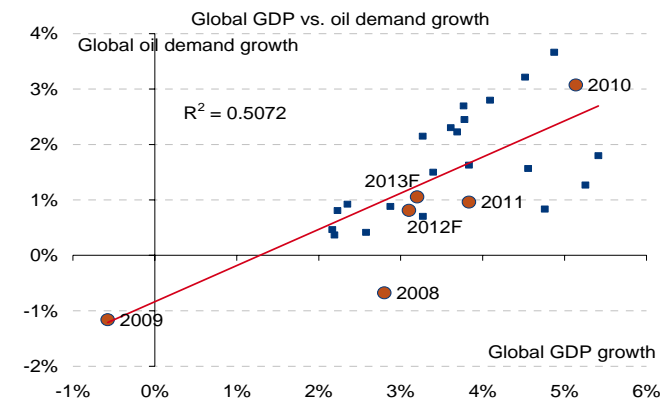
Source: BofA Merrill Lynch Global Commodities Research

1. Macro overview

We remain concerned about the US fiscal cliff in 1H13...

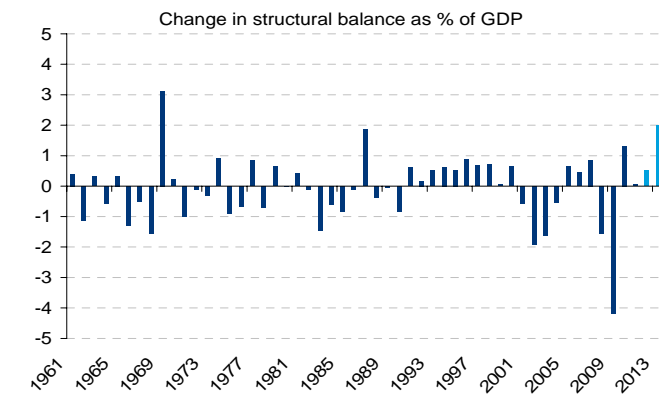
We expect global economic growth to average 3.2% in 2013 supporting energy demand even as Europe remains in recession and the US economic outlook fails to improve materially due to the impending fiscal retrenchment (Chart 1). Most of the contribution to global GDP growth will once again come from Emerging Markets (EMs). Net, we expect some support to energy demand globally, with oil consumption pushing higher by 945 thousand b/d in 2013 relative to the current year. Having said that, we are still concerned that an impending fiscal cliff could tip the US economy into recession, with broad repercussions for the global economy (Chart 2).

Chart 1: We expect global economic growth to average 3.2% in 2013, supporting energy demand...



Source: Bloomberg, IEA, BofA Merrill Lynch Global Commodity Research

Chart 2: ...although an impending fiscal cliff could tip the US economy into recession



Source: Congressional Budget Office, Office of Management and Budget, BofA Merrill Lynch US Economic Research

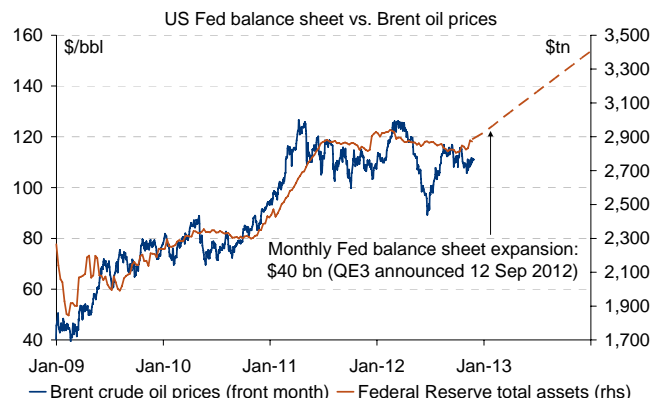
2013 represents 2% GDP which is the drag on GDP our economists currently expect from the fiscal cliff in 2013.

...but see Fed easing pushing oil prices higher in 2H13

The fiscal cliff is a major source of concern, but we expect a remarkable balance sheet expansion by the Fed next year (Chart 3). On top of the \$40bn monthly purchases of mortgage-backed securities that are already announced, we see a net increase in Treasury buying of \$45bn per month by the Federal Reserve as the Operation Twist comes to an end this December. The fiscal retrenchment in the US should thus be partially mitigated by large-scale monetary easing. Of course, this newly printed money will once again run against a constrained environment for both global crude oil and liquid nat gas supplies, lending support to prices (Chart 4).

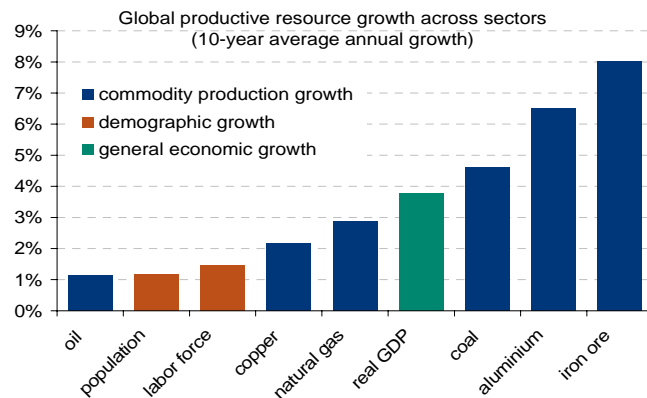
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Chart 3: At any rate, we expect a tremendous expansion of the Fed's balance sheet next year...



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Chart 4: ...to run against a constrained environment for both global crude oil and liquid nat gas supplies

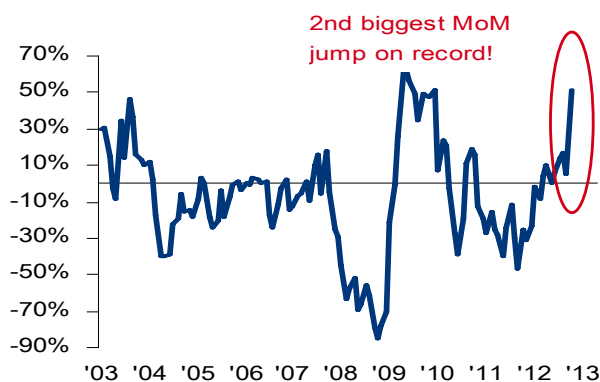


Source: BP, IEA, Bloomberg, BofA Merrill Lynch Global Commodity Research

A stronger China will lend support to energy...

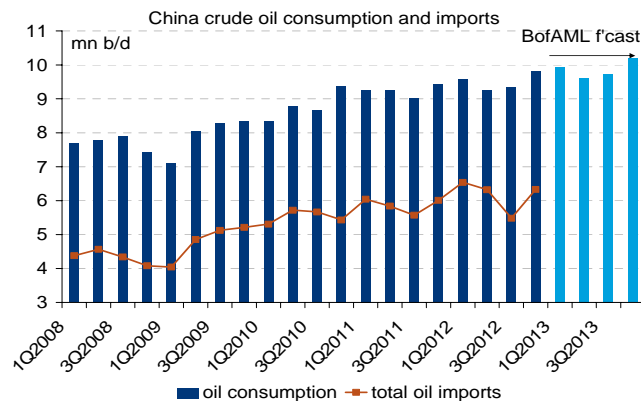
While the US economy remains stuck between Fed easing and a fiscal cliff, optimism on China's economic growth prospects has moved to a 3-year high, according to our Fund Managers Survey (Chart 5). The surge in sentiment has been backed by a slew of data pointing to rising industrial activity, increased electricity generation and improving retail sales. Our economics team has also recently revised its GDP forecast for next year to 8.1%, up from 7.6%. In our view, an improving Chinese economy should lead to higher domestic oil demand and crude oil imports next year (Chart 6). Thus, we project a slight acceleration in year-on-year oil consumption growth in China to 360 thousand b/d in 2013, following 260 thousand b/d growth in 2012.

Chart 5: Growth optimism in China has moved to a 3-year high in our Fund Managers Survey...



Source: BofA Merrill Lynch Global Commodity Research

Chart 6: ...likely resulting in an improvement in domestic oil demand and crude oil imports next year



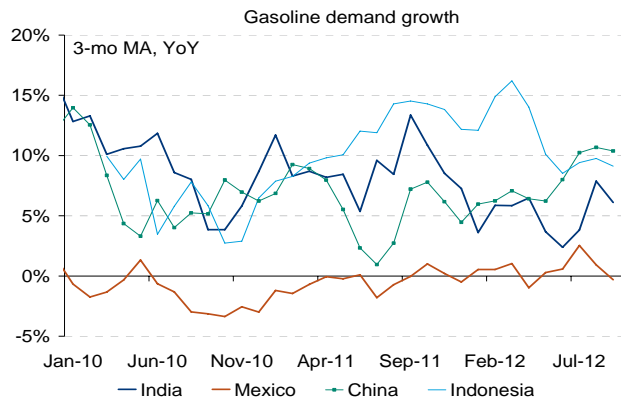
Source: IEA, BofA Merrill Lynch Global Commodity Research

...and other Asian, Latin American economies will help, too

China will not be the only developing economy to see expanding oil consumption. Real interest rates still have room to come down over the next few months and continued policy easing should further boost demand growth in transportation fuels in EMs in 2013 (Chart 7). In turn, transportation fuel demand will lend support to crude oil and petroleum product prices globally next year, in our opinion. Indeed, the most recent data suggests that car sales are expanding at a healthy pace in Russia, Brazil, and China (Chart 8), to name a few, as capital

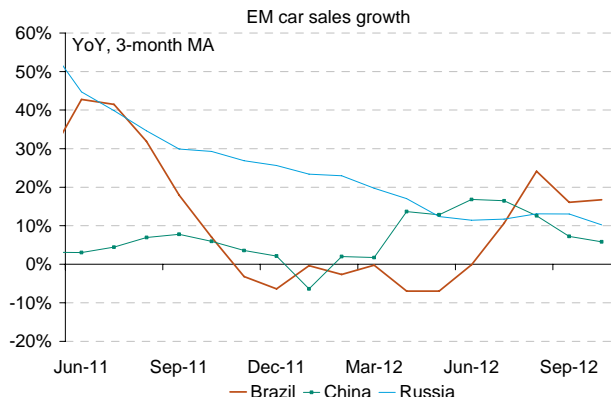
flows to EM debt continue to improve credit availability for consumers, companies and governments alike.

Chart 7: We see demand growth in transportation fuels in EMs lending support to oil prices globally...



Source: JODI, CEIC, BofA Merrill Lynch Global Commodity Research

Chart 8: ...as car sales continue to expand at a healthy pace in Russia, Brazil, and China

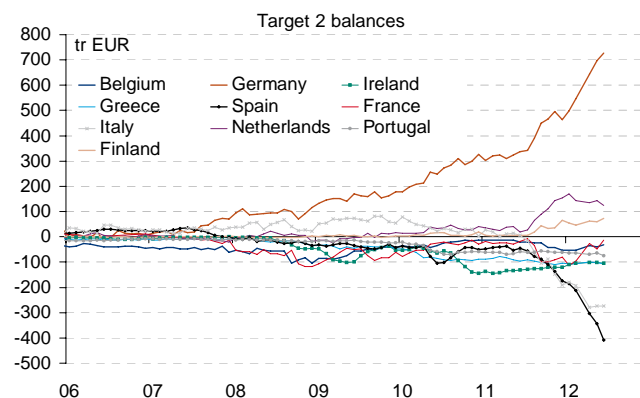


Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Europe risks won't fade given key elections, imbalances...

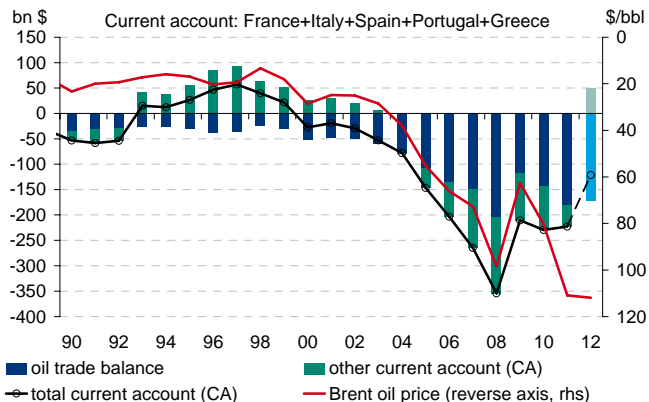
EMs should continue to expand at a healthy rate, but we believe the European economy remains trapped by pronounced Target 2 imbalances that will limit a sustained recovery in economic activity (Chart 9). In effect, capital outflows from Italy and Spain into Germany in recent quarters have deprived Southern Europe of much-needed investment capital, and much of the Eurozone will remain in recession next year. We forecast a GDP contraction in the Eurozone of 0.4% in 2013. As we have explained before, the rapid divergence in Target 2 balances in the past few months may be a direct result of capital flight. But is also reflects unsustainable current account deficits, which are primarily linked to unaffordable energy imports (Chart 10).

Chart 9: We still believe the European economy remains trapped by pronounced Target 2 imbalances...



Source: Euro Crisis Monitor, BofA Merrill Lynch Global Commodity Research

Chart 10: ...and current account deficits that are primarily linked to unaffordable energy imports



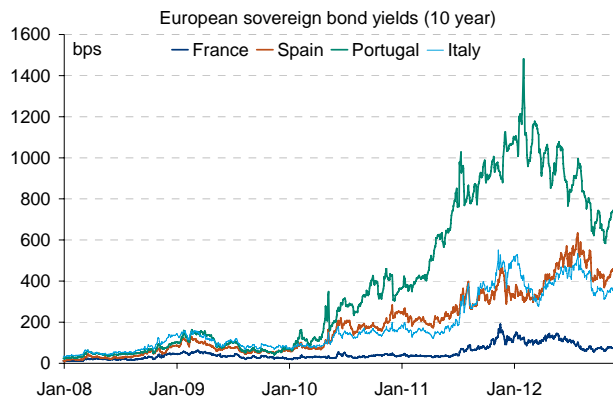
Source: IMF, BofA Merrill Lynch Global Commodity Research
2012 represents IMF projections from the October 2012 World Economic Outlook

...but leaders have done just enough to keep demand stable

Some of the largest economies in the Eurozone, such as Italy and Spain, still face high borrowing costs (Chart 11). This makes repayment of principal and interest very difficult for highly indebted nations. The OMT program set up by the European Central Bank and the measures to keep the euro together should

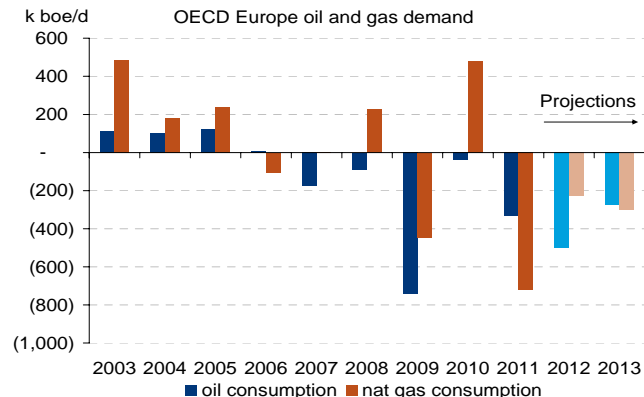
prevent an economic disaster, but there is no real plan so far to reinvigorate the deficit economies of Europe. We therefore see energy demand across OECD Europe lagging historical patterns (Chart 12), with Spain, Italy, Portugal and Greece continuing on a severe oil demand contraction path.

Chart 11: Some of the largest economies in the Eurozone, such as Portugal, Italy and Spain, still face very high borrowing costs...



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Chart 12: ...and we see energy demand across OECD Europe lagging historical patterns



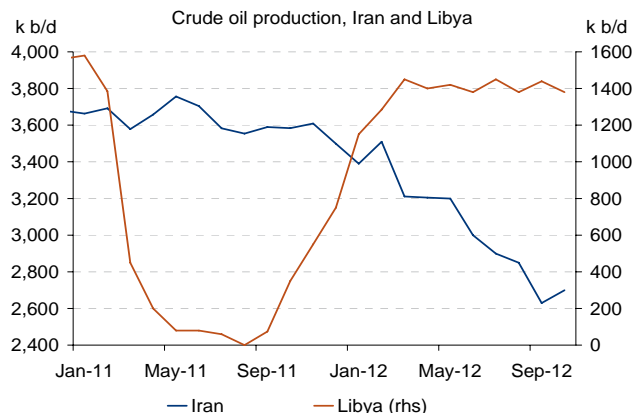
Source: IEA, BofA Merrill Lynch US Economic Research
2012-13 oil consumption growth is BofAML forecasts. 2012 gas consumption growth is YTD Aug, and 2013 gas consumption growth is IEA projections.

Geopolitical risks to remain high, as Iran has been hard hit

Beyond the economics, we expect geopolitical risk to remain high next year, particularly as the Iranian embargo and Arab Spring continue to unfold. In that sense, Iran creates a risk to petroleum prices on both sides. On the one hand, a rapid resolution to the crisis in 1H2013 would be rather bearish for prices. In effect, the drop in Iranian output, largely mitigated by the return of Libya's oil fields, was the largest supply shock to the market in 2012 (Chart 13). On the other hand, additional tensions in the Middle East could result in further output disruptions. As such, we believe that OPEC government budget break-even oil prices will likely expand in 2013. Once again, politicians in the region will likely try to spend their way out of the socioeconomic problems they face (Chart 14). In our view, these budgetary pressures will create a floor for Brent prices of around \$90/bbl next year.

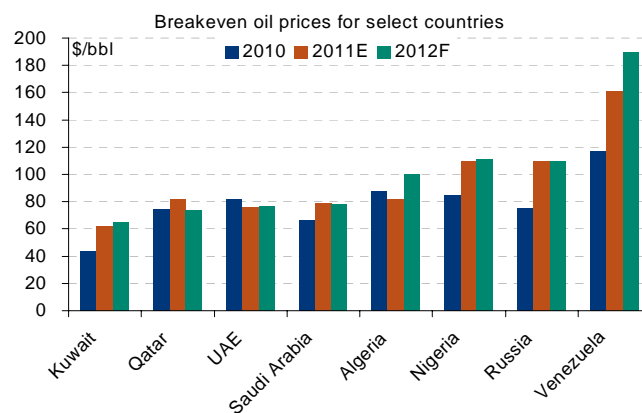
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Chart 13: The drop in Iranian output, largely mitigated by the return of Libya's oil fields, was the largest supply shock to the market in 2012



Source: IEA, BofA Merrill Lynch Global Commodity Research

Chart 14: In our view, government budget pressures in producing countries will create a floor for Brent prices of \$90/bbl next year

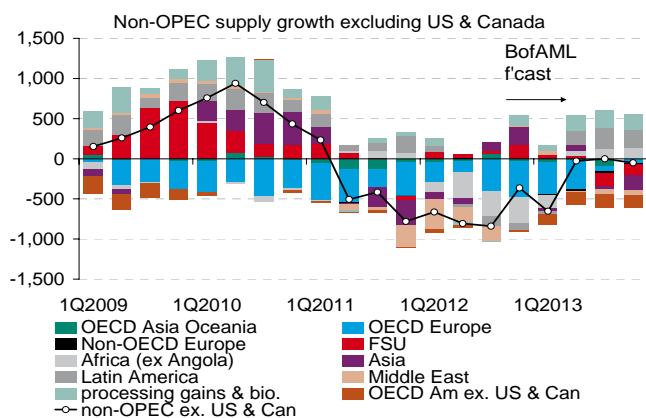


Source: IEA, BofA Merrill Lynch Global Commodity Research
Note Algeria are IMF estimates as per January 2012

Seaborne crude oil, LNG supplies will remain rather tight...

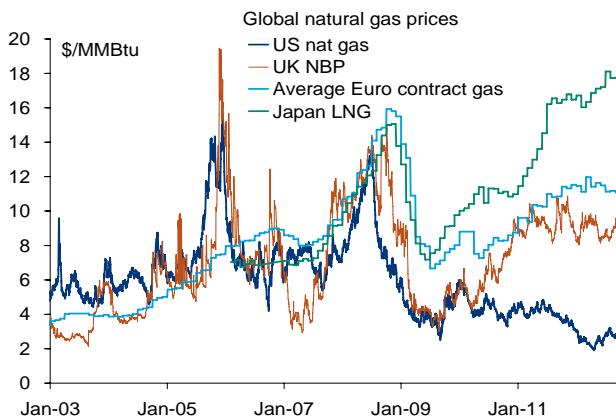
When looking at the energy supply side, both global crude oil and international natural gas output remains tight, in our view, and will likely continue to lend support to prices. For all intents and purposes, non-OPEC production outside the United States is rather meager due to North Sea declines and stagnation elsewhere (Chart 15), creating a contrasting outlook for seaborne Brent and landlocked WTI crude oil. The ongoing production shortfalls will likely support Brent at an average of \$110/bbl next year, in our view. In addition, we see continued upside pressure on international LNG prices due to the tight supply situation and the ongoing Japanese nuclear outages (Chart 16).

Chart 15: Non-OPEC production outside the United States remains rather meager due to North Sea declines and stagnation elsewhere



Source: IEA, BofA Merrill Lynch Global Commodity Research

Chart 16: We see continued upside pressure on international LNG prices due to the tight supply situation



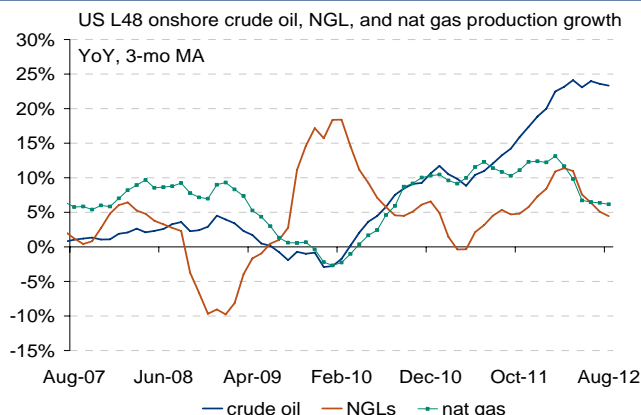
Source: Bloomberg, Reuters, World Gas Intelligence, BofA Merrill Lynch Global Commodities Research

...but surging US shale output creates risk of \$50 WTI

While the rest of the world continues to fight for scarce molecules of oil and gas, North America's energy supplies are surging. On our estimates, onshore US crude oil output growth now vastly exceeds previous growth rates in liquids and nat gas, particularly in Lower 48 states (Chart 17). Indeed, YoY onshore oil supply growth is running at twice the rate that natural gas did at the peak. With profitability for US domestic oil producers high and no change in sight to US rules

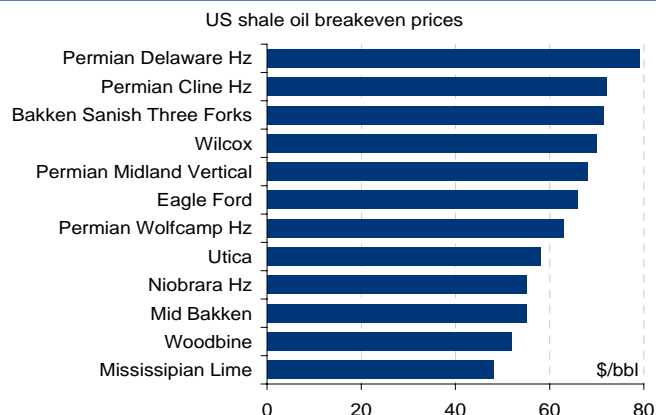
preventing crude oil exports, we expect WTI prices to continue to lag international prices. Indeed, we see a risk of WTI crude oil prices temporarily dropping to \$50/bbl over the next 24 months to force a slowdown in supply growth or a change in crude export rules (Chart 18).

Chart 17: US crude oil output growth is now vastly exceeding previous growth rates in liquids and nat gas, particularly in lower 48 onshore



Source: EIA, BofA Merrill Lynch Global Commodity Research

Chart 18: Unless WTI crude oil prices drop significantly, there is simply no need to ration out supplies

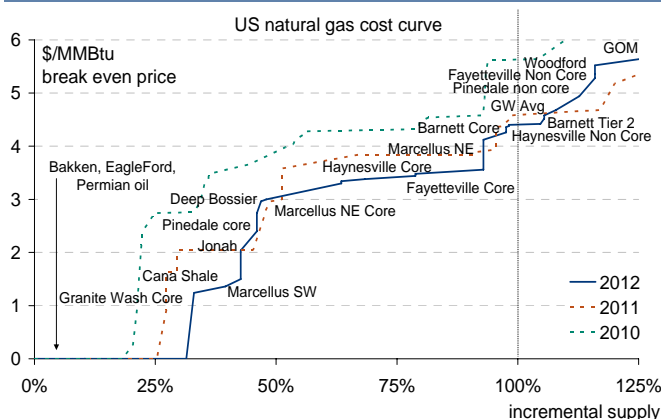


Source: BofA Merrill Lynch Global Research
Breakeven calculations assume a 10% WACC, current strip commodity prices trending to BofAML long term forecasts, standard LOE of \$6/boe, standard state royalty & prod tax rates, and type curves provided by operators

We see steady US natural gas prices in 2013

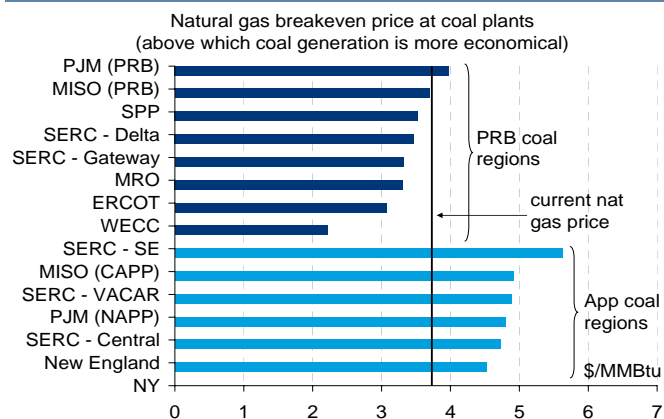
While downside risks on WTI crude oil prices will continue to grow over the next 24 months, we see natural gas supply costs well anchored at between \$3 and \$4.50/MMBtu next year (Chart 19). Similarly, 9 bcf/d of coal-to-gas switching capacity points to a price range of \$3 to \$4.50/MMBtu (Chart 20), suggesting that natural gas prices will remain steady in 2013. As such we maintain our \$3.75/MMBtu forecast for 2013 and introduce a 2014 forecast of \$4.20/MMBtu. Even then, a precipitous brief drop in WTI crude oil prices over the next 24 months could lead to a corresponding rebound in US natural gas prices, as shale oil producers reduce associated natural gas output. Having said that, we would expect any US nat gas price spike to be brief as both demand and supply dynamics suggest a firm \$3 to \$4.50/MMBtu range over the next two years.

Chart 19: Natural gas supply costs will likely remain well anchored between \$3 and \$4.50/MMBtu next year



Source: BofA Merrill Lynch Global Commodity Research

Chart 20: Similarly, 9 bcf/d of coal-to-gas switching capacity points to a price range of \$3 to \$4.50/MMBtu



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

2. Outlook for crude oil

2.1 Brent

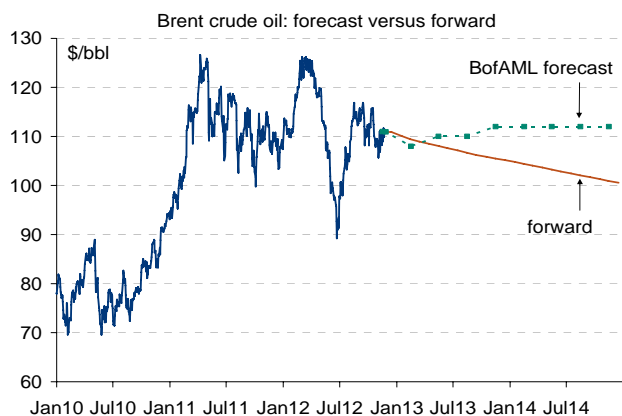
Brent oil prices to average \$110/bbl, touch \$120 in 2013

In 2013 we see a sluggish – albeit improving – US economy, a recessionary environment in Europe and relatively healthy EM growth, coupled with large monetary expansion from the Fed and some geopolitical risks. As such, we believe Brent crude oil prices should average \$110/bbl in 2013, not too far from this year's average. Moreover, we believe that Brent crude oil prices will touch \$120/bbl at some point next year as monetary pressures build (Chart 21). Fiscal cliff concerns may prevent oil prices from moving higher in the short run, but this will likely be outweighed by the positive impact from central bank policy in 2H13, pulling prices up to an average of \$112/bbl by 4Q13. Importantly, a quick resolution of the fiscal cliff would create upside risks to our 2013 forecasts. For 2014, we estimate that Brent crude oil prices will average \$112/bbl.

Oil prices are capped at \$140/bbl or 9% of GDP in 2013

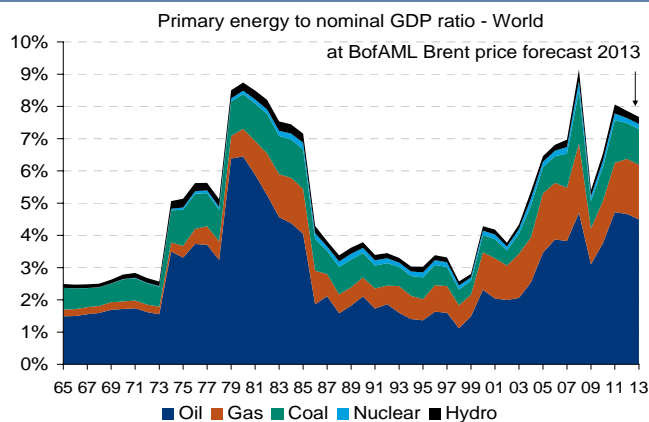
A tight supply side and a raft of disruptions have kept prices elevated and volatile this year, with Brent crude oil prices spiking to close to \$130/bbl in March before falling back down to lows of \$90/bbl in June. We continue to believe that energy as a share of GDP at around 8% is not particularly affordable creating current account problems for countries with wide trade deficits in energy such as Korea, India and the European Periphery. As a result, we see an upside cap for Brent crude oil prices of around \$140/bbl, or 9% of GDP, should global economic growth accelerate or oil supplies fall significantly short of our expectations (Chart 22).

Chart 21: Given the large monetary expansion, Brent oil prices should average \$110/bbl, touch \$120/bbl in 2013...



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Chart 22: ...but energy as a share of GDP is already high, so we see a cap for Brent around \$140/bbl



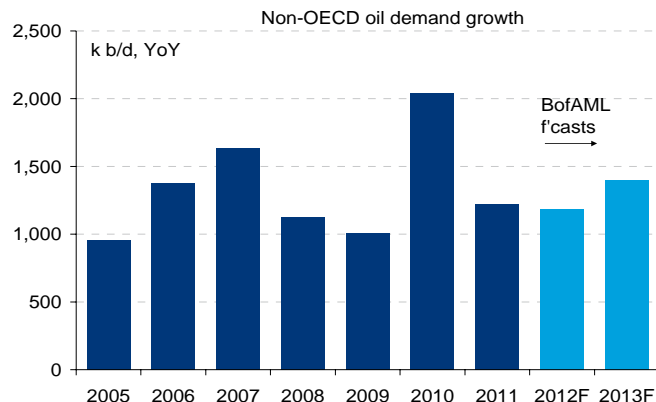
Source: IMF, IEA, BP, Bloomberg, BofA Merrill Lynch Global Commodity Research

Turning more constructive on global oil demand

Looking into 2013, the outlook for global oil demand growth should start to improve in line with more optimistic leading indicators. The appetite for oil in Europe is likely to remain depressed, but we see the rate of demand contraction improving from -500 thousand b/d in 2012 to -275 thousand b/d next year. Overall, OECD oil demand should continue to contract next year but at a lesser rate than we expected just a few months ago. The biggest changes to our balances have perhaps come for the emerging markets, where we see room for a

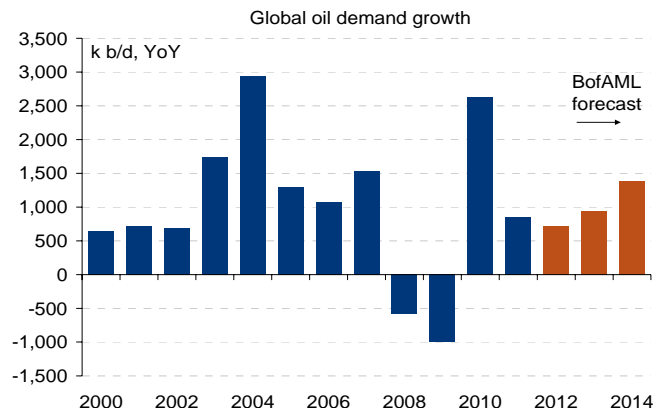
more significant acceleration in demand growth. We now expect 1.4 million b/d of demand growth next year, following on from 1.2 million b/d this year (Chart 23). A rebound in China's demand growth to 360 thousand b/d should help, as should a pick-up in demand in other Asian countries, the Middle East and to a lesser extent Latin America. Combined, we see global oil demand growing by 945 thousand b/d, up from 720 thousand b/d in 2012, and expect a further normalization of demand growth in 2014 (Chart 24).

Chart 23: For the emerging markets, we now see room for a more significant acceleration in demand growth in 2013



Source: IEA, BofA Merrill Lynch Global Commodity Research

Chart 24: Combined, we see global oil demand growing by 945 thousand b/d, up from 720 thousand b/d in 2012

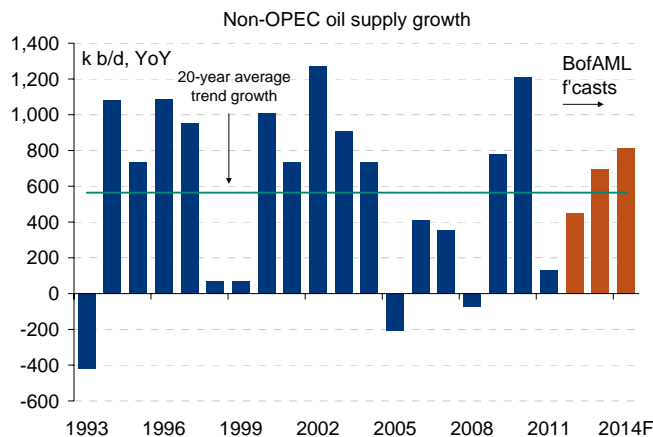


Source: IEA, BofA Merrill Lynch Global Commodity Research

Non-OPEC oil supply: beset by disruptions

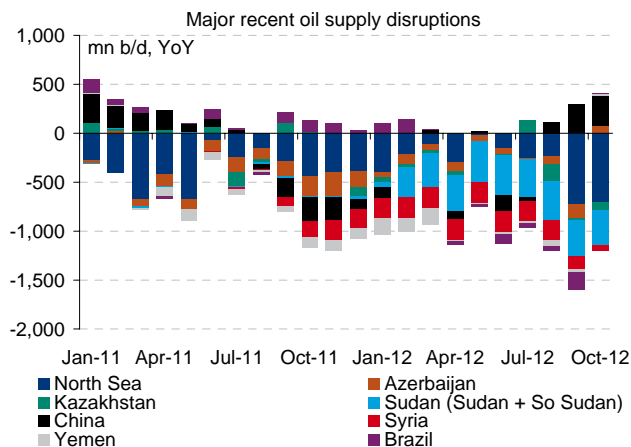
Following several years of subdued performance, non-OPEC oil supply growth saw a significant improvement in 2009 and 2010 with output growth rebounding to 0.8 and 1.2 million b/d, respectively. More recently oil supply growth coming out of the region fell sharply in 2011 (130 thousand b/d) and remained subdued in 2012 (450 thousand b/d) largely due to a combination of unplanned outages, labor conflicts and geopolitical turmoil (Chart 25). Supply shortfalls have been unprecedented both in size and in breadth (Chart 26), consistently averaging between 0.7 and 1.3 million b/d over the past 12 months. In the North Sea, heightened supply risks have become hard to ignore with unplanned outages, field underperformance and labor strikes leading to the weakest loadings in five years in September. Furthermore, outages in China (Penglai), Brazil (Frade) and Azerbaijan (ACG) created a perfect storm of disruptions in the market.

Chart 25: Non-OPEC oil supply growth was subdued in 2011 and 2012 due to unplanned outages, labor conflicts and geopolitical turmoil



Source: IEA, BofA Merrill Lynch Global Commodities Research

Chart 26: Non-OPEC production shortfalls have been unprecedented in size and scope

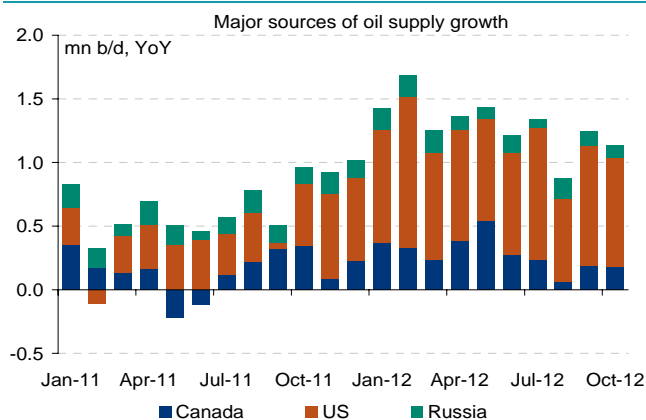


Source: IEA, BofA Merrill Lynch Global Commodities Research

Geopolitical turmoil has been a key constraining factor

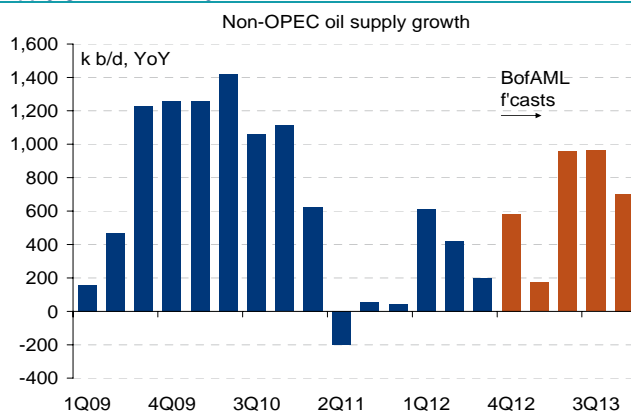
Political turmoil in the Middle East and Africa has also added to production shortfalls. Following massive disruptions in Libya in 2011, which deducted an average 1.1 million b/d from supply that year, political instability cut production in Yemen, Syria and Sudan in 2012. That led to a loss of 350 thousand b/d from South Sudan while output from Syria and Yemen combined declined by 250 thousand b/d in 2012 compared with the year prior. On top of that, the Syrian civil war is far from resolved, fuelling concerns about regional spill-over effects. The only meaningful growth in 2012 came from the US and Canada, and to a lesser extent Russia (Chart 27).

Chart 27: The only meaningful growth in 2012 came from the US and Canada, and to a lesser extent Russia



Source: IEA, BofA Merrill Lynch Global Commodities Research

Chart 28: For 2013, we expect to see a slight pick-up in non-OPEC supply growth to nearly 700 thousand b/d, from 450 in 2012



Source: IEA, BofA Merrill Lynch Global Commodities Research

Non-OPEC supply should improve somewhat in 2013

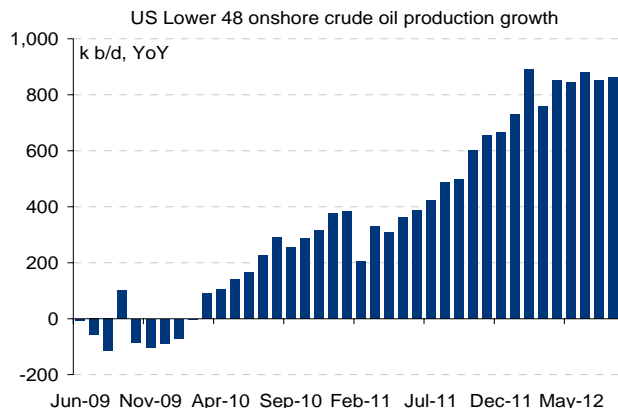
For 2013, we expect to see a slight pick-up in non-OPEC supply growth to nearly 700 thousand b/d, from 450 thousand b/d in 2012 (Chart 28). If all goes according to plan, then many North Sea fields should return to full production levels with the end of maintenance, including Buzzard, which recently resumed normal operating levels of around 200 thousand b/d after a two-month shutdown. Sudan and South Sudan reached a transit/payment agreement in mid-October, which is

encouraging for the resumption of supply. Thus, we expect South Sudan's production to reach 150 thousand b/d by 4Q13. However, ongoing border instability still presents risks. The Penglai offshore field in China recently restarted, reaching 90 thousand b/d at the end of 3Q, although a full restart to maximum capacity of 150 thousand b/d will depend on government approvals.

The Americas will continue to lead supply growth...

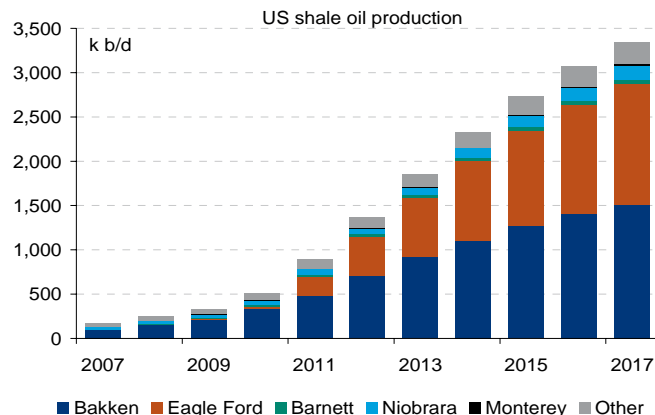
The US has been by far the largest contributor to supply growth over the past few years. Year to date, onshore crude oil production has risen by an astonishing 830 thousand b/d, or 23%, on last year (Chart 29). The strong performance has been driven by shale oil, which has grown by at least 50% each year since 2010. We now see shale oil output rising to 2.3 million b/d by 2014, up from 1.4 million b/d currently (Chart 30). Canada should also contribute strongly to growth with the start-up of several new projects, most notably the Kearl oil sands mining project and ongoing expansions at Christina Lake and Firebag.

Chart 29: Year to date, onshore crude oil production has risen by an astonishing 830 thousand b/d, or 23%, compared to last year



Source: EIA, BofA Merrill Lynch Global Commodities Research

Chart 30: We now see shale oil output rising to 2.3 million b/d by 2014, up from 1.4 million b/d currently



Source: Woodmac, IEA, EIA, Reuters, company reports, BofA Merrill Lynch Global Commodities Research

...while Latin American contributions may be more muted

Elsewhere in the Americas, Brazil should also be contributing to growth in 2013. In 2012, Brazil output was negatively impacted by extensive maintenance at some of the largest offshore fields and weather-related delays to their return. As a result, production should show an annual contraction for the first time since 2004 (Chart 31). However, as turnarounds are completed and the newly started Baleia Azul field ramps up, production should grow. Nonetheless, we expect Brazil growth to be relatively muted going forward as Petrobras recently tempered medium-term growth projections. Colombia, meanwhile, should continue to add to growth in the region, with production expected to surpass the 1 million b/d mark by mid-2013 (Chart 32).

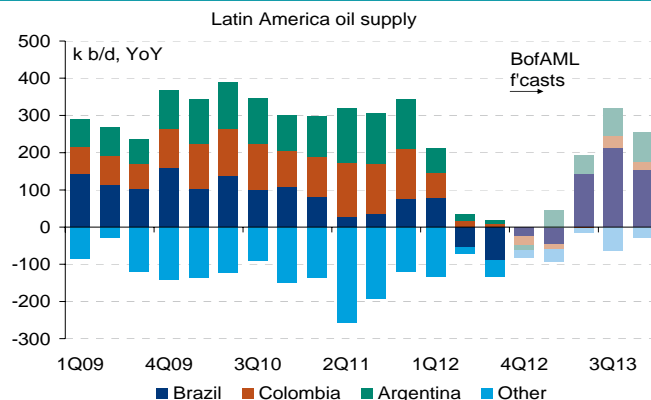
30 November 2012

Chart 31: Brazil's production in 2012 should show an annual contraction for the first time since 2004



Source: IEA, BofA Merrill Lynch Global Commodities Research

Chart 32: We expect a rebound in Latin American oil supply growth in 2013 but have tempered our growth expectations for Brazil

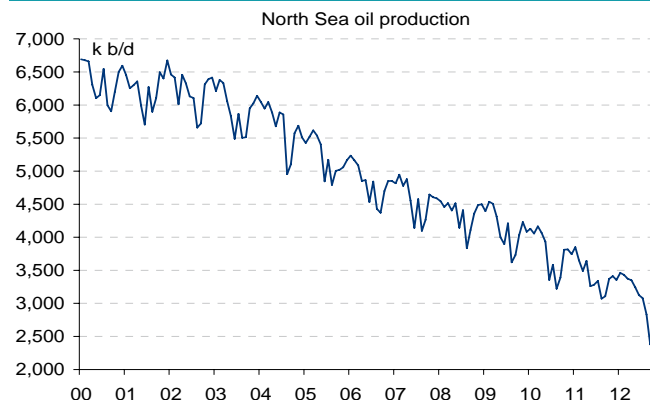


Source: IEA, BofA Merrill Lynch Global Commodities Research

Outages and declines will weigh on non-OPEC supply...

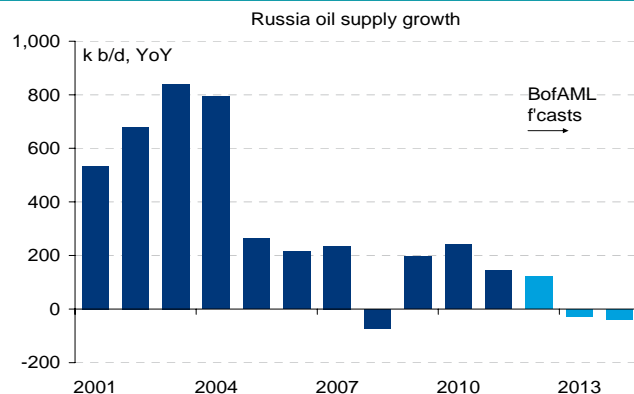
Still, we believe disruptions will continue to impact non-OPEC supply in coming years. In addition to political turmoil that will likely weigh on production out of the Middle East and Africa, key areas of supply growth continue to be plagued by declines. In the North Sea, field declines have been particularly pronounced (Chart 33). While much of the underperformance in 2012 had to do with unexpected outages, we believe output will continue to decline as old and mature fields decline faster, are more susceptible to unplanned outages and also require longer periods of planned downtime to stem the rate of decline. Even the addition of some smaller fields including Skarv, Huntington and Jasmine, whose start was recently delayed to 2013, will not help much, in our view.

Chart 33: North Sea declines have been particularly pronounced



Source: IEA, BofA Merrill Lynch Global Commodities Research

Chart 34: Russian oil supply could start to contract in 2013



Source: IEA, BofA Merrill Lynch Global Commodities Research

...and Russia could start to see declines in 2013

Russia may also start to see growth slow and even decline in coming years. Production there has been robust and continues to reach post-Soviet highs of 10.8 million b/d (Chart 34). However, as brownfield declines accelerate and begin to more than offset additions from new fields, particularly Vankor in east Siberia, we could start to see year-on-year contraction as early as the second half of 2013.

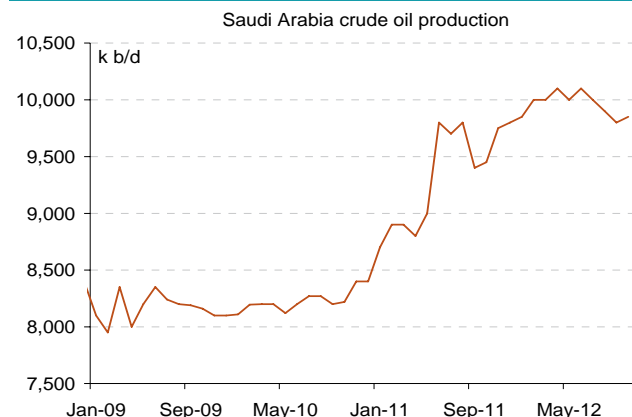
Libya and Saudi Arabia surprised to the upside

OPEC production recovered earlier in 2012 as the Libyan production rebound defied expectations. The country is now producing at close to pre-civil war levels. Meanwhile, Saudi Arabia has been pumping at 30-year highs of around 9.9 million b/d for most of this year (Chart 35). This left only 2 million b/d of spare capacity, the lowest since 2008 annual averages. The start-up of the giant Manifa field, which is expected to start in 1H13 with initial rates of 500 thousand b/d rising to 900 thousand b/d by 2014, should help create some breathing room, but we believe much of the additional volume will replace field decline losses on existing capacity.

Iraq's output scaled new highs

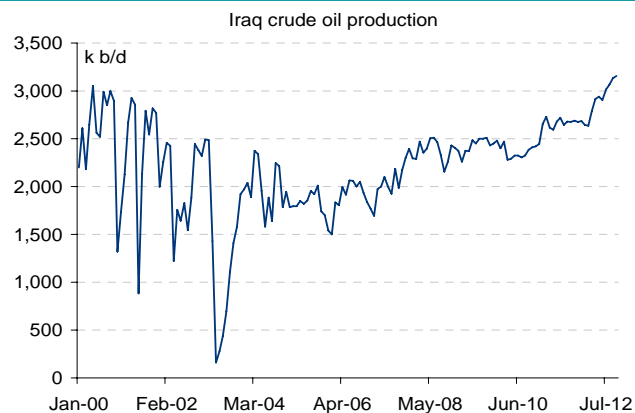
Going forward, we believe growth will be dominated by Iraq (Chart 36). Back in July, Iraq's crude oil output exceeded 3 million b/d and October production levels even reached 30-year highs. The start-up of two 900 thousand b/d single point mooring systems certainly helped the output surge, despite operating well below capacity due to a lack of storage facilities and low pipeline flows. Overall, we expect Iraqi production to rise steadily to 3.4 and 3.6 million b/d in 2013 and 2014, respectively, up from 3.2 million b/d currently.

Chart 35: OPEC production recovered earlier in the year as Saudi Arabia has been pumping at 30-year highs



Source: IEA, BofA Merrill Lynch Global Commodities Research

Chart 36: Going forward, further OPEC growth will likely be dominated by Iraq



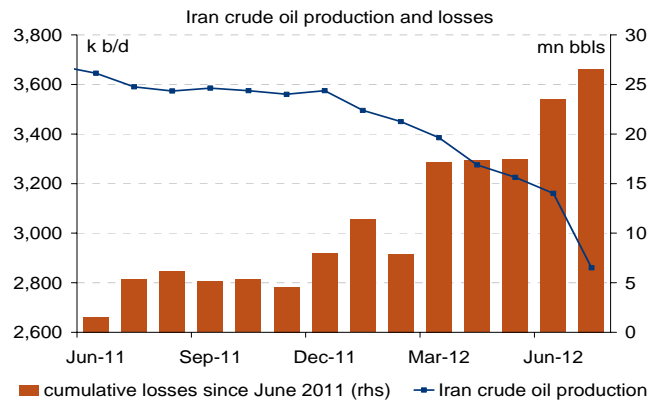
Source: IEA, BofA Merrill Lynch Global Commodities Research

Iran remains a key risk

Even then, OPEC was not able to make up for the losses experienced in Iran where supplies have fallen off a cliff, tightening crude oil supplies globally (Chart 37). US sanctions and the European embargo meant crude oil production in Iraq has fallen to 22-year lows of 2.7 million b/d, down from 3.5 million b/d at the end of 2011, while exports fell to as low as 1 million b/d recently. This year, the drop in Iranian output was largely mitigated by the return of Libya's oil production. Going forward, additional tensions in Iran and the Middle East could result in further disruptions, which may not be as easily absorbed given low spare capacity in the market (Chart 38). A rapid resolution of the crisis that allows Iran to re-start production and exports could be bearish for oil prices in the short run.

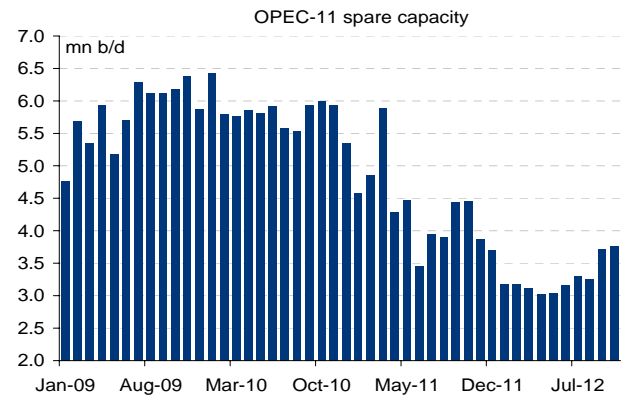
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Chart 37: Iranian supplies have fallen of a cliff due to the embargo, tightening crude oil supplies globally



Source: IEA, BofA Merrill Lynch Global Commodities Research

Chart 38: Additional tensions could result in further disruptions which may not be as easily absorbed given low spare capacity

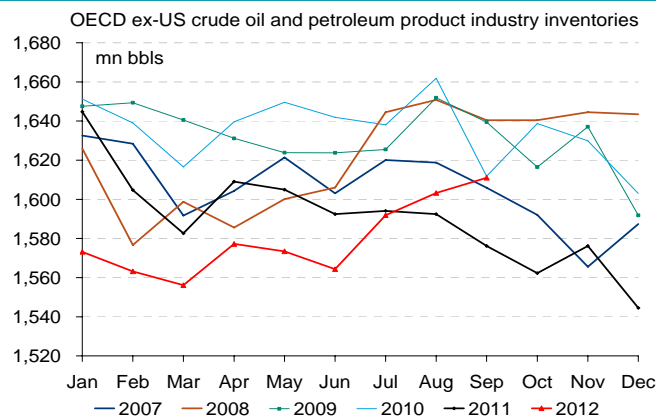


Source: IEA, BofA Merrill Lynch Global Commodities Research

Commercial stocks outside the US are relatively low

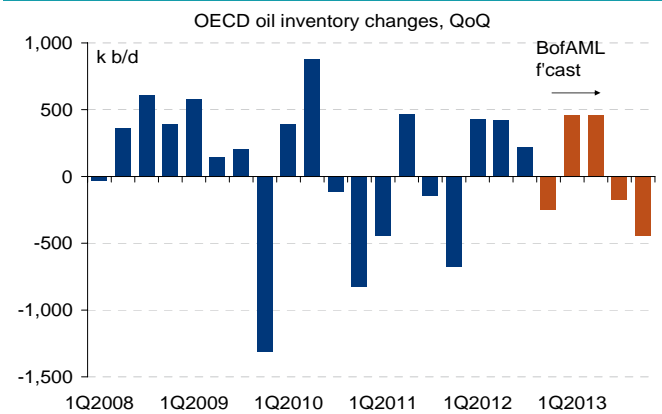
Commercial inventories of petroleum outside the US were exceptionally low for the first half of 2012, amplifying the impact of the Iranian oil embargo on prices and in particular on the degree of backwardation in the market. While stocks of crude oil have rebuilt recently, bringing them in line with the 5-year average, we remain concerned about the low levels of inventories for petroleum products (Chart 39). Going forward, we project that inventories will build in the first half of 2013, when we see little further upside risk to prices in the absence of unexpected shocks, but we expect draws in the second half of the year that should provide further support to prices (Chart 40).

Chart 39: Commercial inventories of petroleum outside the United States have been exceptionally low but now look more comfortable



Source: IEA, BofA Merrill Lynch Global Commodities Research

Chart 40: We expect builds near-term but see the potential for draws in the second half of next year which could provide support to prices



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

2.2 WTI

We see a risk of \$50/bbl WTI under adverse scenario

US natural gas and NGL prices have drastically decoupled from international prices in recent years due to fast-growing production. With North American producers now rotating away from natural gas and into crude oil, we are increasingly concerned that this dynamic is repeating itself in WTI and other regional crude oil markets (see ['Light sweet light for America'](#)). Granted, crude oil is a much tighter and less regional market than natural gas or liquids. But the dynamics are very similar and there is a risk that both export and infrastructure constraints could isolate North American crude markets over the next 24 months.

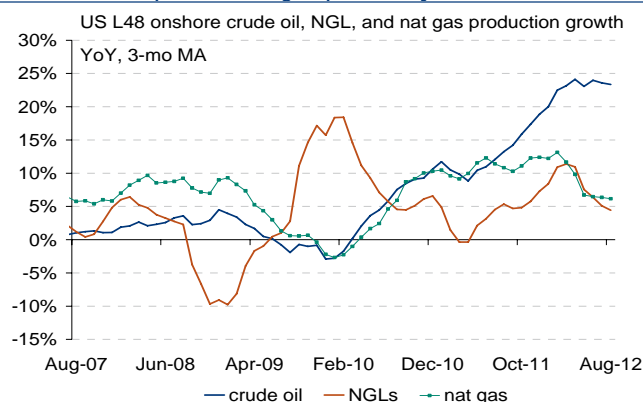
Sharply cutting our forecasts to reflect changing dynamics

To account for these changing market dynamics, we sharply reduce our average WTI crude oil forecasts for 2013 to \$90/bbl, from \$100/bbl, and we introduce an average 2014 WTI forecast of \$92/bbl. While not our base case, WTI could drop to \$50/bbl under a scenario where landlocked grades become trapped in the US due to a lack of export options and refining capacity, forcing a slowdown in domestic shale oil output growth and/or a change in crude oil export rules.

US shale oil fields have delivered incredible growth in 2012

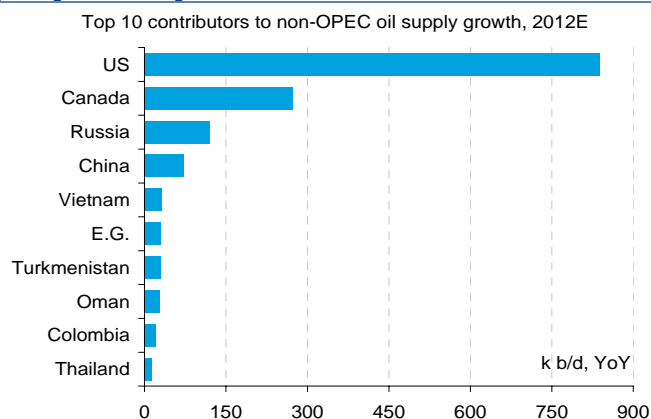
To some extent, this is already happening with the WTI discount to Brent trading at \$24/bbl, driven by the fundamentals in each market moving in opposite directions. The Midwest is saturated in crude oil, while the North Sea has been plagued by underproduction problems. But of particular concern is that oil output growth in the US is now exceeding previous growth rates experienced in dry natural gas (Chart 41). Thus, the saturation point for the US crude oil market could come faster than the market expects despite the large gap in imports. In short, domestic crude oil output growth in the US is putting non-OPEC growth rates around the world to shame (Chart 42).

Chart 41: US crude oil output growth is now vastly exceeding previous growth rates in liquids and nat gas, particularly in lower 48 onshore



Source: EIA, BofA Merrill Lynch Global Commodities Research

Chart 42: Crucially, domestic crude oil production growth in the US is putting non-OPEC growth rates to shame



Source: IEA, BofA Merrill Lynch Global Commodities Research

But infrastructure growth can barely handle the surplus

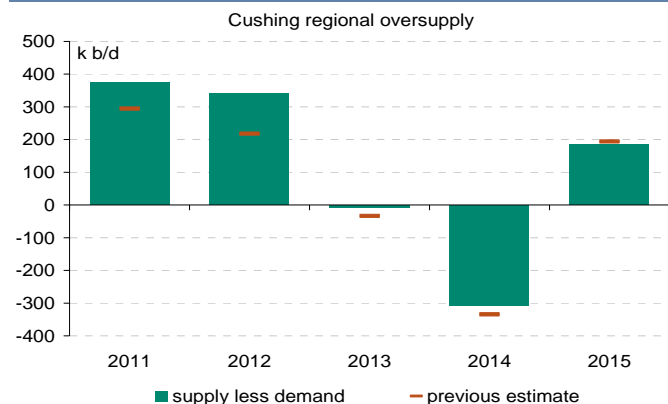
This rapid growth in volumes is starting to overwhelm the existing infrastructure across the US and Canada. Crude oil producers are rushing to rail, barge or truck barrels where there is no pipeline capacity available. In North Dakota, rail capacity has increased from 100 thousand b/d about a year ago to 350 thousand

b/d currently, and now moves nearly half of North Dakota volumes. Refiners have taken advantage of these low input prices and have delivered phenomenal growth in petroleum products, leading to a surge in diesel exports.

Expansion of Seaway will provide some relief short-term

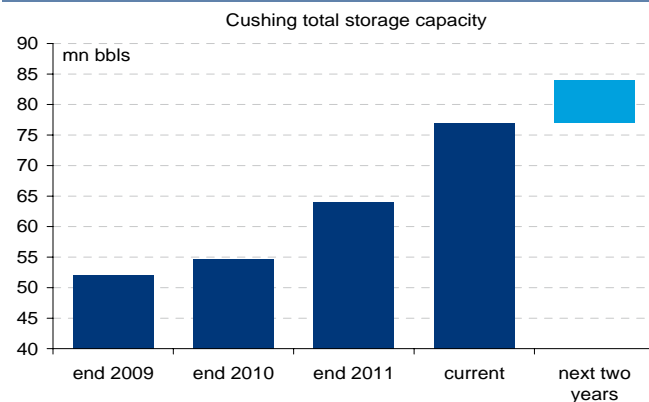
For the time being, Brent-WTI differentials are unlikely to widen much further as the planned expansion of pipeline and storage capacity in the Midwest should alleviate some of the recent pressures. So we still see a modest improvement in Cushing balances as Seaway expands from capacity of 150 thousand b/d to maximum flow capacity of 400 thousand b/d in 1Q13 (Chart 43). Also, storage capacity in Oklahoma should continue to increase above and beyond 80 million barrels in the next two years, limiting near-term risk of super-contango and thus immediate downside risks to WTI crude oil prices (Chart 44).

Chart 43: We see a modest improvement in Cushing balances as Seaway expands in 1Q13



Source: EIA, Enbridge, TransCanada, company reports, BofA Merrill Lynch Global Commodities Research

Chart 44: Also, storage capacity in Oklahoma will continue to increase, limiting the near-term risk of super-contango



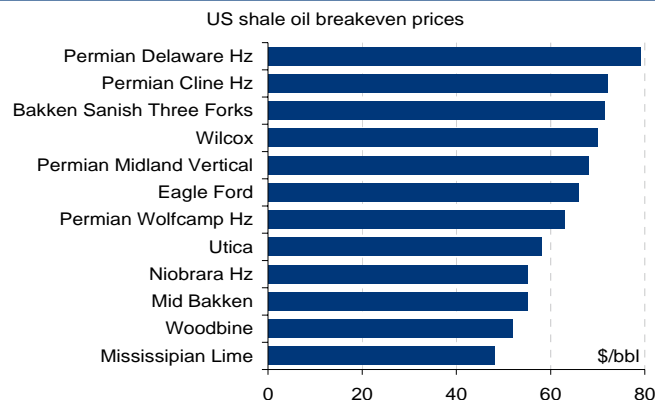
Source: EIA, Genscape, BofA Merrill Lynch Global Commodities Research

Yet shale oil is highly profitable on tech advances

With storage and transport capacity filling up quickly, production is growing unchecked. We estimate the profitability of many shale oil producers is exceptionally high as shale oil breakeven costs can be as low as \$48/bbl (Chart 45). Moreover, borrowing costs for oil producers have fallen to record lows (Chart 46), in line with the compression in credit spreads and interest rates. Thus it seems only lower oil prices will be able to slow down this dramatic expansion.

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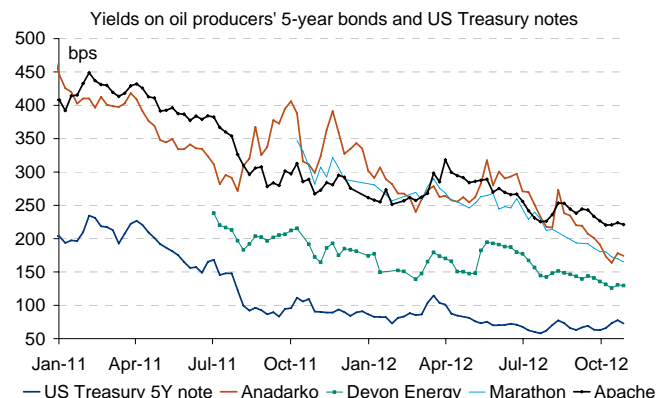
Chart 45: Even then, we estimate that the profitability of many shale oil producers is exceptionally high...



Source: BofA Merrill Lynch Global Research

Breakeven calculations assume a 10% WACC, current strip commodity prices trending to BofAML long term forecasts, standard LOE of \$6/boe, standard state royalty & prod tax rates, and type curves provided by operators.

Chart 46: ...and their borrowing costs have fallen to record-lows across the board

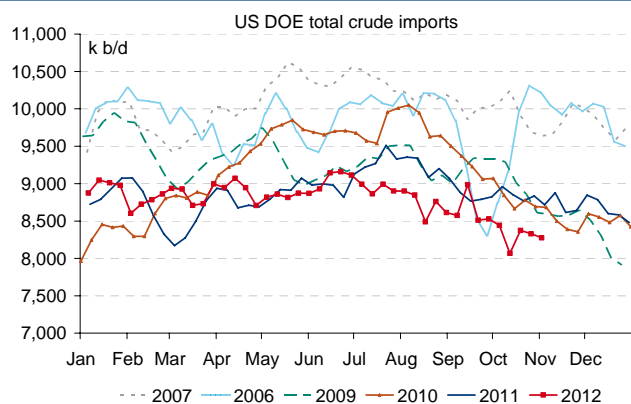


Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Refiners may be saturated with light oil in the next 18 months

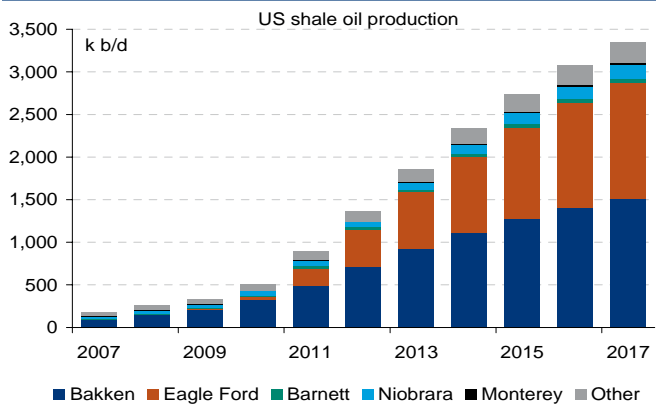
Yet an immediate collapse of WTI crude oil prices seems unlikely. For the time being, exports of petroleum product exports continue to rise unimpeded, with local refiners the big beneficiaries of the surge in Midwest oil output. Meanwhile, increased domestic oil output has led to a marked reduction in crude oil imports (Chart 47). We estimate that light sweet domestic output growth could grow to 2.3 million b/d by 2014 (Chart 48), suggesting that domestic oil could soon displace light sweet crude imports completely. It is not yet clear what will happen next. The initial knee-jerk reaction could well be a further drop in domestic light sweet oil prices to displace some imported heavy grades within the constraints of refining capabilities. An alternative could be an outright decoupling of domestic landlocked crude slates from Brent, à la UK-US natural gas.

Chart 47: ...while increased domestic oil output is leading to a reduction in total crude imports



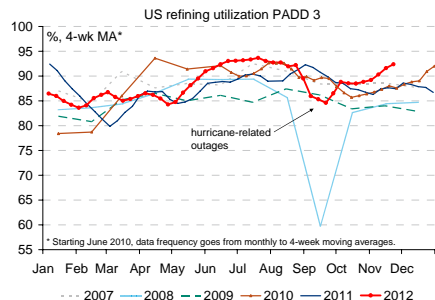
Source: EIA, BofA Merrill Lynch Global Commodities Research

Chart 48: Looking out, light sweet domestic output growth could grow to 2.3 million b/d by 2014...



Source: Woodmac, IEA, EIA, Reuters, company reports, BofA Merrill Lynch Global Commodities Research

Chart 49: Refining utilization rates in the Gulf Coast are above seasonal highs from 2008 and are quickly approaching max levels



Source: EIA, BofA Merrill Lynch Global Commodities Research

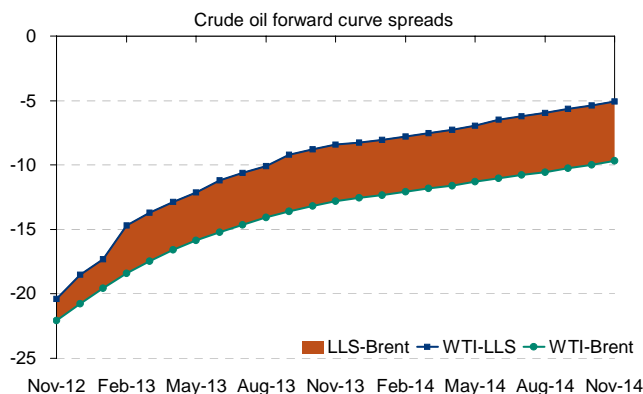
But where will all the crude go?

We wonder about the fate of barrels heading to the Gulf Coast. Refining utilization rates in the Gulf Coast are quickly approaching maximum levels (Chart 49). Refiners have been adjusting throughput crude slates as much as they can in response to rapidly changing crude quality differentials and some are maximising light sweet crude intake as pricing warrants. Specifically, Valero has light crude oil processing capacity of about 300 thousand b/d in its Gulf Coast refineries, compared to current processing of 200 thousand b/d. Should it employ this spare capacity, some heavy crude imports may be displaced, but not all, as idling upgrading units would likely be the most inefficient, expensive option for refiners.

LLS-Brent could fall sharply if crude export rules hold...

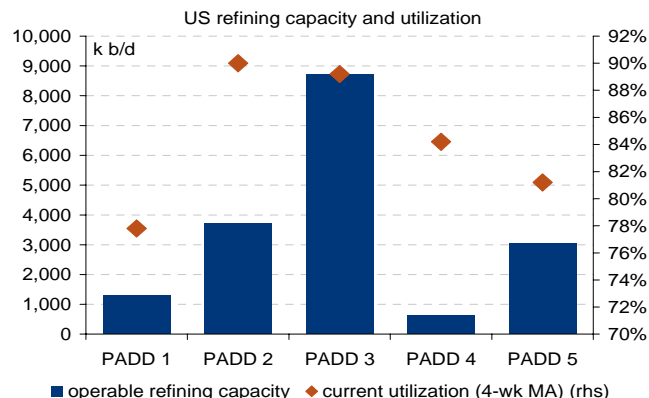
To some extent, a marked disconnect between domestic crude oil grades and Brent is already taking place. LLS is trading below Brent, reflecting the growing surplus of light sweet crude oil. Having said that, at \$1-2/bbl the discount is rather small and correlations between the two grades remain high. Forward prices, however, are starting to reflect a more significant decoupling of Brent and LLS (Chart 50), as domestic producers keep selling forward long-dated LLS prices in fear of their product being trapped in North America.

Chart 50: LLS is already trading below Brent, reflecting the growing surplus of light sweet crude oil



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Chart 51: Looking at refining capacity in the US, we believe that a saturation point is not immediate



Source: EIA, BofA Merrill Lynch Global Commodities Research

...potentially dragging other grades down like WTI, Bakken

For the time being, refiners in PADD3 are running hard to process all this light sweet oil, but can they continue? Looking at refining capacity in the US, we believe that a saturation point is not immediate (Chart 51). But unprofitable refiners have continued to shut down in recent years, and much of this capacity may not be available even if prices of domestic grades continue to decline. Thus, should LLS decouple from Brent, other grades like WTI and Bakken could end up trapped in the US due to a lack of export options and refining capacity. While this is not our base case, WTI could drop below \$50/bbl under that scenario to rein in domestic shale oil output growth or force a change in crude oil export rules.

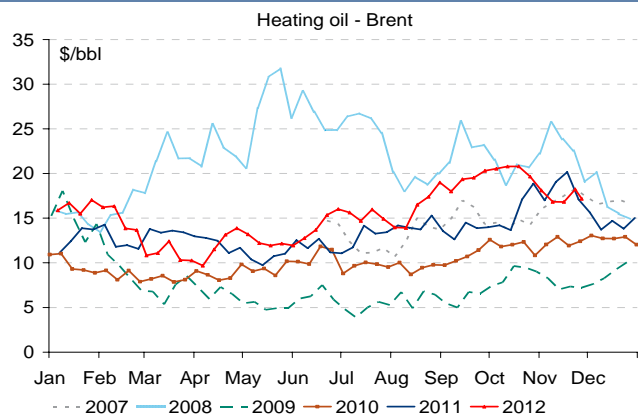
3. Outlook for petroleum products

3.1 Distillates

Middle distillate cracks had a phenomenal year

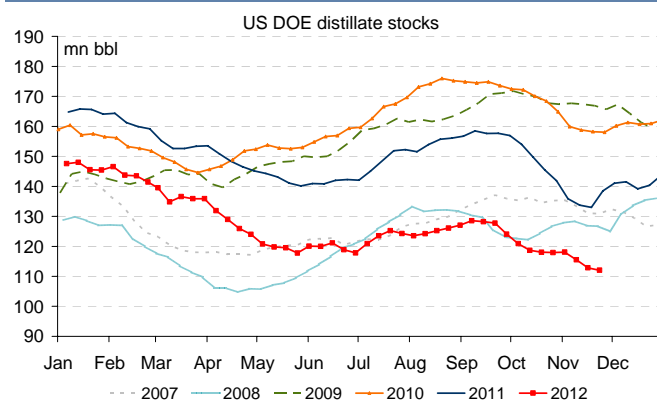
Atlantic Basin petroleum product markets have received strong support this year from countless refining outages and low inventories. NYMEX heating oil crack spreads to Brent crude oil increased rapidly from the late summer and even surpassed the \$20/bbl mark through much of October (Chart 52). Although cracks have retreated somewhat, the crux of the problem remains: distillate inventories failed to build over the summer, fueling concerns that supplies may not be adequate through the coming winter and beyond. Although price strength is expected during the fourth quarter, cracks are trading at \$14/bbl above RBOB gasoline, a strong premium even for this time of year. In the US, middle distillate stocks now sit at record-low seasonal levels (Chart 53), while in Europe stocks have only recently started to show improvement after remaining at the lowest levels since 2008 for several months. In our view, the Atlantic Basin could face a diesel supply crunch this coming winter and we believe diesel crack spreads remain vulnerable to spikes in 2013.

Chart 52: Heating oil crack spreads to Brent crude oil increased rapidly through the second half of 2012



Source: Reuters, BofA Merrill Lynch Global Commodities Research

Chart 53: Inventories failed to build at all over the summer so supplies may not be adequate through the winter, particularly in the US



Source: EIA, BofA Merrill Lynch Global Commodities Research

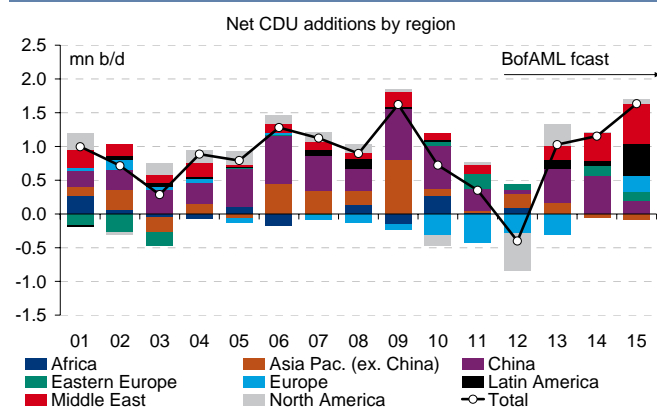
Global refining capacity unexpectedly shrank in 2012

Following a catalogue of closures, delays to additions and start-up problems, refining capacity in Europe and on the US East Coast shrank drastically this year, tightening already stretched Atlantic Basin product markets (Chart 54). This widened the deficit, particularly for diesel, and explains why refineries failed to build inventories this summer. As some anticipated arrivals were delayed or had ramp-up issues, we now see global refining capacity *contracting* by 410 thousand b/d this year, against our initial expectations from five months ago of a 918 thousand b/d *increase*. Some of the outages that beset markets appeared to be temporary at first, but once they became sustained they pushed the market into a deficit. Significant supply rationalizations also cut into growth, amounting to 1.1 million b/d in 2012, driven in particular by closures in North America (Chart 55).

We sharply reduced our capacity forecasts for 2013

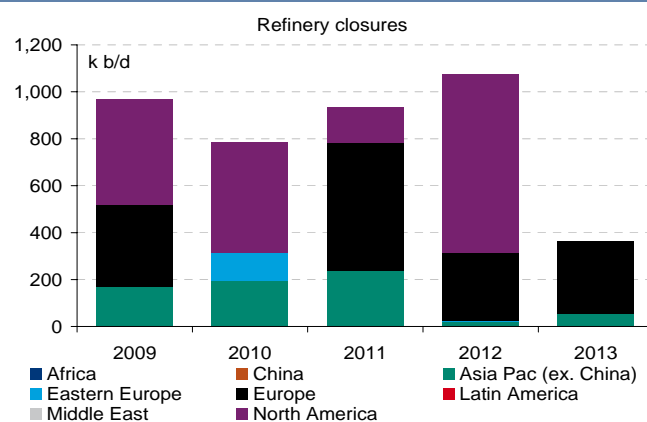
Drawing from the disappointing performance this year, we re-assessed our expectations for the future and risked each CDU addition or upgrade based on reputation of the refiner, location and complexity of the addition. Additions and upgrades are predominately located in less experienced regions like China and the Middle East and the proportion of complex refining units (hydrocrackers and cokers) in the global system is rising (Chart 56). Thus, capacity is more prone to unexpected issues and delays, and we expect to see lower utilisation rates. On our updated numbers, global refining capacity growth should recover to 1 million b/d, a welcome development given this year's decline. However this is significantly less than our prior expectation of 1.6 million b/d. Capacity growth then picks up more steam in 2014 and 2015.

Chart 54: Given closures, delays to additions and start-up problems, refining capacity in Europe and the US East Coast shrank in 2012



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

Chart 55: Closures also cut significantly into growth, amounting to 1.1 million b/d in 2012, up from 0.9 million b/d in 2011



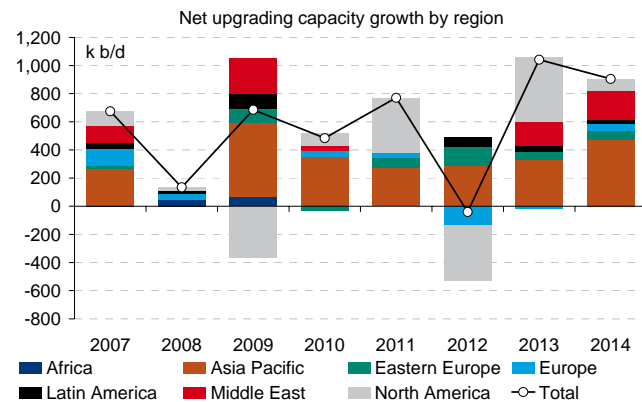
Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

Expect a vulnerable product market environment in 2013

Yet, compared to our expected demand growth of 725 thousand b/d, we see a relatively tight market environment in 2013 given low inventory levels (Chart 57). Any further delays or start-up problems could result in temporary price spikes. Unfortunately delays and disruptions are already in the works. The long-planned modernization project at BP's Whiting refinery (total capacity 405 thousand b/d) should see the largest crude unit with capacity of 260 thousand b/d down through the first half of 2013. This outage alone, if prolonged, could nearly close the gap between capacity and demand growth.

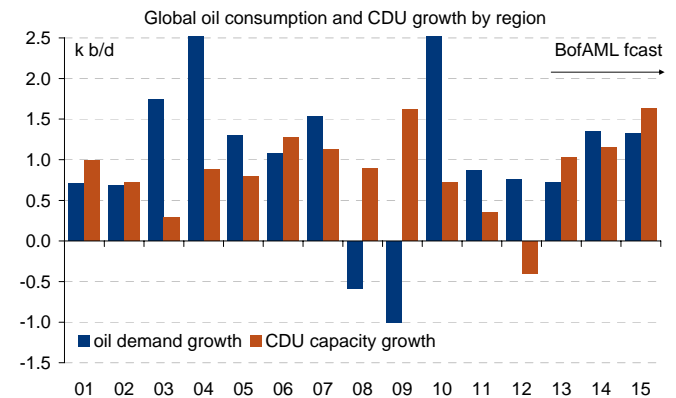
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Chart 56: Additions and upgrades are predominately located in less experienced regions like China and the Middle East



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

Chart 57: Compared to expected demand growth of 725 k b/d, we see a relatively tight market environment in 2013 given low inventories



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

Europe faces a structural diesel deficit...

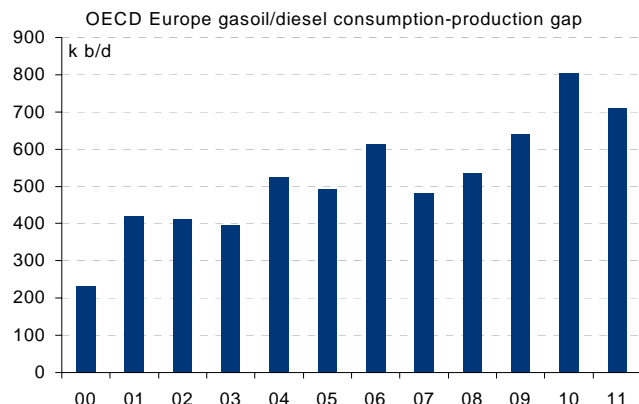
Markets should see some relief with the return of key refineries, including Delta's 185 thousand b/d Trainer refinery in Pennsylvania and the ramp-up of the second crude unit at Motiva's Port Arthur refinery (capacity 325 thousand b/d). If all the expected capacity increases materialize fully and smoothly, refining margins are likely to cool off somewhat in 2013. However, at the heart of the problem lies a structural deficit of diesel in Europe (Chart 58). Due to recent closures of gasoline refining capacity, Europe also lost a lot of diesel capacity and thus its flexibility to turn up output when the market tightens. Refining units are old and stretched, leading to production glitches and longer maintenance periods while at the same time trying to meet higher quality standards.

...and has to compete for gasoil barrels

To meet its diesel deficit, Europe has to compete for diesel cargoes with Latin America, which draws heavily on US supplies, and Asia, a region that also faces a diesel supply crunch on rising demand from China, India, and Australia. Strong demand for distillates from EMs and lower imports drove inventories to record low seasonal levels in the region for several months (Chart 59) and we see a risk that distillate cracks could spike again, especially if winter weather turns out colder-than-normal.

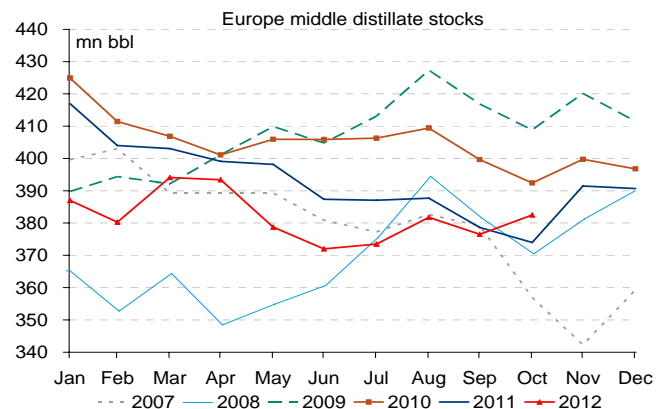
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Chart 58: Europe suffers from a structural deficit of diesel and has to compete for barrels



Source: Reuters, Euroil, BofA Merrill Lynch Global Commodities Research

Chart 59: Strong EM demand for distillates and lower imports drove stocks to record low seasonal levels in the region for several months

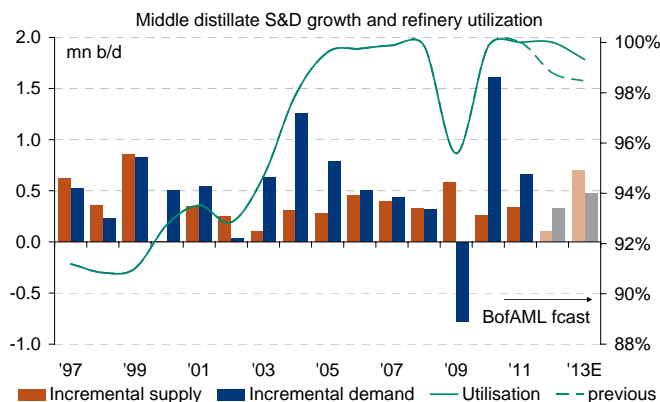


Source: Bloomberg, Reuters, IEA, BofA Merrill Lynch Global Commodities Research

Distillate utilization rates are likely to stay elevated...

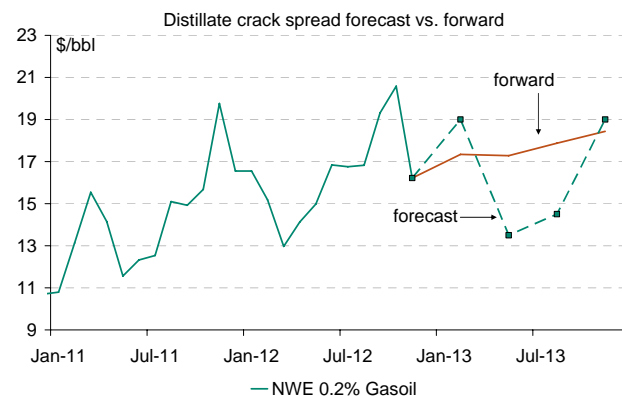
With global demand for distillates outpacing supply growth in 2012, capacity has been operating at maximum levels. Even a pick-up in diesel supply growth in 2013 is unlikely to create much breathing room as utilization rates should remain at 99% (Chart 60). We only assume a modest pick-up in demand, but if global growth was to surprise our expectations the market could tighten further. This could leave cracks spreads vulnerable to spike risks. We forecast \$16.00/bbl for US heating oil on Brent crude oil and \$16.50/bbl for European gasoil cracks in 2013, mostly below the forward post the winter (Chart 61).

Chart 60: With global distillate demand outpacing supply growth, even a pick-up in supply in 2013 is unlikely to create much breathing room



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

Chart 61: We forecast \$16.00/bbl for US heating oil on Brent crude oil, \$16.50/bbl for European gasoil in 2013, below the forward post winter



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

...but margins could cool off post the winter

Margins on heating oil and gasoil might experience some downside in the second quarter relative to the current forward curve as more distillate upgrades are coming. At Port Arthur (Texas), Motiva should double its CDU capacity to 600 thousand b/d by the close of 2012, and as part of the expansion is installing a hydrocracker (75 thousand b/d). Similarly, Valero is installing a 60 thousand b/d hydrocracker at its Port Arthur refinery which we expect will ramp up towards the end of 2012. Thus we see distillate yields and production rising going into 2013 on strong margins and expect some limited rebuild in stocks. But while margins are likely to cool off, we still see considerable spike risk in heat cracks.

3.2 Gasoline

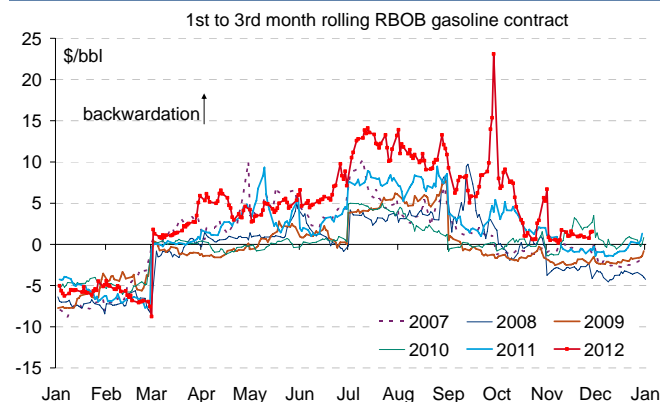
Tightness in gasoline markets eased recently...

Much of the strength in US and European product markets of the last few months was driven by physical tightness in gasoline. A series of one-off refinery outages specifically impacting FCC units, including fires in Venezuela (Amuay), Canada (St John Irving) as well as the US (including California's Richmond), led to a dramatic decline in US gasoline production. A dearth of gasoline exports from Europe also severely impacted supply, given the gasoline-centered refinery closures there. As a result, near-dated timespreads spiked to unprecedented highs (Chart 62), exacerbated by an active hurricane season in the US East Coast. However, physical tightness has recently abated somewhat with the return of refineries from maintenance and outages, plus demand rolling over seasonally and the switch to easier-to-produce winter grade gasoline.

...but inventories are at rock bottom in some locations

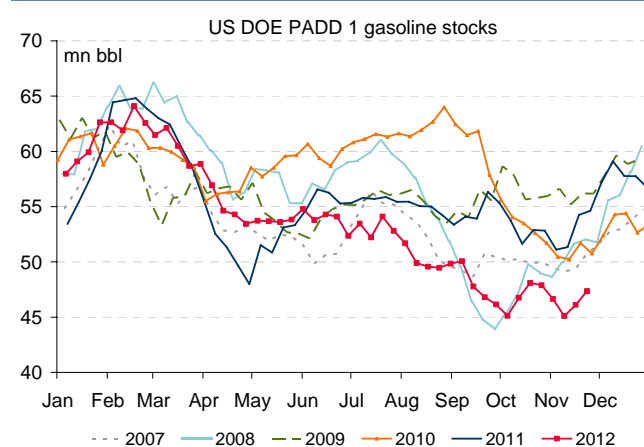
The tightness in the market is best reflected by low inventory levels. In the United States, gasoline inventories saw counter-seasonal draws in recent weeks and stocks in the East Coast now sit at precarious lows of 47 million bbl (Chart 63). That is in part explained by US gasoline imports coming in about 20% lower than last year. More recently, gasoline demand has seen significant improvement in the latest weeks, even rising to as high as 8.74 million b/d on a 4-wk MA basis which is 2% above last year's levels.

Chart 62: US and European gasoline markets experienced severe tightness and near-dated timespreads reached unprecedented highs



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Chart 63: Gasoline markets have been extremely tight, with PADD 1 stocks sitting at record low seasonal levels



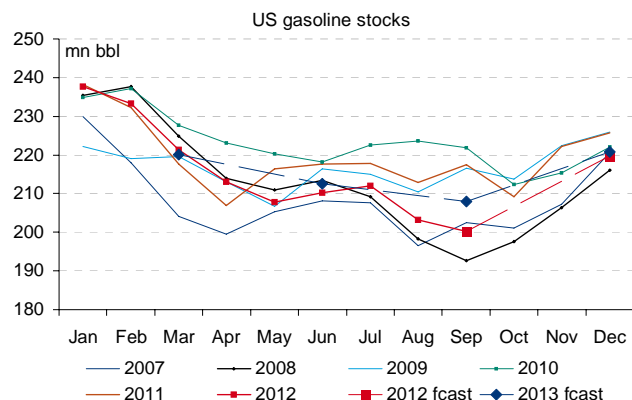
Source: EIA, BofA Merrill Lynch Global Commodities Research

Turning less negative on gasoline for 2013...

Thus for 2013, we believe stocks should see some improvement and rebuild from low 2012 levels (Chart 64). However, we are turning less negative on our outlook for gasoline in 2013. Gasoline refining capacity fell sharply in 2012 on refinery closures in Europe and the US, providing much-needed capacity rationalization and supporting gasoline-centered refinery utilization rates. For 2013, we now expect utilization rates to only fall to 87%, compared to prior estimates of 84% (Chart 65).

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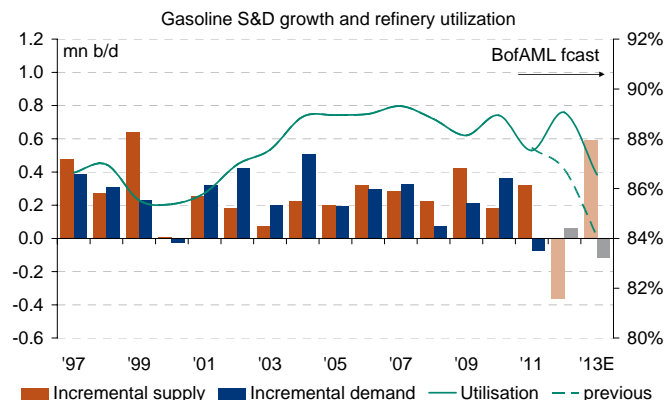
Chart 64: We believe US motor gasoline inventories should see some improvement in 2013 from 2012 levels



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

Note: forecast is quarterly

Chart 65: Given gasoline-centric refinery rationalization, we estimate utilization will only fall to 87% next year, compared to 84% previously



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

...but the upside to cracks may be limited

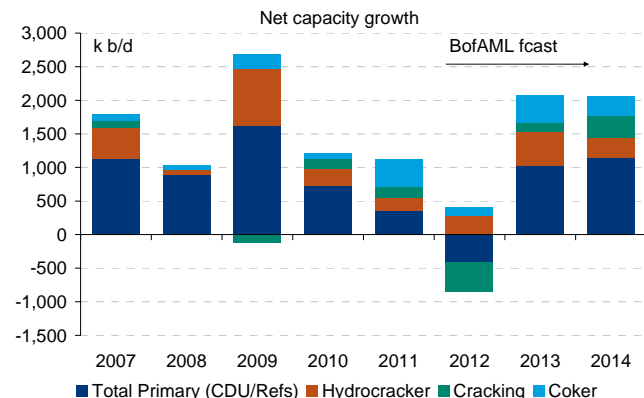
Going forward, we see gasoline supply rising by 0.6 million b/d in 2013 with the growth of refining capacity in China, India, Latin America and even Pakistan. We also see inventories supported by falling gasoline demand in Europe due to the recession, a potential fiscal cliff-related confidence shock in the US and rising energy efficiency. Lower corn prices could further remove some of the upside pressure on gasoline. All in all, we now forecast \$6.50/bbl for average US RBOB cracks on Brent crude oil and \$5.50/bbl for European gasoline cracks for 2013, both slightly below the forward.

Gasoline may play catch-up with distillates

Although gasoline inventories in the Atlantic Basin could slowly rebuild towards more normal levels in 2013 as unplanned outages subside and new capacity hits markets, a limiting factor could come from product yield configurations. High margins and stronger global demand for distillates has lead refiners to rationalize gasoline-centric refineries and maximize distillate yields at the expense of other products in recent years. For example, refiners have even been prioritizing the addition of diesel-producing hydrocracker units (which grew by nearly 300 thousand b/d this year) compared to gasoline-producing cracking capacity (which declined by 450 thousand b/d) (Chart 66). On the back of that, both US and EU distillate yields have been rising steadily (Chart 67). Interestingly, diesel yields have continued to rise in the US even with the crude slate becoming lighter given the vast expansion in light onshore crude oil production.

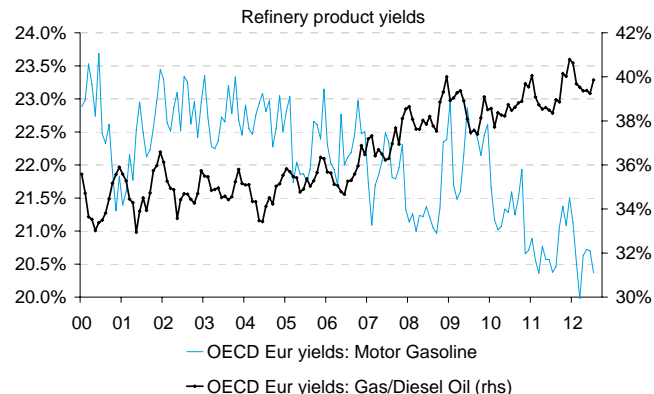
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Chart 66: Refiners have been prioritizing the addition of diesel-producing hydrocracker units



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

Chart 67: As a result, both US and EU distillate yields have been rising steadily



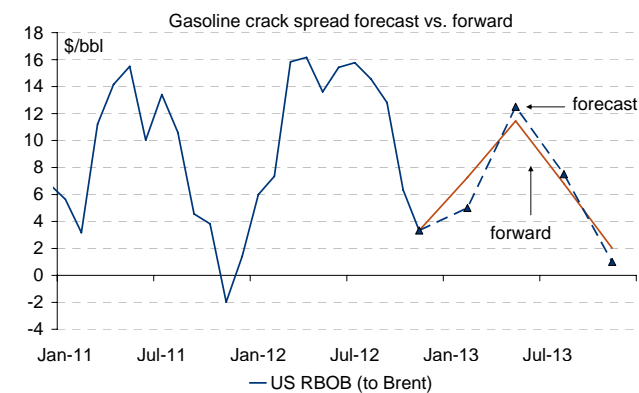
Source: Reuters, BofA Merrill Lynch Global Commodities Research

Yields for a given product are defined here as output of the given product over total product output.

We see upside to gasoline relative to HO next summer

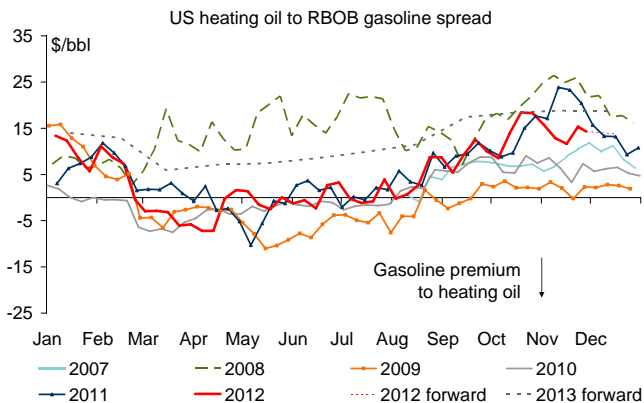
Tightness in the Atlantic Basin gasoline market is thus more persistent than we originally expected. With more capacity chasing middle distillate barrels, we could again see tightness in gasoline markets in 2013. Plus, with US refining utilization back up at seasonal highs and low crude stocks in Europe, there is simply not much room to grow. This could lead to supply shortages by the summer driving season. Thus the strong premium of US HO to RBOB gasoline that is currently priced into the forward curve for summer 2013 looks perhaps too lofty although we currently see little outright upside to gasoline crack spreads for next summer (Chart 68 and Chart 69).

Chart 68: With refining capacity chasing distillates, we could see temporary tightness in gasoline markets



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

Chart 69: The strong premium of US HO to RBOB gasoline currently priced into the forward curve for summer 2013 looks perhaps too lofty



Source: Reuters, BofA Merrill Lynch Global Commodities Research

3.3 Residual fuel oil

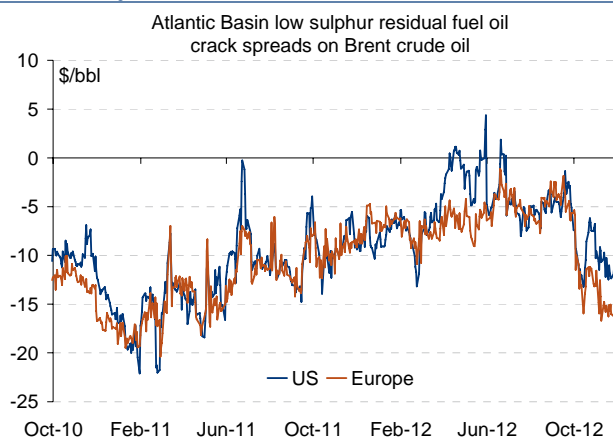
Residual fuel oil cracks have been under pressure

As for the bottom end of the barrel, low sulphur residual fuel oil cracks have been severely challenged, selling off to their weakest level in 18 months (Chart 70). Straight-run demand from the United States has been extremely weak while bunker fuel oil demand has been weak everywhere. Moreover, some Iranian fuel oil exports are creeping into the market at huge discounts, depressing fuel oil prices further.

We do not expect utilization rates to improve in 2013

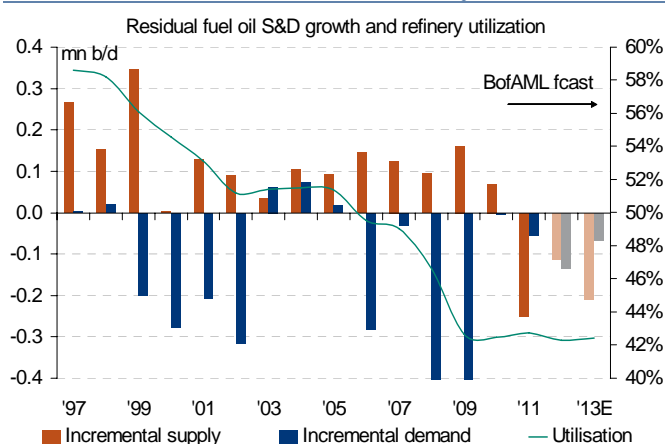
Going forward, we do see fuel oil supply declining in 2013 with the loss of Petit Couronne, Rome and Venice refineries. Upgrading expansions at Elefsina and Sines, for instance, are also expected to replace residual fuel oil-producing units with ones that produce distillates. But in terms of utilization rates next year, we may not see much of an improvement as demand is likely to decline globally as it is phased out of various uses including heating (Chart 71). We see prices averaging -\$12.60/bbl for US residual fuel oil cracks on Brent crude oil and -\$11.50/bbl for European cracks in 2013, both below the forward. We also see a risk that more Iranian barrels will hit the markets. While Japan may restart further nuclear capacity which could depress its straight-run fuel oil demand. Should heating oil or gasoil crack spreads spike, we see even greater downside risk to residual fuel oil as greater crude runs and distillate production may lead to greater resid supplies as a by-product, exacerbating oversupplies.

Chart 70: Residual fuel oil crack spreads have been under severe pressure lately



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Chart 71: We do not see much of an improvement in utilization rates in 2013 as demand continues to be weak structurally



Source: BP, IEA, various company sources, BofA Merrill Lynch Global Commodities Research

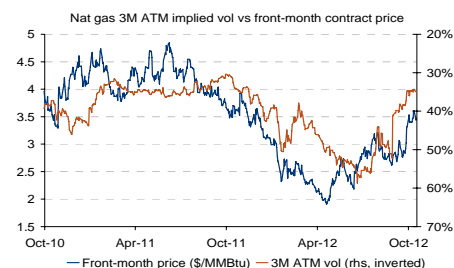
4. Outlook for natural gas & power

4.1 US natural gas

The US natural gas market is normalizing...

Due to the warm weather conditions, the US natural gas market ended last winter with 2.4 tcf of fuel in storage, a staggeringly high level that compares to a 5-year average of 1.5 tcf (Chart 73). As the storage injection season kicked in, market participants grew increasingly nervous about exhausting the existing 4.2 tcf of storage capacity by early autumn ('storage containment'). In reality, however, the pace of inventory builds slowed down dramatically in the months of July, August and September and the surplus to the 5-year average fell rapidly. By all means, the US natural gas market has started to normalize.

Chart 72: Near-dated implied vol has fallen sharply reflecting an upward trend in prices



Source: EIA, BofA Merrill Lynch Global Commodities Research

...triggered by an adjustment in supply and demand

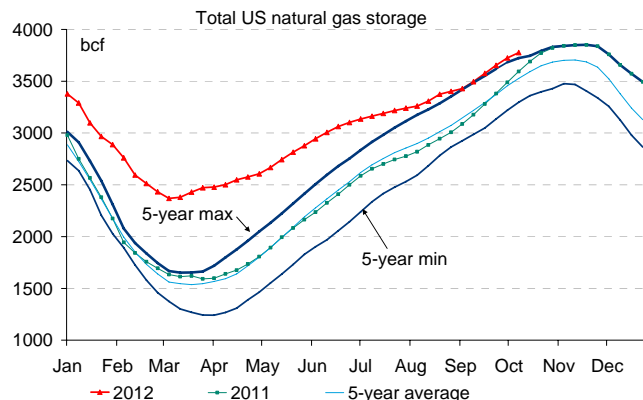
Below-normal injections into storage units across the country are largely the result of high demand for gas in power generation as well as lower output growth (Chart 74). The adjustment both on the demand and supply side triggered a normalization of inventories which allowed prices to move higher (see [Natural gas normalizing](#)). Front-month NYMEX natural gas prices have rallied strongly as the risk of storage containment in 2012 dissipated. Prices for the calendar year 2013 also moved higher and are currently trading at \$3.90/MMBtu. This upward trend in prices has effectively reflected the decreasing need for natural gas in power generation as producers curbed fast output growth. Meanwhile the adjustment in the balance also triggered a sharp drop in implied volatility (Chart 72).

Little upside to forward prices in 2013

Yet, we see little upside to forward prices in 2013 as structural consumption still has to catch up with supply. We stick to our average 2013 forecast for US nat gas prices of \$3.75/MMBtu and introduce a 2014 forecast of \$4.20/MMBtu. However, we highlight one important upside risk. As downside risks to WTI grow, we still see US nat gas production costs well anchored at between \$3 and \$4.50/MMBtu next year. Similarly, 9 bcf/d of coal-to-gas switching capacity suggests a mid-price range of \$3 to \$4.50/MMBtu. Still, any temporary dip in WTI oil prices could lead to a corresponding rebound in US nat gas prices as associated nat gas output falls. Even then, any nat gas price spike should be temporary as long-run supply/demand dynamics point to a tight price range.

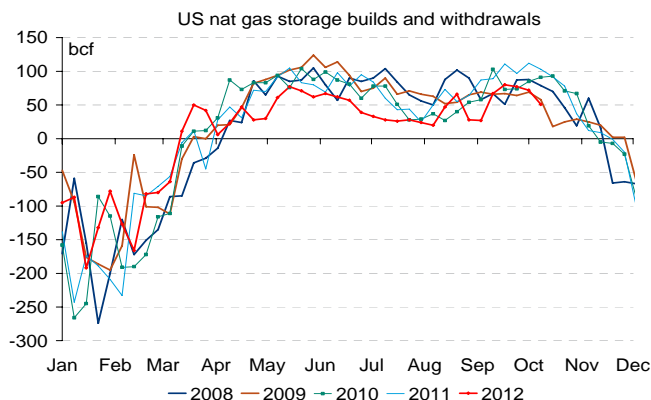
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Chart 73: Despite exiting the winter with 2.4 tcf in storage, a jump in nat gas burn this summer has helped reduce the stock overhang



Source: EIA, BofA Merrill Lynch Global Commodity Research

Chart 74: In turn, the combination of lower output and high demand has led to below-normal storage injections in the US market

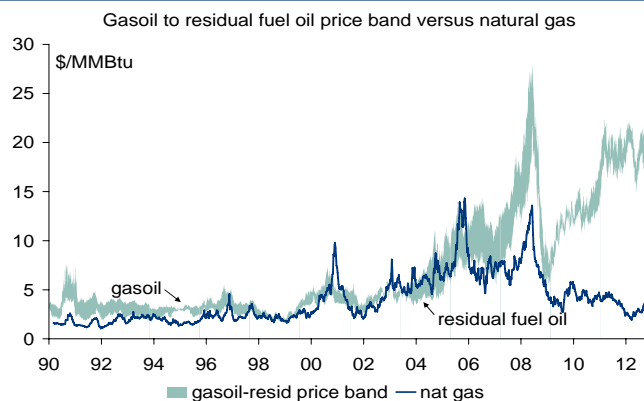


Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Looking out, nat gas remains bound by coal substitution

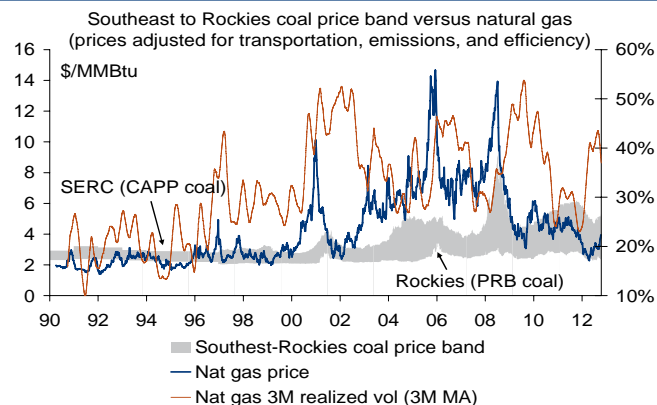
Between 2000 and 2008, natural gas and oil still competed actively in the power generation sector. Both oil and gas output in North America were running short of demand, and the linkage between oil and gas prices intensified (Chart 75). At the top, diesel-to-gas substitution typically capped natural gas prices, while at the low end of the range, residual fuel oil prices limited the downside to gas. This linkage collapsed in 2008 after a big spike in oil prices and the subsequent recession. Since then, natural gas prices have steadily re-entered the "thermal coal substitution band" (Chart 76), with Rockies coal at the bottom and Southeast coal at the top. This price band equates to a natural gas price of \$2 to \$5.50/MMBtu, and will limit natural gas price swings significantly in the future, in our view.

Chart 75: As oil and gas markets tightened in the 2000-08 period, the linkage between oil and gas prices intensified but...



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Chart 76: ...since 2008, nat gas prices re-entered the "thermal coal substitution band" where they traded for most of 1990-99



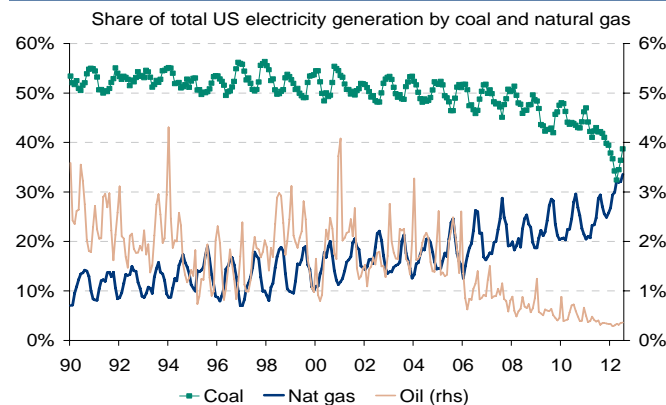
Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

There has never been a larger demand substitution buffer

The key point to remember is that there is more natural gas substitution now on the coal side than there was ever on the oil side. In its heyday, there was about 2 bcf/d of oil-to-gas substitution capacity in a range of \$8/MMBtu. Of course, oil-to-gas substitution lasted for several years, until the supply of oil and gas diverged structurally (Chart 77). In contrast, coal-to-gas switching capacity nears 9-10 bcf/d in a \$3/MMBtu range. In fact, the substitution between coal and gas reached 7 bcf/d in some months this spring, as prices briefly collapsed to \$2/MMBtu (Chart 78). Gas consumption by power generators increased remarkably since this

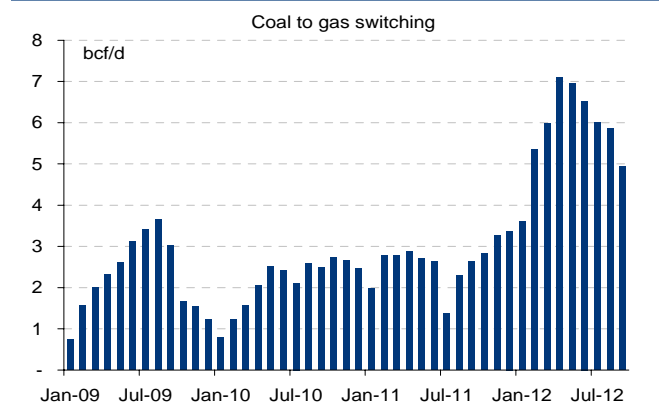
winter in response to low prices. A back-of-the-envelope calculation suggests that total coal-to-gas switching capacity equates to a yearly inventory shift of around 3.3 tcf, or 80% of the total storage capacity in the country. In short, substitution will likely keep US nat gas and coal prices trading hand-in-hand for a long time.

Chart 77: We estimate that oil-to-gas substitution capacity in the US is about 2 bcf/d, and lasted for several years



Source: EIA, BofA Merrill Lynch Global Commodity Research

Chart 78: In contrast, the substitution between coal and gas reached 7 bcf/d this spring, as prices briefly collapsed near \$2/MMBtu

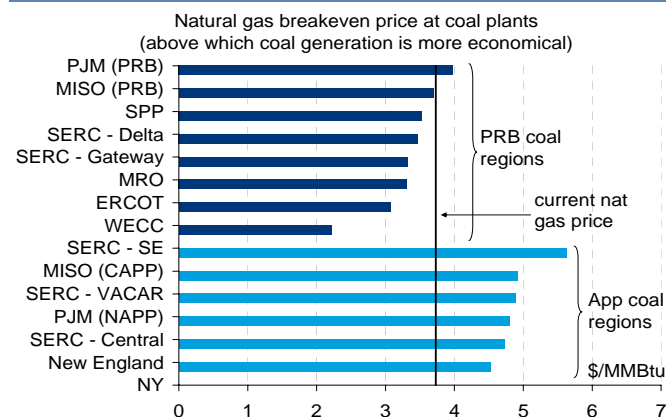


Source: EIA, BofA Merrill Lynch Global Commodity Research

Gas-to-coal switching should keep prices range-bound

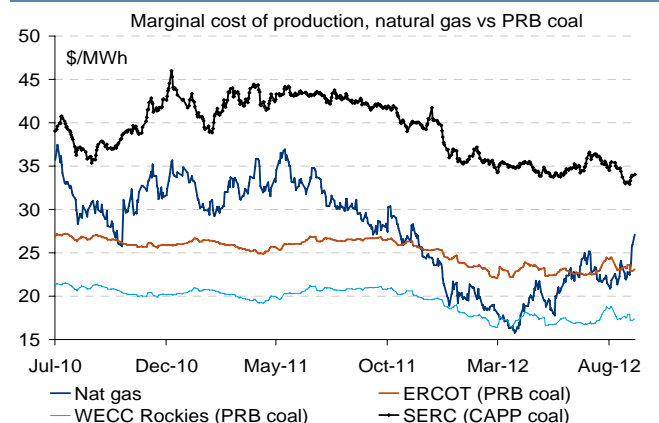
Going forward, a flat production profile will shift some gas-fired power generation back into coal and we see switching decline to an average of 3.4 bcf/d next year, from 5.2 bcf/d in 2012. However as the need to coal-to-gas switching does not disappear, the upside to natural gas will remain capped by coal. With CAL13 natural gas prices trading at \$3.90/MMBtu, coal-to-gas switching out of PRB coal is no longer economical in most regions (Chart 79 and Chart 80). Above \$4-4.50/MMBtu, the relative advantage of natural gas over coal disappears rapidly and power generators will switch back into coal. The continued need for coal-to-gas switching effectively creates a lid to nat gas prices next year.

Chart 79: Now that gas prices have recovered, coal-to-gas switching out of PRB coal is no longer economical in most regions



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Chart 80: Hence we can loose some layers of coal-to-gas switching, especially in the low PRB coal consuming regions



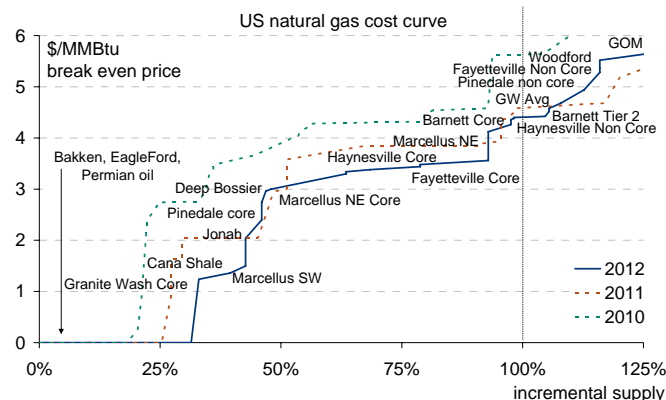
Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Supply would speed up if prices rise above \$4/MMBtu

This assumes no outright sharp production declines, which we find unlikely as the supply side also seems to be converging towards a \$3-5/MMBtu price range (Chart 81). The marginal incremental supply for gas in the United States requires

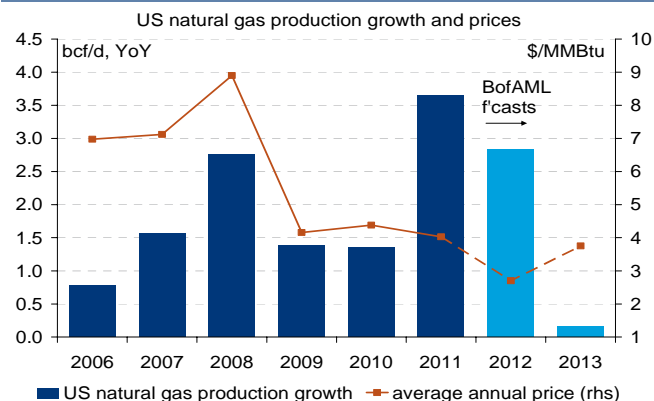
prices to trade around these levels to justify the investment. Even then, it is important to note that this band has yet to settle, as the supply curve has continued to shift to the right, on the back of technological improvements and the development of new and more economic basins. At any rate, whenever prices have traded above \$4/MMBtu, supply growth has grown at a pretty fast pace (Chart 82). Meanwhile, below that number, output increases have tended to fade.

Chart 81: The supply side of natural gas in the US seems to be converging towards a \$3 to \$5/MMBtu price range



Source: BofA Merrill Lynch Global Commodity Research

Chart 82: Since the shale revolution started, supply growth has grown at a pretty fast pace whenever prices have traded above \$4/MMBtu

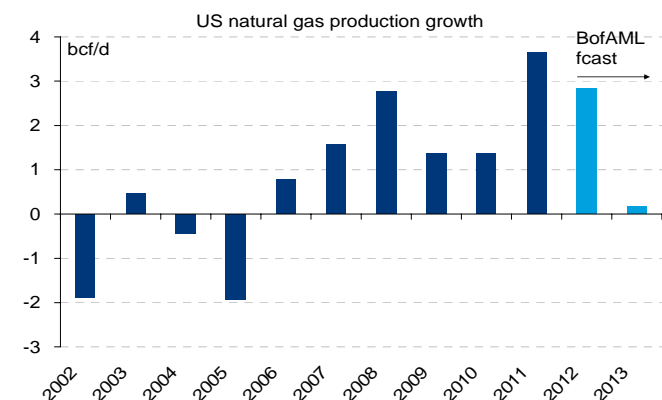


Source: Bloomberg, EIA, BofA Merrill Lynch Global Commodity Research

We do not expect real production declines next year

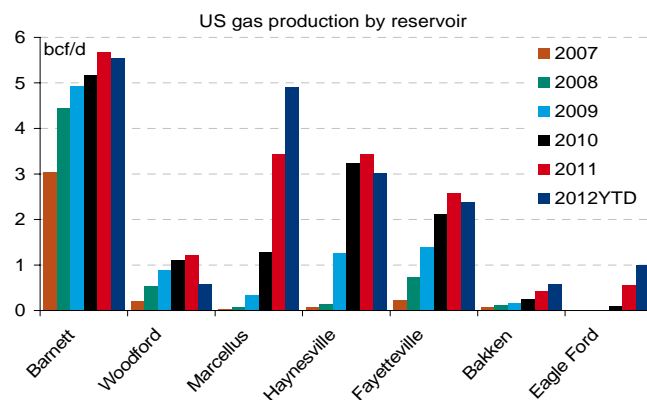
The fundamental problem in the market is that production remains too high. Dry nat gas output grew by an impressive 2.8 bcf/d in 2012 to 64.3 bcf/d (Chart 83), driven by efficiency improvements, associated gas production and ethane rejection (see [Propane over ethane](#)). For 2013, we see a fairly flat production profile but not the steep declines that we had originally hoped for. Elevated production levels are surprising when contrasted with the total US gas rig count, which has dropped to 13-year lows in 2012.

Chart 83: Dry nat gas output grew by an impressive 2.8 bcf/d in 2012 to 64.3 bcf/d even despite the depressed price environment



Source: EIA, BofA Merrill Lynch Global Commodities Research

Chart 84: The market is subject to a tug of war between production falling in dry gas shale areas and growing in lower cost liquid areas



Source: BofA Merrill Lynch Global Research

Oil rich shales boost associated gas at zero cost

Surely, drilling in high cost gas plays like the Barnett, Haynesville or the Woodford has already fallen sharply as their breakeven costs sit above \$4/MMBtu. But rigs are expanding in areas with a high liquid content like the SW Marcellus where

costs are as low as \$1/MMBtu. Significant pipeline de-bottlenecking in the Marcellus, where we see 3.6 bcf/d of new pipeline capacity added in 2013, will also distribute more Marcellus gas around the country. In addition, areas like the Eagle Ford or the Permian Basin attract substantial amounts of capital because of their high oil content (65-90%) and producers keep on shifting rigs from the dry gas areas to these oily plays. Gas production in the Eagle Ford has increased by 80% YoY in 2012. Factoring in efficiency gains, gas supply from liquid shales is still expanding strongly (Chart 84).

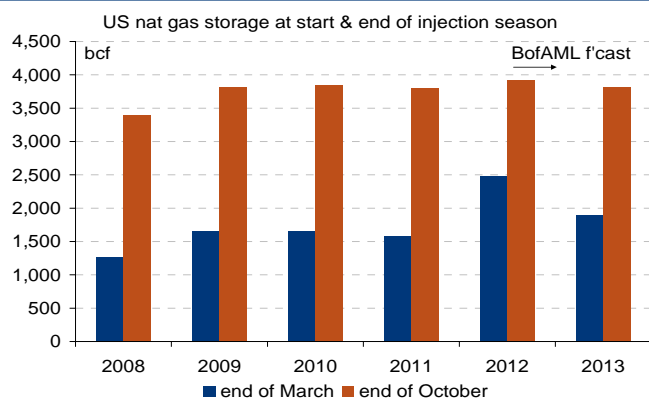
Inventories will likely remain elevated in 2013

The outlook for other components of US natural gas demand is not particularly rosy. Industrial demand growth could be constrained by lower US economic growth given the fiscal cliff. Thus, following very strong growth of 3.1 bcf/d in 2012, we see total gas demand contract by 0.6 bcf/d in 2013. Thus, inventories will likely remain elevated in 2013. We see end of March inventories at 1.9 tcf and end of October 2013 inventories at 3.8 tcf, both above the 5-year average (Chart 85). The risks to our view are significant aggregate production declines.

Lower oil/gas correlations means structurally lower vol

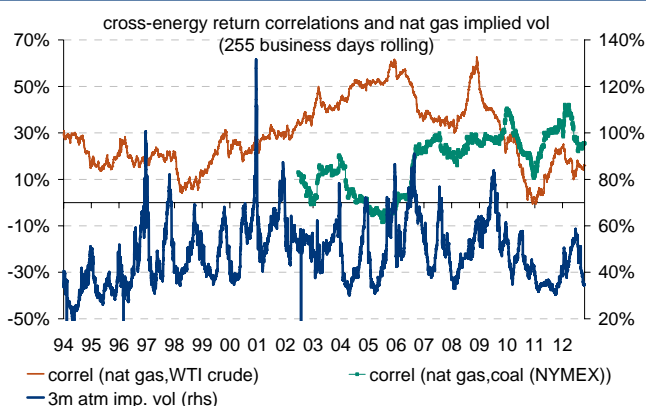
Back in the 1980s and 1990s, natural gas captured an increasing market share to oil-fired power generation in the US, due to its lower costs and cleaner burn. As this shift accelerated in the 2000-08 period, correlation between oil and gas prices picked up. Supplies for both oil and natural gas were tight, but gas was steadily pricing out oil in power units across the country. More recently, the phenomenal ramp-up in domestic shale gas output has led to a structural collapse in the correlation between oil and natural gas prices. Even then, while the correlation between gas and oil has fallen, it has significantly picked up between gas and coal, as gas has started to displace coal in the US electricity generation sector. In our view, the structural collapse in oil/gas correlations and the surge in coal/gas correlations will translate into structurally lower volatility in the US nat gas market (Chart 86).

Chart 85: We see end of March 2013 inventories at 1.9 tcf and end of October inventories at 3.8 tcf, both still above the 5-year average



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Chart 86: In our view, the structural collapse in oil/gas correlation will translate into lower vol structurally in the US nat gas market



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

4.2 UK natural gas

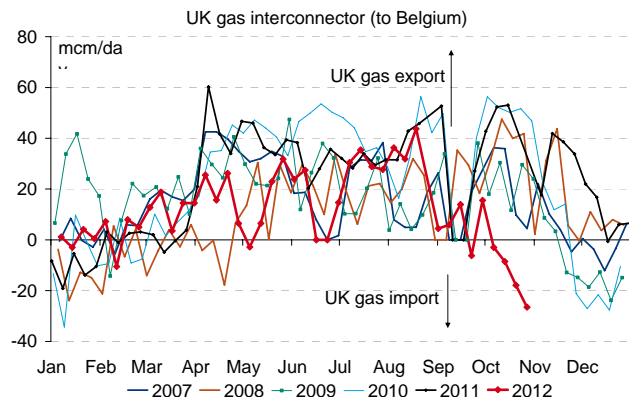
We see upside to UK natural gas prices in 2013...

UK NBP nat gas prices have posted large gains recently (Chart 89). Although cold weather and lingering supply concerns can explain the recent price performance, we believe UK supplies will continue to be vulnerable in 2013 thereby providing support to prices. Moreover, we see UK natural gas prices benefitting from a raft of coal retirements (for more detail, click GEW [5 Nov 2012](#)). In our view, the premium embedded in near-term contracts is starting to look lofty but longer-dated contracts for winter 2013 at 70 p/therm offer value.

...but full storage and imports could reduce winter premium

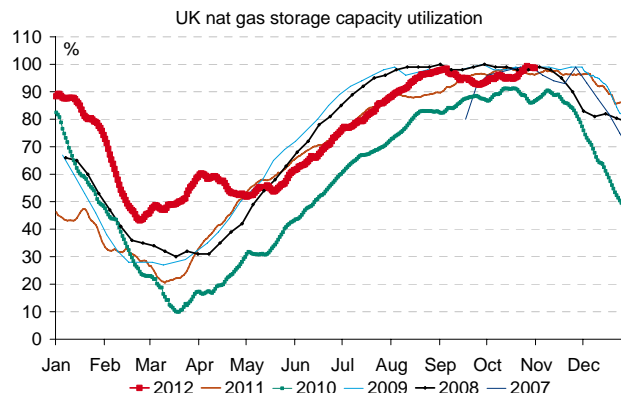
A premium of NBP prompt to benchmarks on major European hubs led to a reversal in flows between the UK and the Continent in October, earlier than in previous years. Now the UK imports gas via the Interconnector from Belgium and via the BBL pipeline from the Netherlands (Chart 87). However, the premium embedded in NBP prices stands in contrast to high inventories. Storage capacity which is virtually maxed out at 99% utilization rates (Chart 88). Continental European storage capacity utilisation is also fairly high at 89%. Essentially much of the UK's storage capacity is located in Europe and the UK has begun to draw on this storage early this year given the switch on the Interconnector. Keeping high storage levels and pipeline import flows in mind, the current premium baked into the NBP winter forward curve looks lofty.

Chart 87: The UK now imports gas via the Interconnector from Belgium and via the BBL pipeline from the Netherlands



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Chart 88: Inventories are high, particularly in the UK where capacity is virtually maxed out at a 99% utilization rate



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Domestic supply problems could linger...

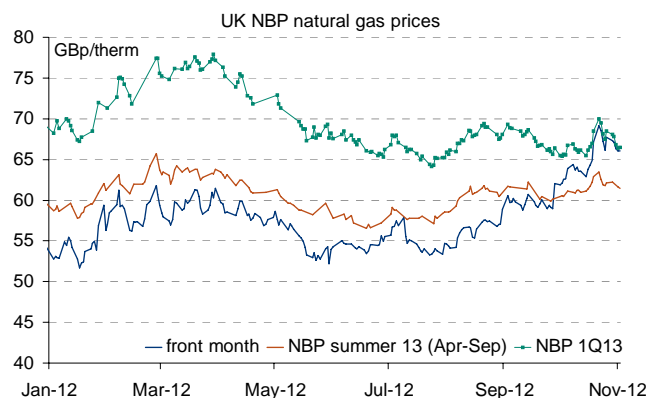
Looking beyond that, we remain constructive on UK natural gas for 2013. Combined with steep decline rates in mature fields, indigenous production in the UK Continental Shelf has fallen by 13% YoY during the first 7 months of the year. Centrica's South Morecambe field was again having trouble recently, going offline several times. In addition, Total's Elgin/Franklin platform in the North Sea remains offline following a gas leak in March, removing about 15 mcm/d from Britain's market. Although the leak has stopped, production has not yet resumed and our colleagues in equity research expect a very slow restart in early 2013.

...making the UK more exposed to North Sea output issues

In an environment of sharply declining domestic gas production (Chart 90), the

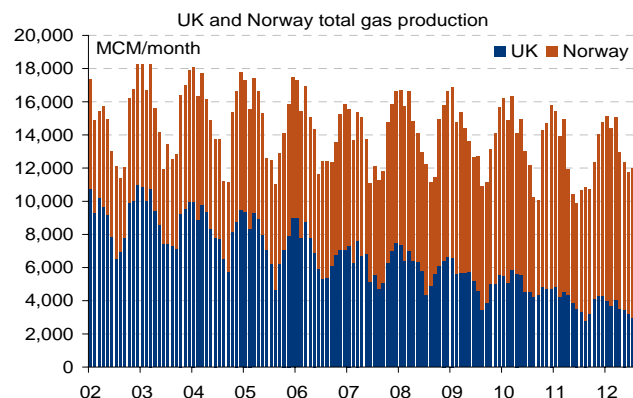
UK is more dependent on supply from Norway. Norwegian producers, however, have to fulfill their obligations with mainland Europe first due to long-term contracts, leaving Britain more exposed to Norwegian supply problems. In fact, Norwegian exports to the UK remained flat over the past years while export to Europe have trended up (Chart 91). Even during recent production problems, Norwegian pipeline flows to Germany and the Netherlands remained supported, while Langeded volumes dropped sharply. The issue is exacerbated by Continental Europe trying to entice Gazprom to renegotiate long-term contracts thereby boosting demand for Norwegian gas in the short-term.

Chart 89: Prompt and winter UK nat gas prices have risen strongly recently, in part on colder-than-normal weather



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Chart 90: Falling indigenous production in the UK Continental Shelf has left the UK much more exposed to Norwegian supply problems



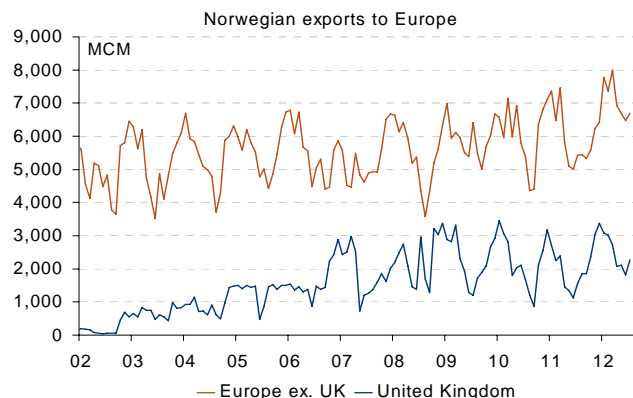
Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

LNG is a big questionmark given ongoing diversions to Asia

In addition, the UK gas market is also being squeezed by LNG diversions. LNG imports into the UK have literally plunged this summer with send-outs from LNG terminals coming in as low as 8 mcm/d on some days. On average this summer (Jun-Aug), send-out flows averaged roughly 40 mcm/d, compared to 68 mcm/d in the same period last year and 45 mcm/d in winter 2011/12. Liquid gas cargoes are being diverted to more lucrative destinations in Asia, Latin America and even Canada. For instance, Qatari LNG volumes to Asia are up 50% YoY, but down 30% YoY to Europe (Chart 92). Although netback premia have come down from \$8-10/MMBtu seen over the summer, key UK supplier Qatar continues to receive a \$3/MMBtu premium for deliveries into Northeast Asia over the UK. As a result, the UK now receives the bare minimum of liquid gas. Although some of this was due to recent planned maintenance at two trains in Qatar, we believe the UK will remain exposed to tightness in global LNG markets going forward.

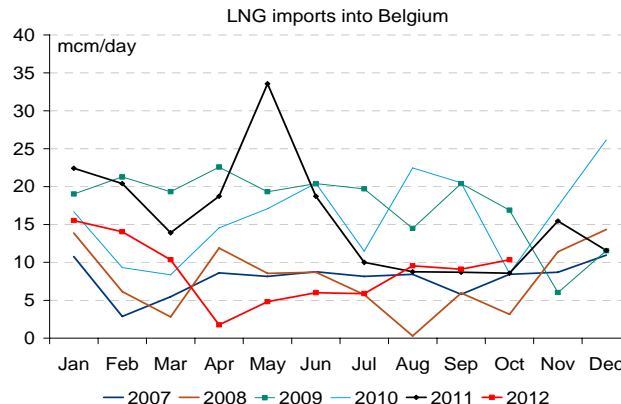
30 November 2012

Chart 91: In fact, Norwegian exports to the UK have remained flat during the past years while they have trended up to Europe



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Chart 92: Liquid gas cargoes are being diverted to more lucrative destinations like Asia, and away from Europe

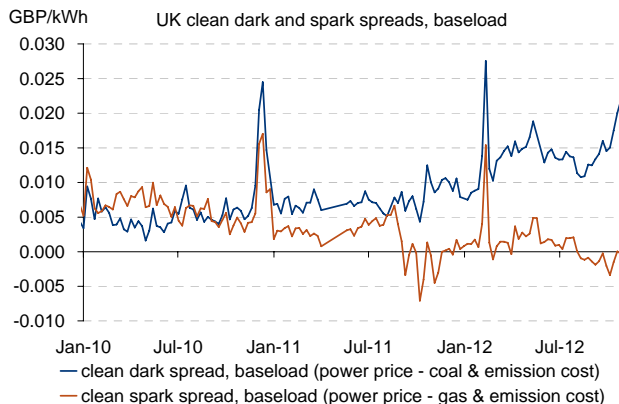


Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

Gas demand is currently weak on gas-to-coal switching

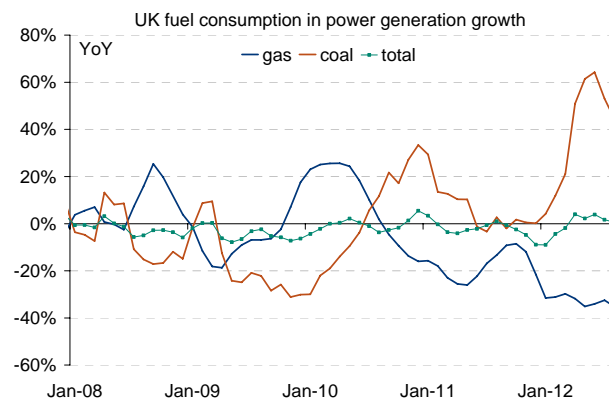
On the demand side, extremely strong clean dark spreads have given utilities every incentive to run coal-fired units. This is because spot API2 coal prices in Europe collapsed from \$128/mt in September last year to \$89/mt currently on physical oversupplies, as did CO2 emission prices in Europe. Meanwhile European gas prices held up, partly supported by high oil prices and strong global demand for LNG. Consequently clean dark spreads soared relative to those for gas (Chart 93). As a result of that, European gas consumption from the electricity sector has been extremely weak while coal demand has soared (Chart 94).

Chart 93: Consequently power generation margins from coal (clean dark spreads) soared relative to those for gas (clean spark spreads).



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research
Assumes coal plant efficiency of 35% and gas plant efficiency of 49%

Chart 94: European gas consumption from the electricity sector has been extremely weak while coal demand has soared



Source: Bloomberg, BofA Merrill Lynch Global Commodity Research

We see upside to winter 2013/2014 NBP prices

However, we believe the outlook for gas consumption in the UK may improve in 2H2013 as there is a significant amount of non-compliant coal-fired power generation capacity that will be forced to retired during the year¹ (Chart 95). On

¹ As part of the UK government's plan to move to 15% renewable generation by 2020, these plants were allowed (1) to upgrade to become cleaner or (2) shut by 2016. Plants that chose to shut were given an allowance of hours to run by 2016. With higher carbon taxes expected in 2013 and low current coal prices, most plants have run at close to full. Hence, about 6GW capacity will shut in 2013 as they have used their remaining hours.

our estimates, about 6 GW of coal capacity (7% of total capacity) will begin to decommission from 2Q13. With power imports from the continent maxed out and further reliability improvements from the nuclear fleet unlikely, most of the slack will have to be taken up by gas, particularly at new and efficient CCGTs. On our estimates gas consumption in power generation will increase by 220 mcm/month or 7.5 mcm/d YoY in 2013, with the demand increase the strongest during the high demand season in winter when coal capacity is maxed out.

We see higher UK power and gas prices

As more gas plants have to ramp up in 2013 to fill the gap, UK power prices will likely rise. Although the impact on marginal spark spreads will likely be somewhat contained given the excess CCGT capacity in Britain, higher gas demand should stimulate higher gas prices and thus power prices. The positive impact on gas could be further exacerbated by coal-fired margins declining following the introduction of a special UK carbon tax of GBP 3.70 per ton of CO₂ from 1 April 2013, in addition to the existing European wide permit. In any event, as spare capacity in coal generation is increasingly maxed out it also creates upside price spike risk in power prices especially going into the high demand season next winter (Chart 96). Longer-dated NBP gas contracts such as winter 2013 offer value, in our view.

Chart 95: Next year, about 6 GW of coal plants will be retired

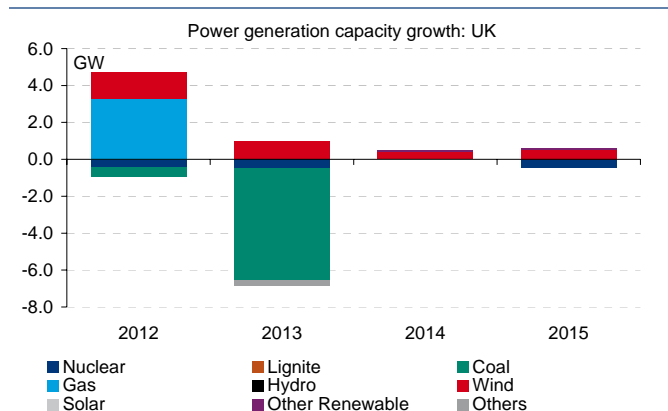
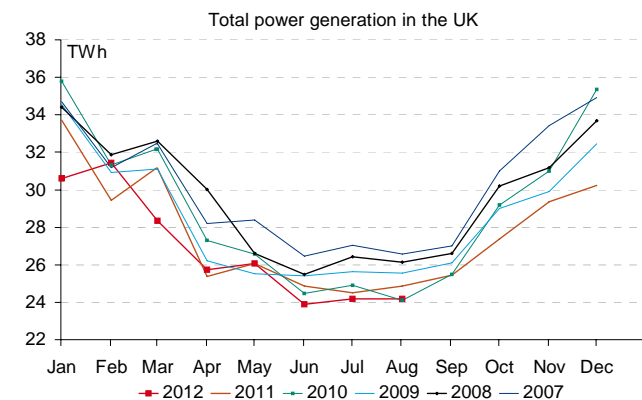
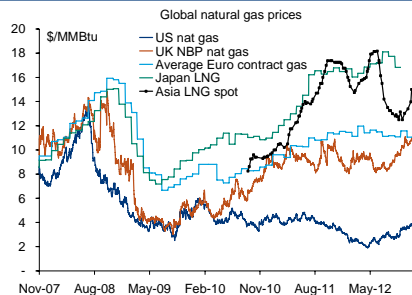


Chart 96: As spare capacity in coal generation is increasingly maxed out, it also creates upside spike risk in gas prices next winter



4.3 Global LNG

Chart 97: Asian spot prices soared to 4-year highs this summer, but have since retreated



Source: Bloomberg, Reuters, World Gas Intelligence, BofA Merrill Lynch Global Commodities Research

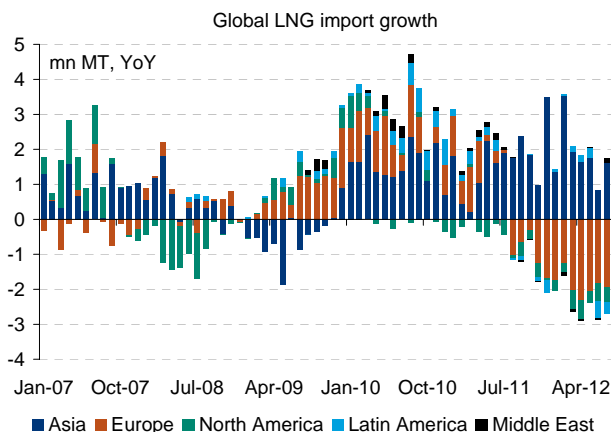
Global LNG prices have retreated from summer highs...

Asian LNG markets experienced tightness in 2012 (Chart 98), with Asian spot prices soaring to 4-year highs above \$18/MMBtu over the summer (Chart 97). Much of the strength can be attributed to ongoing nuclear outages in Japan, where 95% of capacity remains offline following the earthquake/tsunami in March 2011. In addition, demand out of other Asian countries remained robust (Chart 99), while ongoing supply disruptions in Yemen and Nigeria further exacerbated global LNG market tightness. Prices have since retreated, dropping as low as \$12.50/MMBtu as ample supplies ahead of winter and mild weather have dampened demand, particularly out of China.

...but could see a lift heading into 2013

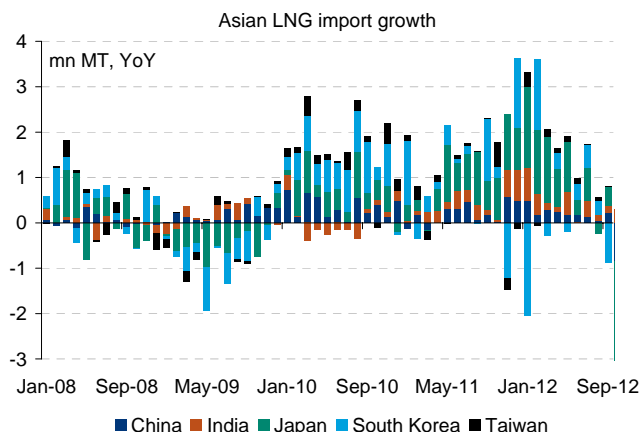
More recently, Asian LNG prices found some support, currently trading at around \$15/MMBtu. A new supply outage in Indonesia following a fire at Tangguh's 3.8 mmtpa Train 2 provided some uplift. More importantly, South Korea recently shut down two nuclear reactors (totaling 1.8 GW of capacity) after discovering forged safety certificates. Although it is yet unclear whether more will follow on the back of safety concerns, we could see LNG import growth rise after having fallen 9.3% YoY in October.

Chart 98: Pacific LNG markets experienced tightness in 2012...



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Chart 99: ...in large part due to ongoing nuclear outages in Japan and strong demand out of other Asian countries



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

In 2013, LNG prices will likely be supported...

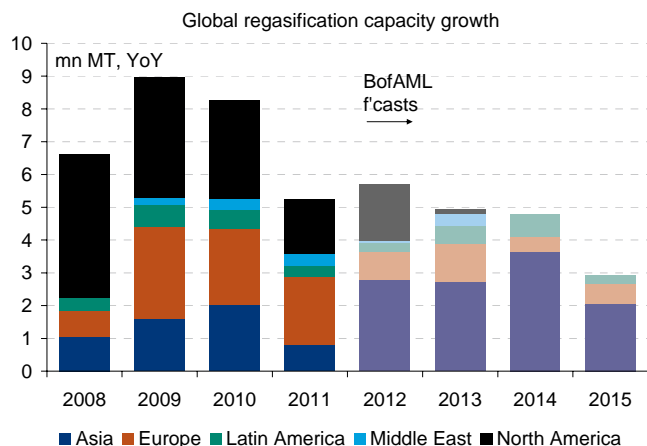
Although prices could moderate again post winter, we believe LNG prices will be supported in 2013. For one, LNG import capacity continues to see additions in key Asian importing countries like China and India (Chart 100). In China, the new 3.0 mmtpa Ningbo import terminal received its first cargo in September. It is the country's sixth facility, and the third to be added since late 2011 (following Rudong and Dalian). CNOOC is also planning new projects in Zhuhai, Hainan, and Shenzhen in coming years. In India, the country's largest terminal in Dahej is slated to expand from 10 to 15 mmtpa by 2015, reaching 12.5 by October of 2013. Petronet also plans to more than double capacity to 25 mmtpa by 2015.

...as Asia will continue to lead global LNG demand growth

In addition, traditional LNG exporters are increasingly building new import

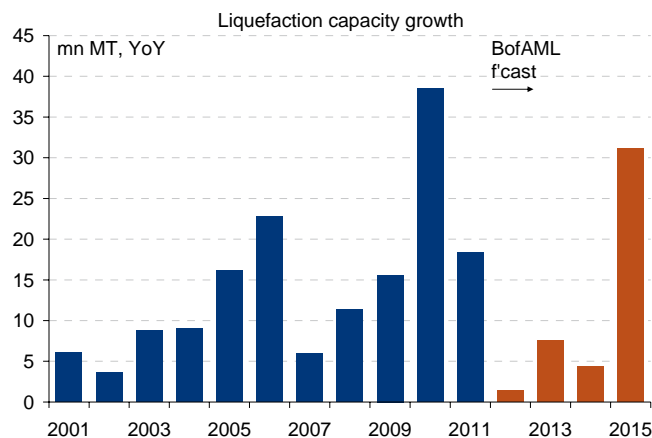
terminals. Indonesia currently has one floating terminal in operation (West Java), with two more on the way in coming years. The Arun liquefaction plant will also be modified into a regas terminal. In Malaysia, the country's first import terminal in Melaka is expected to come online in 2Q13. New players are also emerging. Thailand started importing LNG a year ago and Singapore will start taking volumes in 2013. It is also important to highlight Latin America where Brazil, Argentina and Chile built out 17 mmtpa of regas capacity in the past 5 years. Such strong regional demand should continue to support diversions from Europe, as netbacks still show a \$2-3/MMBtu premium for deliveries to Asia over Europe.

Chart 100: LNG import capacity continues to see additions in key Asian importing countries, as well as Latin America



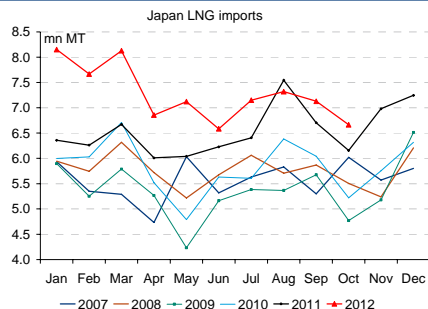
Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Chart 101: We believe global LNG markets will remain tight in 2013 as LNG demand grows strongly but supply growth remains minimal



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Chart 102: Through the first 10 months of 2012, Japan's LNG imports have come in 13.5% higher than the same period in 2011



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

Markets will remain tight on the lack of major supply adds

Overall, we believe global LNG markets will remain tight in 2013 as LNG demand grows strongly but supply growth remains minimal (Chart 101). In 2012, only one liquefaction project started, the Australian Pluto plant with capacity of 4.3 mmta. Angola LNG, scheduled to start in July with 5.2 mmta of capacity, was recently delayed to 1Q13. Two new plants are starting up in Algeria (Skikda and Arzew) that should add to volumes in 2013 and 2014, although much of growth will be offset by the closure of older trains. Still, we only see major supply additions in 2015. Overall, LNG liquefaction capacity is expected to grow by 7.6 million mt in 2013, modestly higher than the 1.4 million mt growth in 2012. Thus, excess liquefaction capacity is likely to remain tight through the next few years.

The key risk remains Japan

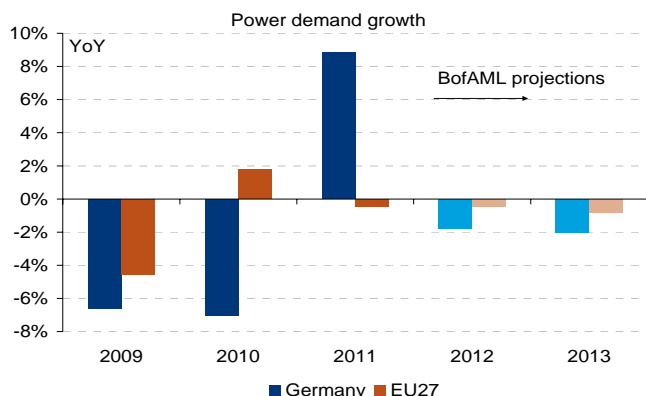
Still, Japan remains the key uncertainty in LNG markets. Through the first 10 months of 2012, imports came in 13.5% higher than 2011 (Chart 102). Growth has decelerated, with October imports up 8% YoY versus 24% in 1Q12. But we see a risk that more nuclear restarts will slow LNG demand further. Operator Kansai plans to restart two units at Takahama (totaling 1.7 GW of capacity) by next summer, adding to the two that are currently in operation at Ohi (2.4 GW capacity). Also, the revival of non-nuclear thermal power plants could further quell LNG demand. Japan's Tohoku Power recently claimed that two coal-fired power plants at Haramachi (totaling 2.0 GW of capacity) will resume operations by spring of 2013. Yet despite risk that LNG demand could moderate, we find it unlikely that imports will fall below pre-crisis levels of around 70 million mt.

4.4 German power

German wholesale power prices have steadily declined...

Although Germany remains Europe's industrial powerhouse and has so far escaped the crisis in the periphery rather unscathed, economic headwinds have left a stamp on electricity demand in Germany. Power demand is set to contract at a rate of 2% in 2012 (Chart 103), particularly from the industrial sector which consumes 45% of total power demand. The slowdown is already eating into power generation margins in Europe's powerhouse and German wholesale electricity prices have been on a steady downward trend over the last 19 months (Chart 104). Year-to-date, CAL13 German baseload power prices have fallen by 9%. Although power prices and margins are declining in most European electricity markets, Germany is getting hit particularly hard with French, Dutch and Belgian power prices recently rising to a high premium above German power prices.

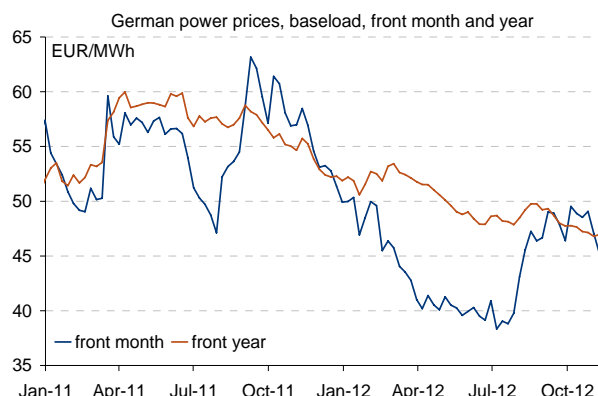
Chart 103: The economic slowdown has left a clear stamp on electricity demand, which is set to contract by 2% in 2012 and 2013



Source: EuroStat, BofA Merrill Lynch Global Commodities Research

Demand is defined as net electricity generation less net imports, also known as electricity "available for domestic consumption"

Chart 104: In addition to weak demand, vast expansion in renewable capacity has put wholesale baseload power prices under pressure

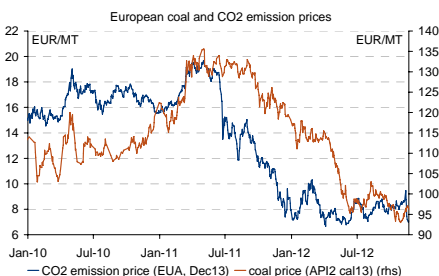


Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

...partly on a weak economy & higher renewable capacity...

The vast expansion in renewable capacity increased electricity supply, generating oversupply in the power market. On our estimates, the share of renewable capacity rose from 27% in 2006 to 50% in 2012, which has put further pressure on German baseload power prices. Germany today has about 30 GW of solar power generation capacity, up from 4.8 GW in 2008. The drastic fall in fixed costs of photovoltaic solar elements partly helped the build-out in renewables, further aided by generous subsidies.

Chart 105: The low value of carbon further helped to push down power prices



Source: Bloomberg, BofA Merrill Lynch Global Commodities Research

...and partly on lower coal and CO2 prices

On the other hand, the large weight of coal in Germany's generation stack has not helped German power prices. Compared to its neighbours, Germany's power generation stack is significantly more coal and lignite-fired. With thermal coal prices on a steady downward path, forward power prices have fallen as well. Since 3Q11, API-2 front month coal prices have decreased by 25%, reaching their lowest value in more than two years because of deteriorating demand and physical oversupply generated by major coal exporters like the United States, Australia or South Africa. On top of that, the low value of carbon (CO2 Cal13 emission prices dropped sharply to 7 EUR/MT, the lowest level in 3 months) further helped to push down power prices (Chart 105).

Coal has benefitted from the phase-out of nuclear...

With coal enjoying a significant premium over gas in power production in Germany, the bulk of the shutdown of 7 nuclear reactors (8 GW) in 2011 was replaced by generation with cheap and dirty coal rather than cleaner and more expensive natural gas (Chart 106). So far this year, brown coal and lignite-fired power generation has increased by 7.5% in Germany compared to the same period last year, one of the strongest increases in years (Chart 107).

Chart 106: In addition, the shutdown of 7 nuclear reactors (8 GW) last year was replaced by cheap and dirty coal

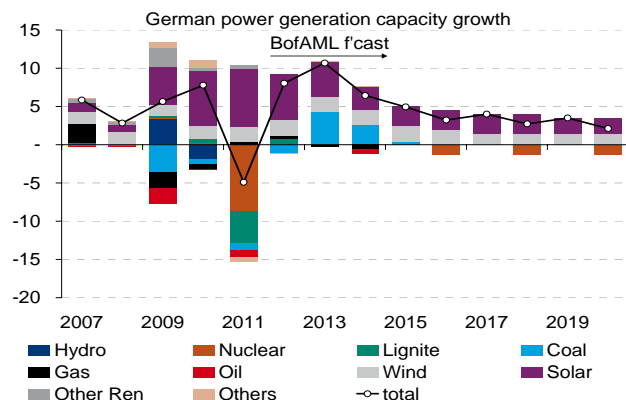
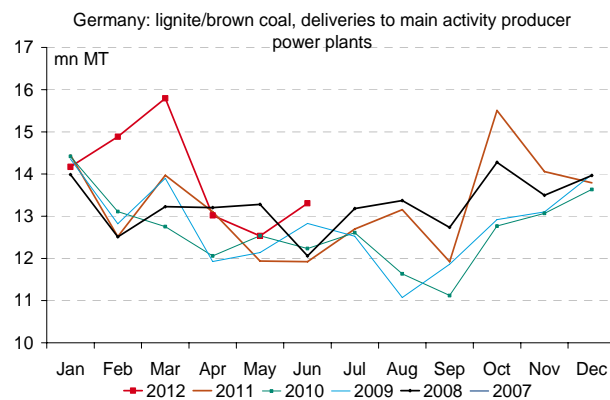


Chart 107: Brown coal and lignite-fired power generation has increased strongly as indicated by deliveries of coal to utilities



...while gas utilization rates are dropping sharply

Meanwhile, gas-fired power plants have been under-utilized and even idled given the relatively higher costs of running them. German gas plants are severely under-utilized as the country is producing around 13% of its electricity through green technologies like wind or solar. As a result of that, gas plant utilization rates this summer fell to almost zero at some plants because of increased solar and wind generation. Coal and renewables have increasingly crowded out gas generation.

Oversupply will persist on strong growth in renewables...

Over the medium-term there is a big push in growing renewable generation capacity further, partly to replace nuclear capacity (Chart 108). Renewable capacity appears set to expand strongly over the coming years, with 28 GW solar and 16 GW wind capacity growth expected between 2011 and 2020. That means the share of renewables in total capacity could rise to 58% of capacity. Of course, renewables do not replace conventional capacity one for one due to lower utilization rates, but we should see overall capacity expand strongly which means peak spark spreads should remain under pressure.

...and net expansion in coal-fired capacity

Meanwhile, coal capacity in Germany is expected to grow by 6.7 GW on a net basis over the next two years, despite 2.6 GW of expected retirements. While the UK is retiring about 6 GW of coal fired capacity in 2013, Germany is not expected to retire any material amount of coal generation capacity. Strong margins due to the cost advantage of coal plants give generators a strong incentive to keep coal plants running (Chart 109). The fact that more than 60% of German coal capacity is also used for heating and further makes policy-driven closures of coal plants difficult. Finally, the unreliability of renewable inputs (e.g. wind and sun) also argues for maintaining thermal capacity. Of course, such strong growth in

renewables will crowd out some high cost thermal capacity, mainly inefficient gas plants, and put downward pressure on power prices.

Chart 108: Over the medium term, the big push in generation capacity growth in Germany is in solar and wind to replace nuclear capacity

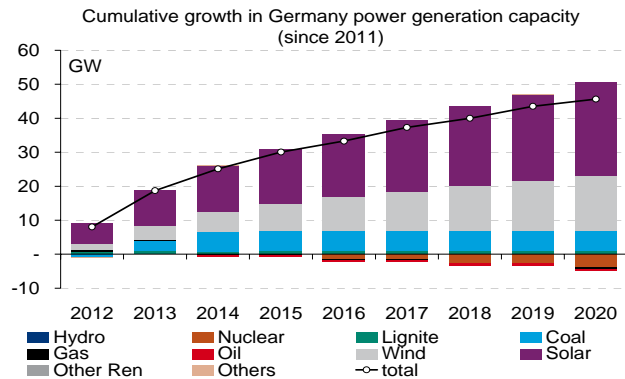
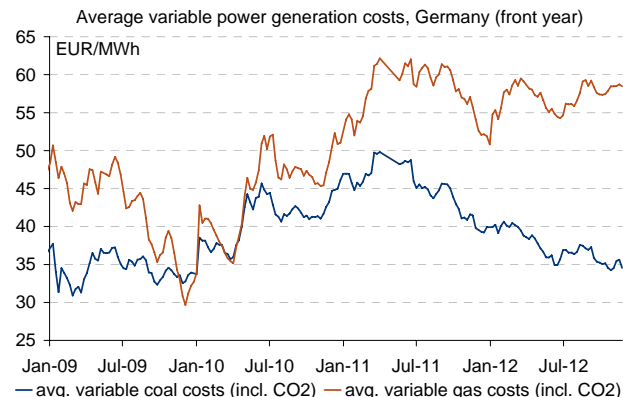


Chart 109: Strong margins due to the cost advantage give generators a strong incentive to keep coal plants running



Puts on Cal13 German baseload look attractive

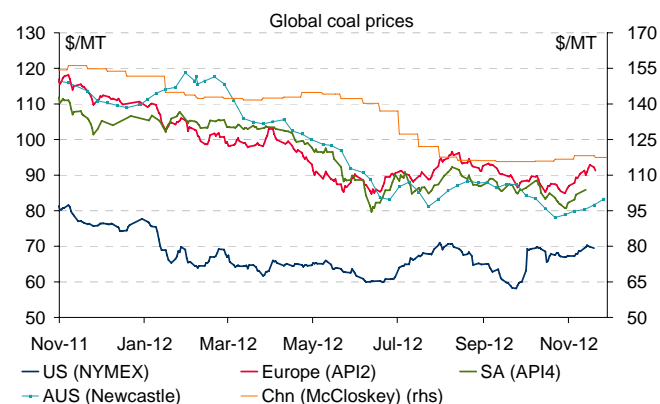
Such strong growth in renewable capacity will only add to the existing oversupply in the German power market, at a time when power demand will likely fail to recover back to pre-crisis levels. Moreover, the increasing role of renewables combined with depressed coal prices is putting many CCGT producers in Germany under severe stress. Already, several gas producers in Germany have warned that they might have to idle or shut down CCGT capacity in light of negative spreads, even during the upcoming peak winter period. This creates potential for higher volatility and sharp price movements. Finally, we also see room for European thermal coal prices falling further in 2013 putting more downward pressure on German power prices. Thus, puts on CAL 13 German baseload look attractive, in our view.

5. Outlook for thermal coal

Physical thermal coal markets remain weak

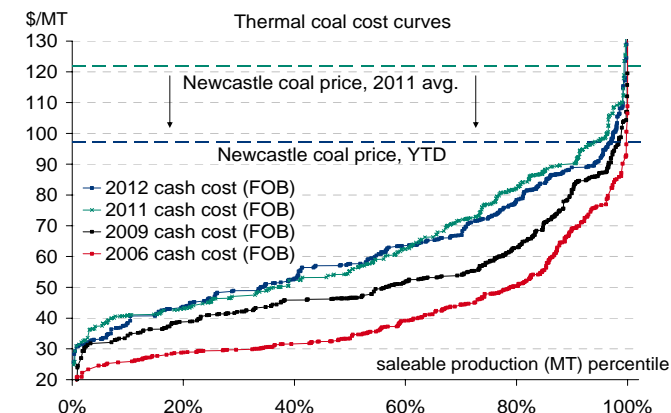
Seaborne thermal coal continues to battle with heavy physical oversupply as producers still export too much into a weak seaborne market (Chart 110). Inventories are bloated as demand just cannot keep up. Despite the recent rally since late October, front month European (API2) coal prices, now at \$93/MT, have been on a downward trend since early summer. As we have highlighted before, low spot coal prices are starting to scratch cost levels for many coal mines around the world, compressing producer margins (Chart 111). However, the forward curve is trading in a steep contango, reflecting the physical oversupply and high inventory situation. As producers often sell physical volumes forward, the contango is helping to protect their margins leading to delays in production curtailments. Thus while thermal coal prices will likely remain on a downward path, it is likely to be a slow grind lower. We re-iterate our Newcastle average price forecast of \$95/mt for 2013. We also think CAL14 API2 will trade below \$100/mt within six months.

Chart 110: The seaborne global market for thermal coal continues to battle with heavy oversupply in the physical market



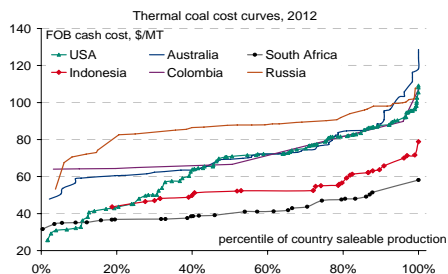
Source: Reuters, Bloomberg, BofA Merrill Lynch Global Commodities Research

Chart 111: Low spot prices are starting to scratch at cash cost levels for many coal mines around the world



Source: AME, BofA Merrill Lynch Global Commodities Research

Chart 112: High cost producers in China, Australia, Indonesia and the US are getting hit particularly hard



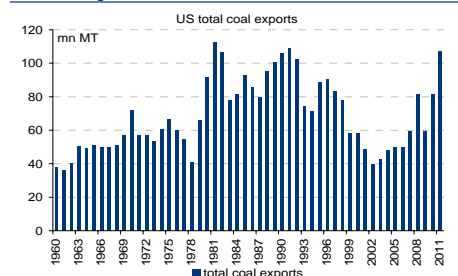
Source: AME, BofA Merrill Lynch Global Commodities Research

Note Indonesian coal is on average lower quality hence once adjusted for quality differences the cost is comparably higher than the line in the chart above indicates.

Spot prices are sitting at cash costs...

High cost producers in China, Australia, Indonesia and the US are getting hit particularly hard (Chart 112), as their margins are turning negative in some places. Rising production costs in recent years, particularly at the mine, means producers now need higher coal prices to break even. However, the recent drop in coal prices puts some of these producers in a position where their revenues cannot cover cash costs. Rising producer currencies are further compressing margins of miners. Finally in China, higher transportation costs have eaten into profits, while in other countries higher taxes and royalties also increased costs.

Chart 113: US coal exports have risen strongly in recent years



Source: EIA, BofA Merrill Lynch Global Commodities Research

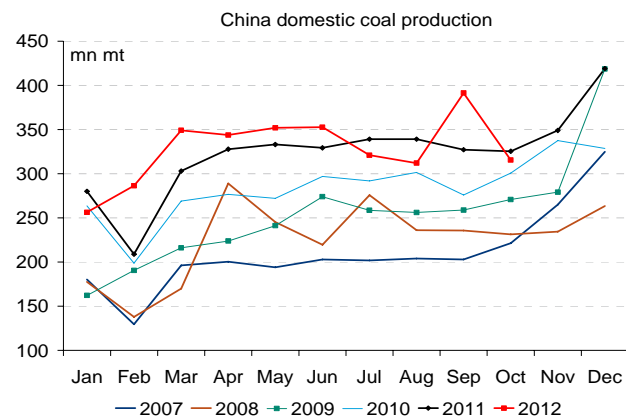
Producers are announcing production cuts

Several producers have announced closures or reduced activity, particularly in Australia. We see outright closures of 8.3 million mt of coal capacity in Australia, of which 3.1 is thermal. This compares to more than 300 million mt of total coal that is expected to be exported from Australia this year. Nearly 50 million mt of capacity from new projects has been delayed. In the US, we estimate 80 million mt of thermal coal production has been curtailed in 2012, compared to total US thermal production of 815 million mt. Still, while production growth has been slowing considerably for most of the year, exports have continued to trend higher (Chart 113). Other major producing countries, such as Indonesia or Colombia, also announced cutbacks but they are relatively small so far. China has also been trying to restrict coal output given domestic oversupplies (Chart 114). Despite a spike in Chinese coal production in September, preliminary data for October indicates a continuation of the production slowdown which began in June.

Ultimately, global coal production is still growing

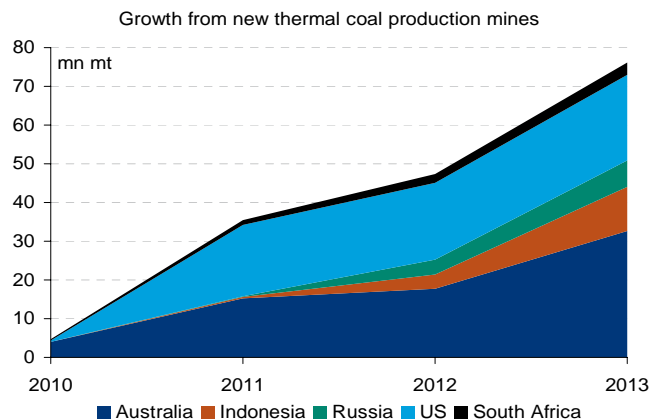
In our view, production cutbacks are neither quick enough nor sufficient in size while new projects are still coming to the market as planned (Chart 115). Continental Coal's new Penumbra mine in South Africa has started and is expected to produce first saleable production in November, adding 36 thousand mt during in 4Q and 105 thousand mt in 1Q13. Russia's second largest coal producer is planning to increase exports from 22.7 million mt to 25 million mt in 2012. Plus, top Colombian coal exporter Cerejon continues to work on a \$1.3bn expansion plan that should boost exports in the second half of 2013. Thus growth is still occurring in a weak price environment. In Australia BHP Billiton is expected to growth thermal production by 13% (or 7.2 million MT) in 2013 on flood recovery of production and new projects coming online.

Chart 114: China has also been trying to restrict domestic coal output given the domestic oversupplies



Source: BofA Merrill Lynch Global Commodities Research

Chart 115: Production is still expanding in many countries as new projects are coming on stream



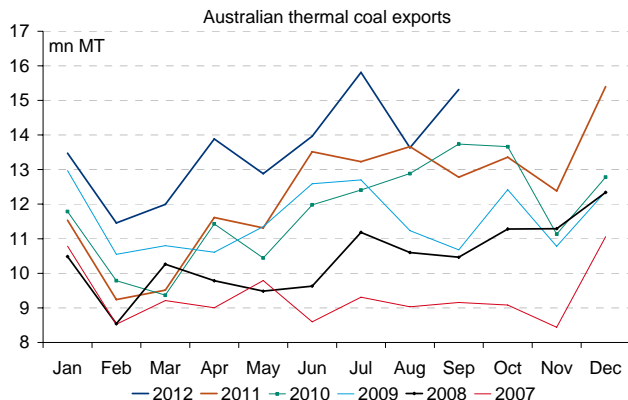
Source: AME, BofA Merrill Lynch Global Commodities Research

Seaborne exports remain high...

With production growth remaining strong, it is no surprise that producers continue to export high volumes, even into a weak spot market. While coming down from record high levels of nearly 16 million mt in July to 13.6 million mt in August, Australian exports set a new record of 15.3 in September. So far this year, Australian exports have recorded strong increases of 15% from last year (Chart 116). South Africa is showing healthy flows as exports in the four months leading up to August are up 13% compared to last year (Chart 117), a clear departure from

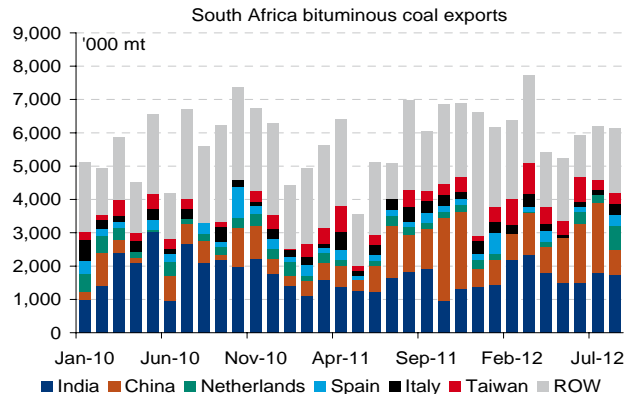
prior years when rail disruptions impacted exports. In light of a slowdown in Asian demand in recent months, more South African volumes have started to head to Europe. On the other hand, Indonesian supplies have been less flexible and exports bore the brunt of the slowdown in Chinese and Indian demand. As a result, Indonesian coal exports are down by 11% YoY in June and July.

Chart 116: Despite some weakness in August, seaborne exports from Australia continue to record strong increases...



Source: McCloskey, BofA Merrill Lynch Global Commodities Research

Chart 117: ...similar to South African coal exports

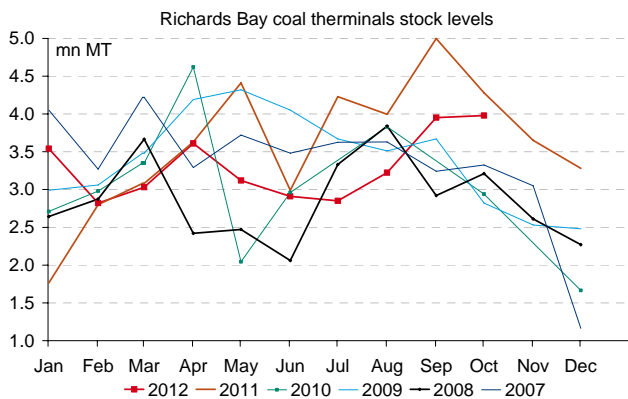


Source: McCloskey, BofA Merrill Lynch Global Commodities Research

Thermal coal stocks seem ample

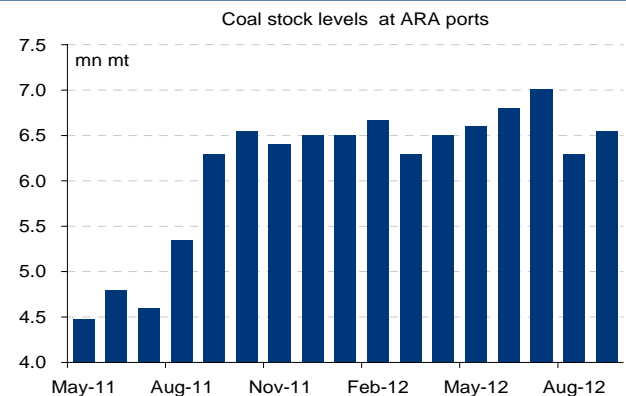
Still, domestic coal stocks by major producers remain ample. Richards Bay Coal stocks have risen by more than 1 million mt in the last three months (Chart 118), as exports slowed from year-to-date highs of 6.3 million mt in July to 5.2 million mt in August. European ports also show high stock levels (Chart 119).

Chart 118: Domestic coal stocks are high both at producers like in South Africa...



Source: McCloskey, BofA Merrill Lynch Global Commodities Research

Chart 119: ... as well as at consumers in Europe

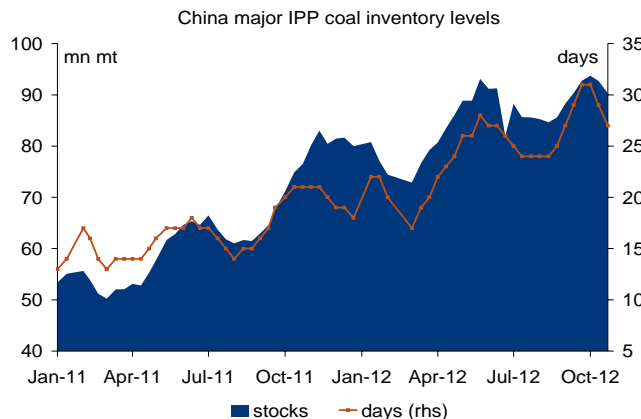


Source: McCloskey, BofA Merrill Lynch Global Commodities Research

Chinese coal demand is pretty lacklustre

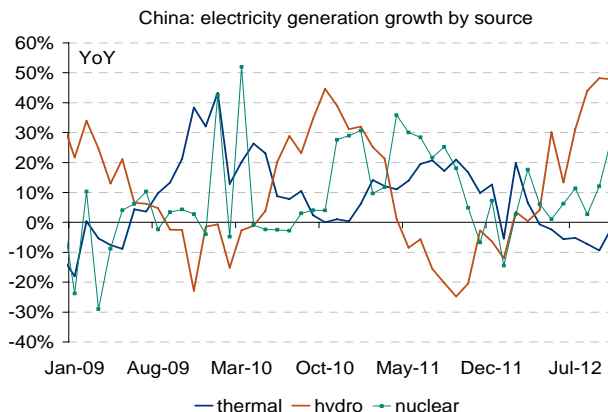
Similarly in China power plants are very well stocked (Chart 120). Relative to demand, stocks at utilities can currently cover 27 days of consumption, 7 days more than one year ago. Clearly the problem is underlying demand. Total power generation barely expanded at 1.4% YoY in the three months to August as the economy has been stabilizing at a lower level. On top of that, remarkably strong hydropower has eaten into thermal power generation demand (Chart 121), which was down by nearly 10% from last year in September.

Chart 120: Chinese coal inventories are utilities are high...



Source: BofA Merrill Lynch Global Research

Chart 121: ...partly because underlying demand is so weak

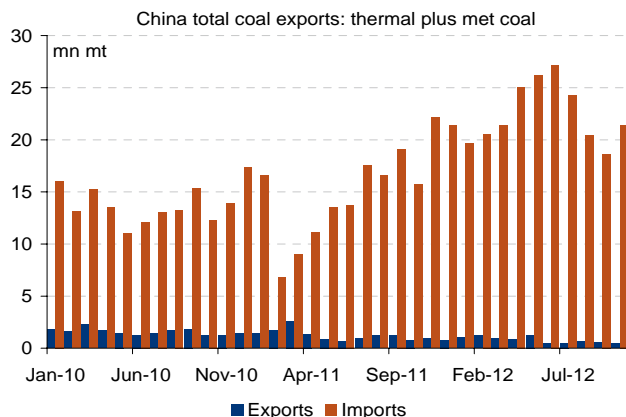


Source: CEIC, BofA Merrill Lynch Global Commodities Research

An open arb might not boost seaborne coal demand, yet

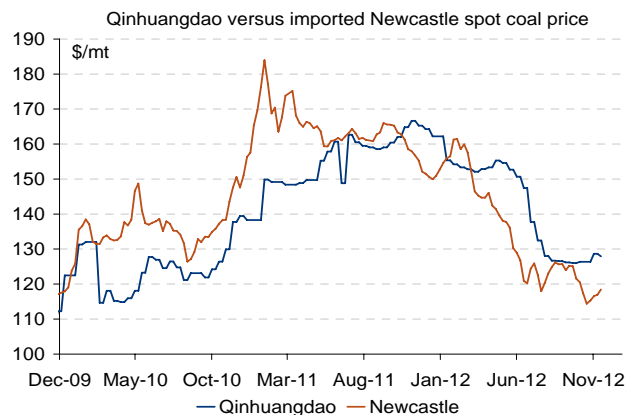
As a result of weak demand, coal imports into China have fallen to 21.4 million mt in October, down from record levels of 27.2 million mt in June. September at just 18.6 mn MT was the lowest import level since October 2011 (Chart 122). Although the arb between domestic coal prices and higher quality Newcastle prices recently opened again (Chart 123), we doubt China will substantially increase its imports in the short run. Unless demand substantially accelerates and stocks start falling, we believe China's appetite for seaborne coal will remain subdued.

Chart 122: As a result of weak demand, coal imports into China have fallen sharply



Source: CEIC, BofA Merrill Lynch Global Commodities Research

Chart 123: Although the arb between domestic and Newcastle prices has opened, we doubt China will substantially increase its imports



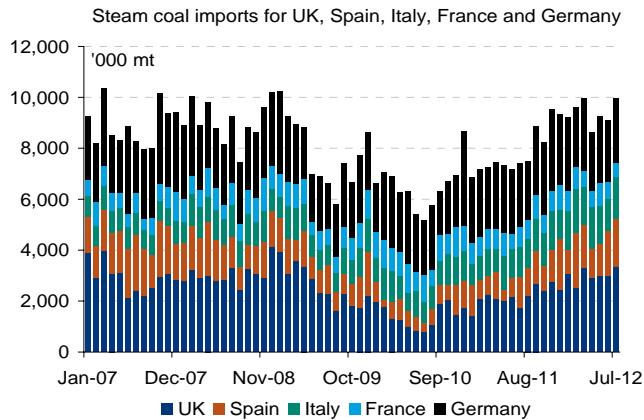
Source: Bloomberg, Reuters, BofA Merrill Lynch Global Commodities Research
Assumes Qinhuangdao to Guangzhou freight costs of \$5.70/mt and port fees of \$4.75/mt. For Newcastle coal, assumes South China freight costs of \$13/mt and port fees of \$7.95/mt.

Europe has been a welcome bright spot

Europe has seen huge gains in coal-fired power generation. European natural gas prices remain elevated on the back of higher oil-linked natural gas contract prices. In the Euro-5 countries, gas used for power generation fell to 5-year lows in August and coal clearly benefitted, keeping imports supported (Chart 124). In the UK, electricity demand is contracting to last year but coal-based electricity generation is growing strongly (up more than 40% YoY) (Chart 125). All in, UK coal consumption is up over 40% YoY in the last four month through August.

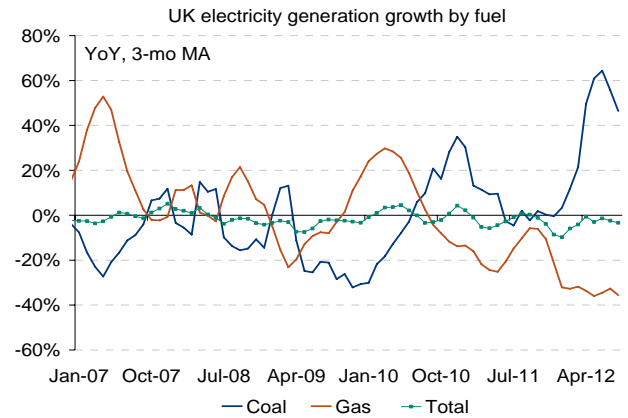
30 November 2012

Chart 124: In the Euro-5 countries, gas for power generation fell to 5-year lows in August and coal has benefitted



Source: McCloskey, BofA Merrill Lynch Global Commodities Research

Chart 125: In the UK, electricity demand growth was flat last month, but coal-based electricity demand continues to grow strongly



Source: DECC, BofA Merrill Lynch Global Commodities Research

The upside risk from here is India

In our view, the greatest support to global thermal coal markets will likely come from India, as the country continues to be plagued by insufficient domestic production and poor infrastructure and distribution networks. Coal stocks are reportedly very low, falling to just 8.8 million mt in September, compared to a 3-year average of 11 million mt for the same month. Overall, stocks represent 8 days of supply despite the Central Electricity Authority recommending at least 22 days. Given such low stocks and ever-rising demand, Indian demand could provide some support to seaborne thermal coal prices as they start to restock this winter.

Appendix

BofA Merrill Lynch global oil supply and demand balance

Table 3: BofA Merrill Lynch global oil supply forecast (in thousand b/d)

	1Q2011	2Q2011	3Q2011	4Q2011	2011	1Q2012	2Q2012	3Q2012	4Q2012F	2012F	1Q2013F	2Q2013F	3Q2013F	4Q2013F	2013F	2014F
OECD Americas	14,343	14,265	14,488	15,233	14,582	15,570	15,460	15,528	16,156	15,678	16,270	16,290	16,327	16,754	16,410	16,941
Canada	3,495	3,263	3,549	3,718	3,506	3,808	3,666	3,712	3,957	3,786	4,083	4,049	4,034	4,243	4,102	4,221
Chile	12	12	13	15	13	15	13	10	13	13	13	13	13	13	13	13
Mexico	2,972	2,963	2,915	2,923	2,943	2,920	2,931	2,919	2,902	2,918	2,798	2,777	2,753	2,749	2,769	2,653
United States	7,864	8,027	8,011	8,577	8,120	8,826	8,850	8,887	9,284	8,962	9,376	9,451	9,527	9,749	9,526	10,055
OECD Asia Oceania	563	572	569	578	571	513	536	638	549	559	467	523	545	541	519	529
Australia	470	489	479	492	483	426	449	553	456	471	394	453	476	455	445	452
OECD Europe	4,033	3,738	3,548	3,748	3,767	3,793	3,600	3,143	3,302	3,459	3,397	3,233	3,075	3,252	3,239	3,158
Norway	2,140	1,979	1,994	2,046	2,040	2,086	1,977	1,742	1,808	1,903	1,855	1,787	1,720	1,817	1,795	1,755
United Kingdom	1,260	1,154	942	1,101	1,114	1,095	1,016	827	916	963	972	888	800	896	889	809
Non-OECD Europe	142	143	141	141	142	144	149	141	131	141	125	123	122	121	123	113
Former Soviet Union	13,638	13,571	13,527	13,573	13,577	13,727	13,620	13,558	13,746	13,663	13,777	13,659	13,393	13,603	13,608	13,703
Russia	10,538	10,566	10,588	10,688	10,595	10,712	10,678	10,702	10,778	10,718	10,811	10,716	10,556	10,678	10,690	10,649
Azerbaijan	992	964	937	802	924	923	896	868	938	906	900	894	834	851	870	919
Kazakhstan	1,700	1,635	1,582	1,663	1,645	1,662	1,614	1,557	1,602	1,609	1,619	1,605	1,556	1,634	1,603	1,711
Non-OPEC Africa (ex Angola)	2,577	2,593	2,605	2,617	2,598	2,442	2,280	2,286	2,301	2,327	2,291	2,337	2,415	2,435	2,370	2,483
Egypt	740	739	738	736	738	739	736	733	729	734	725	720	715	706	717	685
Sudan	455	461	452	445	453	222	65	70	87	111	87	144	191	239	165	290
Non-OPEC Asia	7,864	7,676	7,609	7,591	7,685	7,788	7,602	7,710	7,811	7,728	7,755	7,683	7,668	7,626	7,683	7,734
India	926	914	906	892	910	896	903	910	929	910	899	893	903	875	892	859
Indonesia	937	930	941	923	933	902	875	853	849	870	857	833	808	814	828	795
Malaysia	697	610	648	665	655	698	641	652	648	660	642	632	640	659	643	673
China	4,200	4,158	4,047	4,002	4,102	4,177	4,087	4,168	4,262	4,173	4,257	4,248	4,244	4,225	4,243	4,277
Non-OPEC Latin America*	4,200	4,175	4,213	4,333	4,230	4,278	4,139	4,097	4,251	4,191	4,230	4,319	4,355	4,478	4,346	4,443
Argentina	716	637	697	710	690	683	669	678	666	674	627	629	624	628	627	623
Brazil	2,177	2,177	2,163	2,254	2,193	2,257	2,123	2,073	2,228	2,170	2,210	2,266	2,287	2,381	2,286	2,362
Colombia	866	927	928	951	918	932	945	937	937	938	978	996	1,012	1,015	1,000	1,036
Non-OPEC Middle East	1,776	1,653	1,694	1,469	1,648	1,403	1,455	1,504	1,491	1,463	1,450	1,441	1,442	1,428	1,440	1,336
Oman	891	876	904	894	891	893	915	939	929	919	920	943	969	952	946	907
Processing Gains	2,109	2,086	2,131	2,105	2,108	2,136	2,113	2,159	2,133	2,135	2,165	2,146	2,192	2,154	2,164	2,185
Global biofuels	1,507	1,936	2,184	1,833	1,865	1,571	1,873	2,144	1,935	1,881	1,609	2,029	2,336	2,112	2,021	2,113
Non-OPEC** (incl. processing gains)	52,753	52,408	52,709	53,221	52,773	53,365	52,827	52,908	53,804	53,226	53,537	53,783	53,870	54,506	53,924	54,738
OPEC-11 crude	27,237	26,754	27,206	27,626	27,206	28,677	28,814	28,409	27,609	28,377	27,509	27,159	27,059	26,634	27,090	27,015
OPEC-11 crude plus Iraq	29,902	29,419	29,873	30,309	29,876	31,368	31,734	31,480	30,780	31,341	30,780	30,505	30,455	30,080	30,455	30,630
Saudi Arabia crude	8,831	9,199	9,636	9,666	9,333	9,949	10,066	9,901	9,851	9,942	9,801	9,701	9,651	9,601	9,689	9,739
Other OPEC-11 crude	18,407	17,556	17,570	17,960	17,873	18,728	18,748	18,508	17,758	18,436	17,708	17,458	17,408	17,033	17,402	17,277
Iraq crude	2,665	2,665	2,667	2,683	2,670	2,691	2,920	3,071	3,171	2,963	3,271	3,346	3,396	3,446	3,365	3,615
OPEC NGLs + Non-conventional	5,767	5,722	5,764	5,850	5,776	6,034	6,114	6,312	6,328	6,197	6,306	6,390	6,628	6,645	6,492	6,624
Total OPEC	35,669	35,142	35,637	36,160	35,652	37,403	37,849	37,793	37,108	37,538	37,086	36,895	37,083	36,725	36,947	37,254
Total World Supply	88,422	87,550	88,346	89,381	88,425	90,768	90,676	90,701	90,912	90,764	90,623	90,678	90,952	91,230	90,871	91,992

Source: IEA, BofA Merrill Lynch Global Commodities Research estimates

*Non-OPEC Latin America excludes Mexico (OECD North America) and Ecuador (now OPEC)

Table 4: BofA Merrill Lynch global oil demand forecast (in thousand b/d)

	1Q2011	2Q2011	3Q2011	4Q2011	2011	1Q2012	2Q2012	3Q2012	4Q2012F	2012F	1Q2013F	2Q2013F	3Q2013F	4Q2013F	2013F	2014F
TOTAL OECD Demand	47,135	45,378	46,967	46,749	46,557	46,352	45,615	46,197	46,208	46,093	46,011	45,128	45,673	45,750	45,641	45,473
OECD Americas Demand	24,239	23,809	24,208	23,993	24,062	23,490	23,820	23,906	23,861	23,769	23,478	23,709	23,833	23,769	23,697	23,659
United States	19,466	19,141	19,375	19,249	19,308	18,808	19,005	19,135	19,030	18,994	18,739	18,830	19,018	18,886	18,868	18,813
Canada	2,320	2,222	2,360	2,255	2,289	2,224	2,329	2,335	2,304	2,298	2,255	2,365	2,353	2,331	2,326	2,307
Chile	347	328	329	327	333	344	346	328	326	336	344	349	331	330	338	340
Mexico	2,106	2,118	2,144	2,162	2,133	2,114	2,140	2,108	2,201	2,141	2,140	2,166	2,131	2,223	2,165	2,199
OECD Europe Demand	14,297	14,204	14,784	14,176	14,365	13,778	13,830	14,024	13,819	13,863	13,474	13,559	13,749	13,568	13,587	13,427
OECD Pacific Demand	8,599	7,365	7,975	8,580	8,130	9,084	7,965	8,267	8,528	8,461	9,060	7,860	8,091	8,413	8,356	8,387
<i>OECD Stock Changes</i>																
Industry	-444	469	-144	-680	-200	431	425	508	-251	278	74	464	-178	-446	74	13
Government	-34	36	-384	72	-78	-6	35	13	30	18	30	30	30	30	30	30
<i>OECD Stocks (mn bbl)</i>																
Industry	2,654	2,697	2,683	2,621	2,621	2,660	2,699	2,746	2,723	2,723	2,750	2,806	2,790	2,750	2,750	2,754
Government	1,562	1,565	1,530	1,536	1,536	1,536	1,539	1,540	1,543	1,543	1,554	1,548	1,551	1,554	1,554	1,565
Total Stocks	4,216	4,262	4,213	4,157	4,157	4,196	4,238	4,286	4,266	4,266	4,303	4,354	4,341	4,303	4,303	4,319
TOTAL NON-OECD Demand	41,554	42,315	42,563	42,998	42,358	42,803	43,350	43,943	44,075	43,543	44,077	44,774	45,373	45,536	44,940	46,494
China	9,270	9,255	9,029	9,420	9,244	9,595	9,262	9,355	9,815	9,507	9,944	9,608	9,732	10,188	9,868	10,353
Other Asia	11,091	11,068	10,768	11,229	11,039	11,292	11,374	11,141	11,552	11,340	11,637	11,775	11,500	11,982	11,723	12,113
Middle East	6,919	7,384	7,816	7,337	7,364	7,122	7,696	8,017	7,416	7,563	7,341	7,939	8,283	7,654	7,804	8,058
Latin America	6,053	6,256	6,469	6,382	6,290	6,253	6,444	6,670	6,543	6,478	6,440	6,648	6,880	6,741	6,677	6,855
FSU	4,219	4,357	4,576	4,573	4,431	4,446	4,471	4,653	4,612	4,545	4,528	4,571	4,744	4,709	4,638	4,745
Africa	3,342	3,313	3,196	3,336	3,297	3,416	3,372	3,379	3,413	3,395	3,507	3,502	3,507	3,539	3,514	3,652
Non-OECD Europe	660	682	709	721	693	679	731	728	724	716	680	732	727	724	716	719
TOTAL Demand	88,689	87,693	89,530	89,747	88,915	89,155	88,965	90,140	90,283	89,636	90,088	89,902	91,046	91,286	90,581	91,967
WTI crude oil price forecast (\$/bbl)	94.60	102.34	89.54	94.06	95.14	103.03	93.35	92.20	89.00	94.40	90.00	89.00	89.00	92.00	90.00	92.00
Brent crude oil price forecast (\$/bbl)	105.52	116.99	112.09	109.02	110.91	118.45	108.76	109.42	111.00	111.91	108.00	110.00	110.00	112.00	110.00	112.00

Source: EA, BofA Merrill Lynch Global Commodities Research estimates; Note OECD Europe now also includes Estonia and Slovenia, and OECD Asia Pacific includes Israel (in addition to Japan, S. Korea, Australia and New Zealand).

BofA Merrill Lynch Atlantic Basin petroleum products supply and demand balance

Table 5: US Refined Products Forecasts

US	1Q2011	2Q2011	3Q2011	4Q2011	2011	1Q2012	2Q2012	3Q2012E	4Q2012F	2012F	1Q2013F	2Q2013F	3Q2013F	4Q2013F	2013F
Distillate															
Consumption	4,048	3,866	3,909	4,057	3,970	3,907	3,794	3,847	3,923	3,868	3,958	3,746	3,794	3,966	3,866
Refinery output	4,273	4,402	4,725	4,877	4,569	4,416	4,500	4,621	4,632	4,542	4,568	4,653	4,696	4,741	4,665
Net imports	(504)	(676)	(805)	(949)	(733)	(763)	(943)	(603)	(739)	(762)	(781)	(801)	(735)	(815)	(783)
Transfers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stock (k bbl)	192,583	189,511	202,940	195,025	195,025	176,693	162,127	177,648	174,872	174,872	159,278	168,955	184,135	180,479	180,479
Stock change	(25,354)	(12,710)	965	(11,711)	(4,778)	(23,154)	(21,569)	15,521	(2,777)	8,934	(15,594)	9,677	15,180	(3,657)	(880)
Balancing item															
USGC No. 2 HO Cracks to Brent (\$/bbl)	13.05	11.18	13.39	16.10	13.43	14.18	12.69	16.66	18.50	15.50	19.00	12.50	14.00	19.00	16.13
Forward (23-Oct-2012)	13.05	11.18	13.39	16.10	13.43	14.18	12.69	16.66	18.07	15.40	18.20	19.12	19.69	20.68	19.43
Gasoline															
Consumption	8,663	8,954	8,970	8,692	8,820	8,551	9,012	8,889	8,790	8,810	8,527	8,869	8,885	8,626	8,727
Refinery output	8,800	9,158	9,222	9,099	9,070	8,649	8,977	9,139	9,071	8,959	8,711	9,059	9,198	9,082	9,013
Net imports	293	464	138	(12)	221	258	373	148	223	250	276	273	111	54	178
Transfers	(466)	(669)	(403)	(316)	(464)	(437)	(475)	(448)	(350)	(427)	(454)	(547)	(475)	(369)	(461)
Stock (k bbl)	217,599	217,597	217,436	225,734	225,734	221,360	210,293	205,744	219,746	219,746	220,180	212,518	207,964	220,828	220,828
Stock change	(3,371)	(99)	(1,085)	7,258	(989)	(7,378)	(12,485)	(4,549)	14,002	6,744	434	(7,662)	(4,554)	12,864	(1,138)
Balancing item															
US RBOB Cracks to Brent (\$/bbl)	8.14	12.19	7.84	0.79	7.24	10.96	13.41	11.29	4.00	9.92	5.00	12.50	7.50	1.00	6.50
Forward (23-Oct-2012)	8.14	12.19	7.84	0.79	7.24	10.96	13.41	11.29	4.16	9.96	7.26	11.46	6.80	2.02	6.88
Residual fuel															
Consumption	631	546	459	525	540	506	429	494	454	471	493	443	433	443	453
Refinery output	571	542	565	509	547	536	524	484	540	521	539	544	549	548	545
Net imports	40	11	(180)	(39)	(42)	(52)	(111)	(9)	(78)	(62)	(32)	(93)	(142)	(101)	(92)
Transfers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stock (k bbl)	38,445	38,604	35,414	34,894	34,894	36,985	37,637	35,898	36,646	36,646	37,963	38,738	36,277	36,575	36,575
Stock change	(1,798)	578	(6,707)	(5,002)	(8,242)	(2,013)	(1,467)	(1,739)	748	5,750	1,318	774	(2,461)	299	(449)
Balancing item															
USGC 1% Resid Cracks to Brent (\$/bbl)	(13.76)	(13.44)	(10.20)	(7.60)	(11.25)	(7.40)	(9.46)	(3.08)	(14.50)	(8.61)	(11.00)	(11.75)	(13.75)	(14.00)	(12.63)
Forward (23-Oct-2012)	(13.76)	(13.44)	(10.20)	(7.60)	(11.25)	(7.40)	(9.46)	(3.08)	(14.25)	(8.55)	(11.81)	(9.76)	(8.66)	(8.10)	(9.58)

Source: Reuters, Bloomberg, IEA, US DOE, BofA Merrill Lynch Global Commodity Research
Note: All data are quarterly averages, stocks are end-of-period. Flows in '000 bbl/day; Stocks in '000 bbl.

Table 6: OECD Europe Refined Products Forecasts

OECD Europe	1Q2011	2Q2011	3Q2011	4Q2011	2011	1Q2012	2Q2012	3Q2012E	4Q2012F	2012F	1Q2013F	2Q2013F	3Q2013F	4Q2013F	2013F
Distillate															
Consumption	6,134	5,833	6,278	6,292	6,134	5,967	5,910	6,036	6,307	6,055	6,059	5,773	5,943	6,236	6,003
Refinery output	5,431	5,261	5,515	5,509	5,429	5,389	5,285	5,536	5,419	5,407	5,401	5,319	5,480	5,432	5,408
Net imports	795	581	710	899	746	685	378	696	934	673	775	469	582	913	685
Transfers	(42)	(47)	(62)	(100)	(63)	(57)	(73)	(53)	(57)	(60)	(61)	(64)	(66)	(66)	(64)
Stock (k bbl)	283,327	270,707	259,764	271,705	271,705	274,661	248,791	261,755	260,755	260,755	265,793	261,329	266,102	269,971	269,971
Stock change	4,569	(3,523)	(10,358)	1,406	4,280	4,549	(29,105)	12,964	(1,000)	(2,406)	5,038	(4,465)	4,773	3,869	4,869
Balancing item															
NWE 0.2% Gasoil Cracks (\$/bbl)	13.59	12.80	14.15	16.35	14.22	14.91	14.85	17.33	18.50	16.40	19.00	13.50	14.50	19.00	16.50
Forward (23-Oct-12)	13.59	12.80	14.15	16.35	14.22	14.91	14.85	17.33	17.26	16.09	17.34	17.28	17.87	18.43	17.73
Gasoline															
Consumption	2,020	2,179	2,205	2,052	2,114	1,907	2,031	2,098	1,978	2,003	1,870	2,028	2,056	1,932	1,971
Refinery output	2,847	2,817	2,938	2,913	2,879	2,771	2,779	2,908	2,820	2,820	2,779	2,813	2,926	2,828	2,837
Net imports	(827)	(812)	(849)	(896)	(846)	(965)	(979)	(950)	(893)	(947)	(1,018)	(1,000)	(1,030)	(967)	(1,004)
Transfers	109	106	99	136	112	131	210	133	131	151	132	135	138	143	137
Stock (k bbl)	100,655	92,669	89,274	95,364	95,364	94,025	88,664	88,031	95,420	95,420	97,562	90,342	88,437	95,053	95,053
Stock change	9,984	(6,185)	(1,513)	9,108	1,522	2,678	(1,868)	(633)	7,388	(1,720)	2,142	(7,220)	(1,905)	6,616	(773)
Balancing item															
NWE Prem. Gasoline Cracks (\$/bbl)	1.60	7.65	7.55	0.41	4.30	5.46	12.75	14.18	5.00	9.35	3.00	10.00	8.00	1.00	5.50
Forward (23-Oct-12)	1.60	7.65	7.55	0.41	4.30	5.46	12.75	14.18	5.29	9.42	4.50	9.00	6.90	2.10	5.63
Residual fuel															
Consumption	1,305	1,245	1,271	1,218	1,260	1,208	1,103	1,141	1,160	1,153	1,156	1,039	1,048	1,069	1,078
Refinery output	1,548	1,453	1,431	1,374	1,451	1,427	1,399	1,409	1,427	1,416	1,414	1,397	1,423	1,437	1,418
Net imports	(117)	(75)	(49)	(72)	(78)	(70)	(203)	(140)	(135)	(137)	(124)	(217)	(270)	(243)	(214)
Transfers	(130)	(157)	(125)	(102)	(128)	(158)	(91)	(124)	(120)	(123)	(126)	(125)	(121)	(121)	(123)
Stock (k bbl)	90,103	87,204	87,223	83,675	83,675	82,327	81,828	82,217	83,295	83,295	84,122	85,514	83,965	84,257	84,257
Stock change	(427)	(2,154)	(1,252)	(1,646)	10,001	(863)	210	389	1,078	2,724	827	1,392	(1,549)	292	(786)
Balancing item															
NWE 1% Residual Cracks (\$/bbl)	(15.92)	(13.56)	(10.82)	(8.73)	(12.26)	(7.34)	(5.61)	(5.49)	(16.00)	(8.61)	(13.00)	(12.00)	(12.00)	(9.00)	(11.50)
Forward (23-Oct-12)	(15.92)	(13.56)	(10.82)	(8.73)	(12.26)	(7.34)	(5.61)	(5.49)	(15.67)	(8.53)	(12.50)	(10.57)	(9.31)	(8.70)	(10.27)

Source: Reuters, Bloomberg, IEA, US DOE, BofA Merrill Lynch Global Commodity Research

Note: All data are quarterly averages, stocks are end-of-period. Flows in '000 bbl/day; Stocks in '000 bbl.

BofA Merrill Lynch US natural gas supply and demand balance

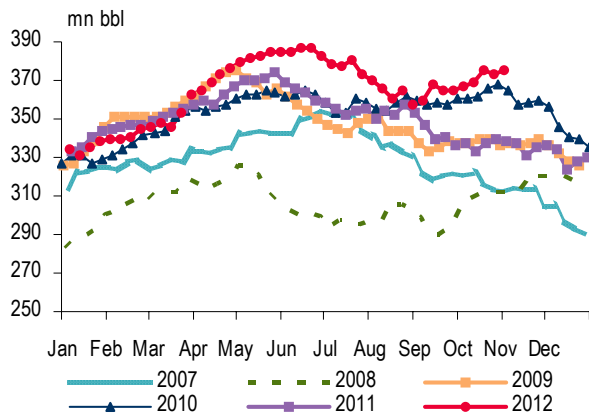
Table 7: US natural gas supply and demand balance

bcf/d	1Q10	2Q10	3Q10	4Q10	2010	1Q11	2Q11	3Q11	4Q11	2011	1Q12	2Q12	3Q12E	4Q12F	2012F	1Q13F	2Q13F	3Q13F	4Q13F	2013F
Total supply	64.88	64.02	65.52	65.34	64.94	66.16	66.01	66.55	68.43	66.79	68.49	68.48	69.07	69.61	68.91	69.26	68.85	69.11	69.17	69.10
dry production	56.58	57.13	58.30	59.21	57.80	59.63	61.22	61.41	63.52	61.45	63.94	64.31	64.42	64.97	64.41	64.84	64.55	64.52	64.58	64.63
total imports	11.42	9.65	9.94	9.99	10.25	11.03	8.95	8.96	8.94	9.47	8.97	8.36	8.83	8.72	8.72	8.87	8.51	8.80	8.69	8.72
pipeline imports	9.87	8.44	9.00	8.96	9.07	9.81	7.90	8.19	8.17	8.52	8.36	8.01	8.26	8.17	8.20	8.36	8.01	8.26	8.17	8.20
LNG imports	1.55	1.22	0.94	1.03	1.18	1.23	1.05	0.77	0.78	0.96	0.61	0.35	0.56	0.55	0.52	0.51	0.51	0.54	0.52	0.52
total exports	3.13	2.76	2.71	3.86	3.12	4.51	4.15	3.82	4.04	4.13	4.42	4.19	4.18	4.08	4.22	4.45	4.22	4.21	4.11	4.25
net imports	8.29	6.89	7.23	6.13	7.14	6.53	4.79	5.14	4.90	5.34	4.55	4.17	4.64	4.64	4.50	4.42	4.30	4.59	4.59	4.47
Total demand	81.84	53.59	57.12	68.05	65.15	83.72	56.14	58.34	67.92	66.53	80.45	61.85	63.35	72.46	69.53	83.57	59.63	61.74	70.97	68.98
plant	3.48	3.44	3.51	3.63	3.51	3.65	3.78	3.80	3.93	3.79	3.94	3.94	3.93	4.01	3.96	4.02	4.02	4.00	4.07	4.03
pipe	2.33	1.49	1.60	1.92	1.84	2.36	1.58	1.64	1.91	1.87	2.27	1.74	1.74	1.94	1.92	2.30	1.77	1.76	1.97	1.95
delivered	76.03	48.65	52.02	62.50	59.80	77.71	50.79	52.90	62.07	60.87	74.24	56.16	57.68	66.51	63.65	77.25	53.84	55.98	64.93	63.00
residential	25.75	7.10	3.65	16.25	13.19	26.17	7.59	3.74	14.61	13.03	20.70	6.30	3.79	16.02	11.70	23.30	6.26	3.70	15.83	12.27
commercial	14.24	5.57	4.13	10.20	8.53	14.77	5.89	4.42	9.73	8.70	12.13	5.43	4.51	10.60	8.17	13.39	5.51	4.52	10.84	8.56
industrial	19.55	16.89	16.70	18.33	17.87	20.03	17.59	17.15	18.92	18.42	19.72	17.82	17.66	19.35	18.64	19.94	17.85	17.85	19.80	18.86
electricity	16.49	19.10	27.53	17.72	20.21	16.74	19.72	27.60	18.81	20.72	21.70	26.61	31.72	20.54	25.14	20.62	24.22	29.92	18.46	23.30
vehicle	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10
Stocks (bcf), end of period	1,652	2,740	3,508	3,111	3,111	1,581	2,530	3,416	3,462	3,462	2,477	3,118	3,673	3,363	2,530	2,078	2,911	3,578	3,402	3,118
Nat gas Forecast											2.51	2.35	2.90	3.60	2.84	3.60	3.40	3.70	4.30	3.75
Forward price 27-Nov											2.51	2.35	2.90	3.72	2.87	3.88	3.93	4.00	4.28	4.02

Source: EIA, BofA Merrill Lynch Global Commodities Research estimates

Petroleum - US

Chart 126: US crude oil stocks



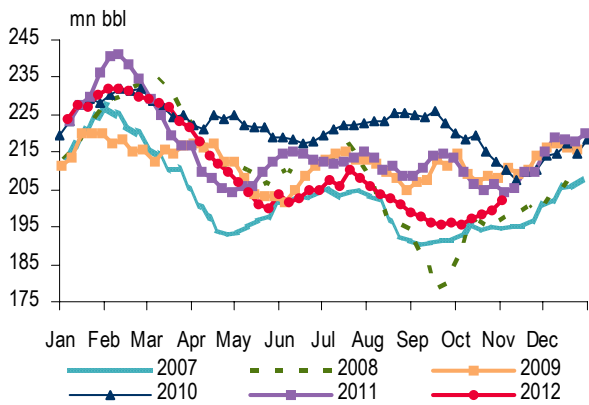
Source: US Department of Energy

Chart 127: WTI crude oil price



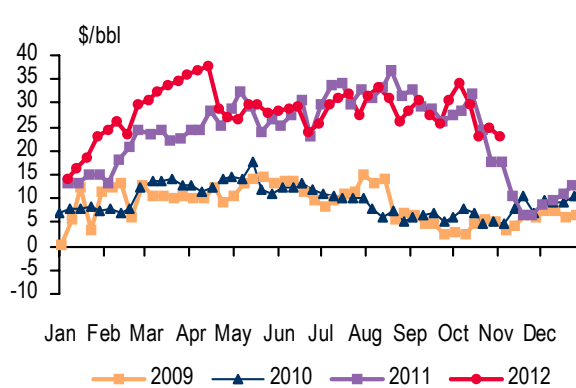
Source: NYMEX, Bloomberg

Chart 128: US gasoline stocks



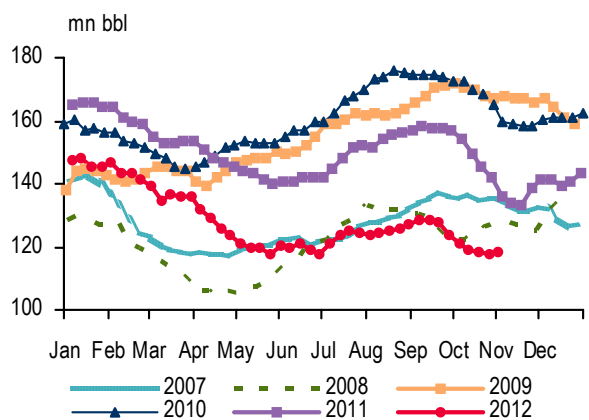
Source: US Department of Energy

Chart 129: US RBOB cracks



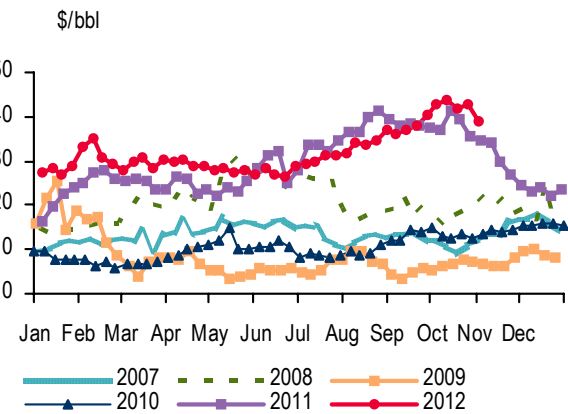
Source: NYMEX, Reuters

Chart 130: US distillate oil stocks



Source: US Department of Energy

Chart 131: US distillate oil cracks



Source: NYMEX, Reuters

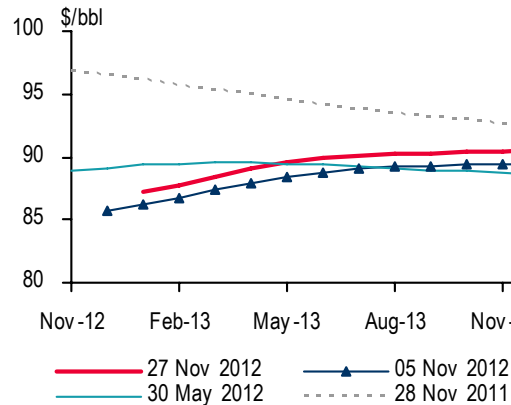
Petroleum - US & Europe

Chart 132: WTI implied volatility



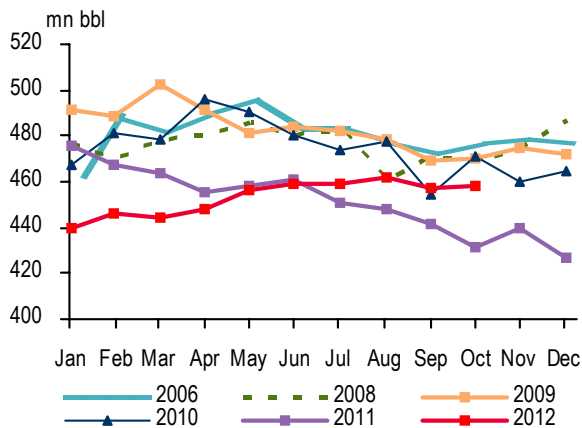
Source: NYMEX, Bloomberg

Chart 133: WTI Term Structure



Source: NYMEX, Reuters

Chart 134: European crude oil stocks



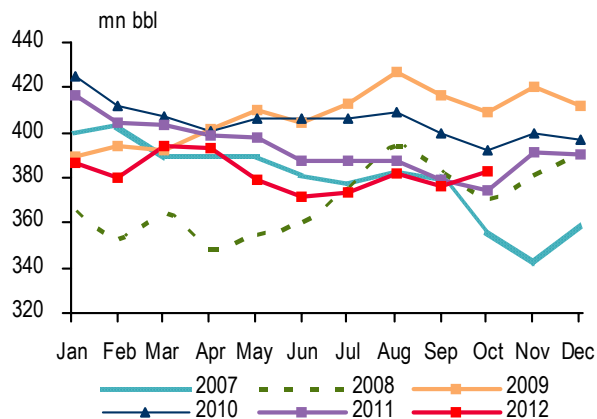
Source: Euroil

Chart 135: Brent - WTI crude spread



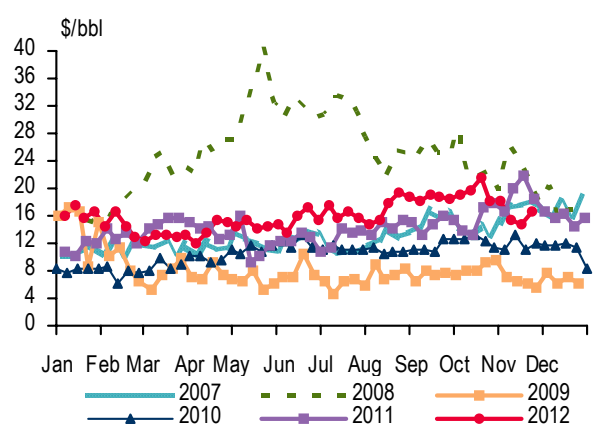
Source: IPE, Bloomberg

Chart 136: European distillate stocks



Source: Euroil

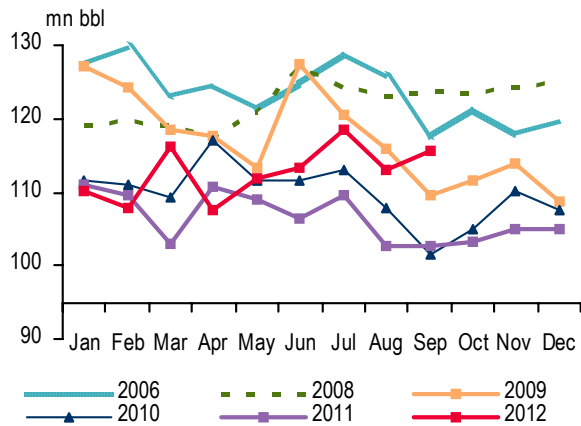
Chart 137: ICE gasoil cracks



Source: Reuters

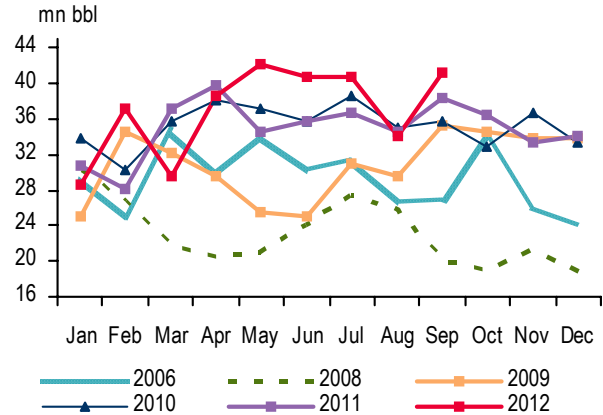
Petroleum - Asia

Chart 138: Japanese crude oil stocks



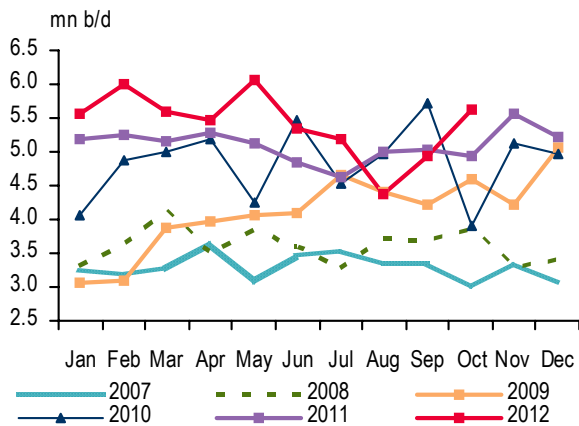
Source: International Energy Agency

Chart 139: South Korean crude oil stocks



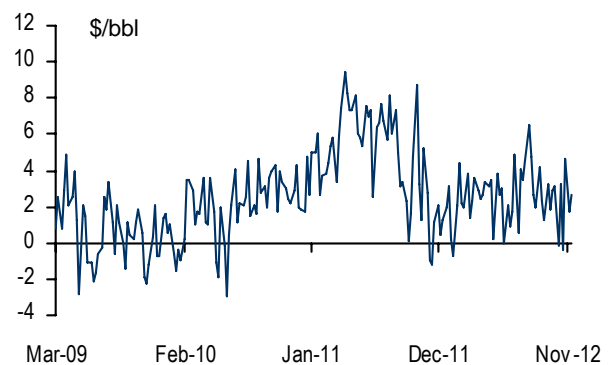
Source: International Energy Agency

Chart 140: China crude oil imports



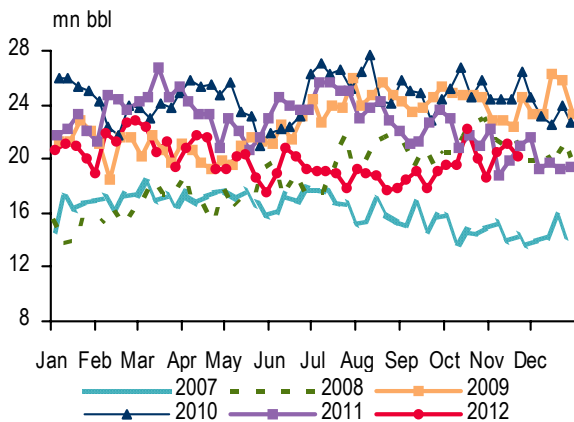
Source: Reuters

Chart 141: Brent - Dubai crude oil spread (1-month contract)



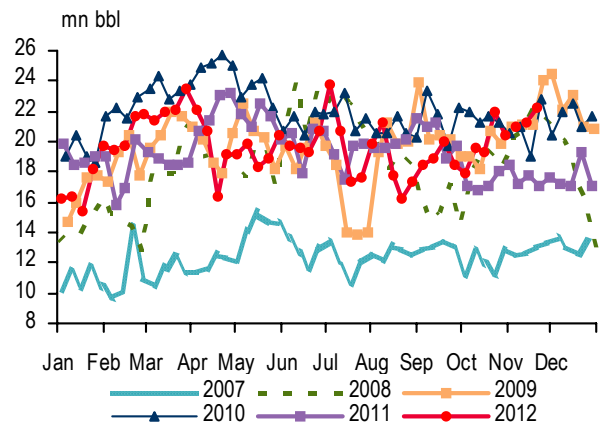
Source: Reuters

Chart 142: Singapore light & mid distillate stocks



Source: Reuters

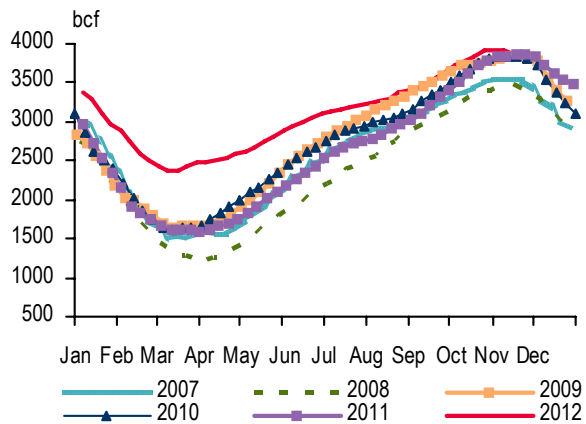
Chart 143: Singapore residual stocks



Source: Reuters

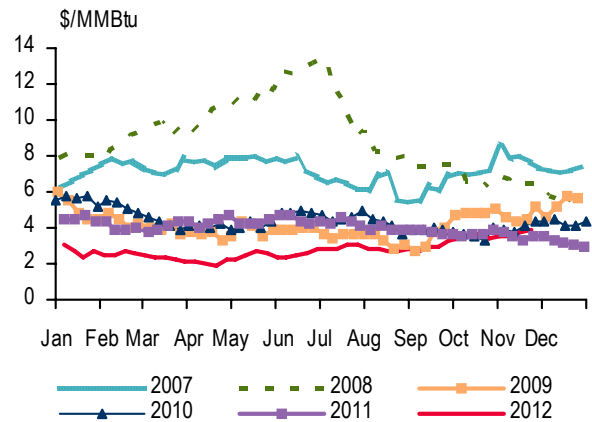
Gas & Power - US

Chart 144: US natural gas stocks



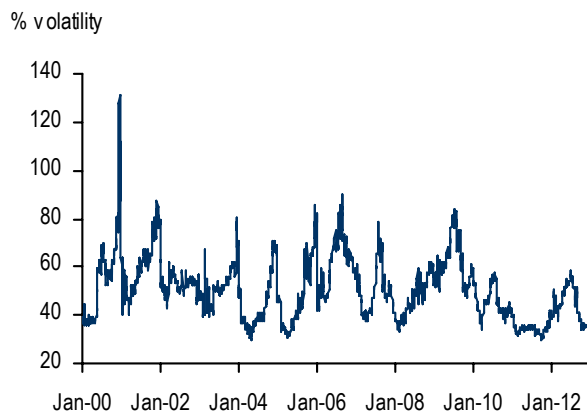
Source: US Department of Energy

Chart 145: US natural gas price



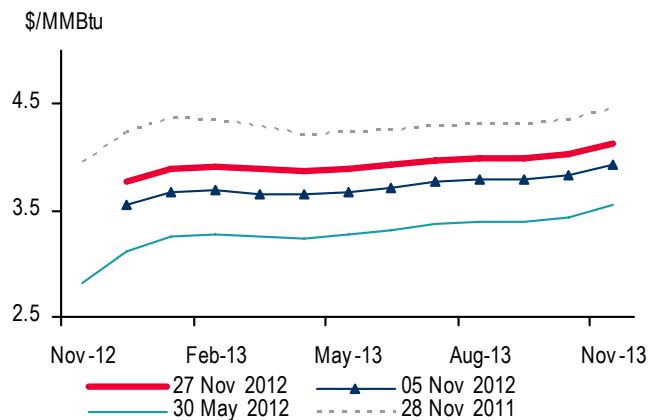
Source: NYMEX, Reuters

Chart 146: US natural gas implied volatility



Source: NYMEX, Bloomberg

Chart 147: US natural gas term structure



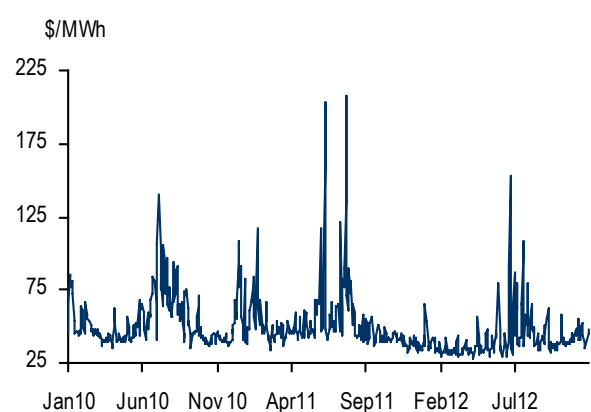
Source: NYMEX, Reuters

Chart 148: US NYMEX forward coal prices



Source: NYMEX, Reuters

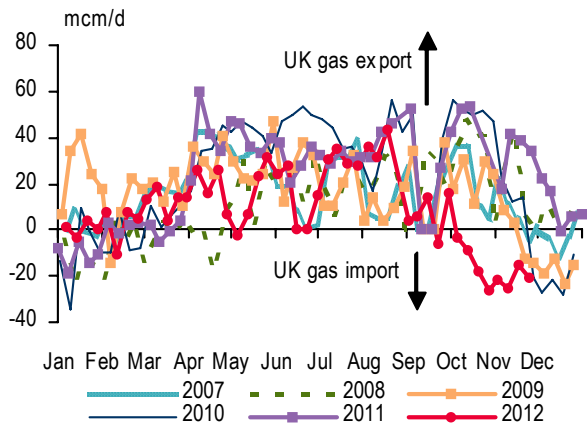
Chart 149: US spot PJM power prices



Source: NYMEX, Reuters

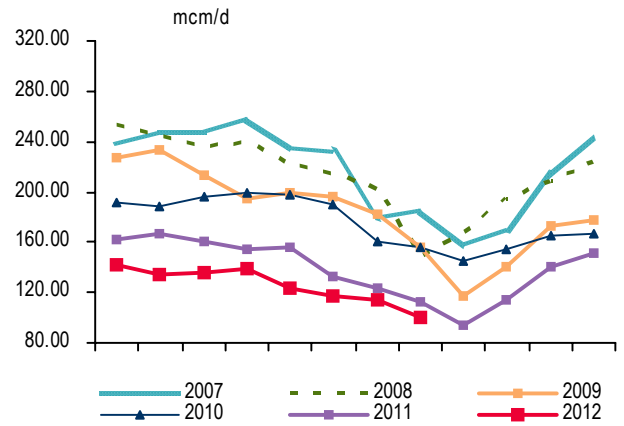
Gas & Power - Europe

Chart 150: UK Interconnector gas flows



Source: UK Interconnector Flows

Chart 151: UK gross gas production



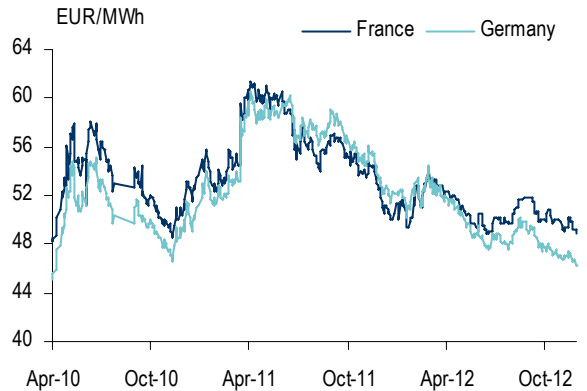
Source: UK Department of Trade and Industry

Chart 152: UK National Balancing Point (NBP) day ahead



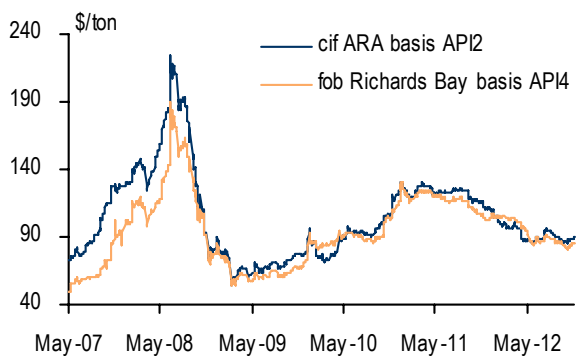
Source: Bloomberg

Chart 153: Germany and France Baseload



Source: Bloomberg

Chart 154: Forward thermal coal assessments, front-month



Source: Reuters

Chart 155: European CO₂ Emissions Price



Source: Reuters

Link to Definitions

Macro

Click [here](#) for definitions of commonly used terms.

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