COMMERZBANK

Commodity Spotlight Energy

23 January 2014

How the US supply of LNG will change the gas market in future

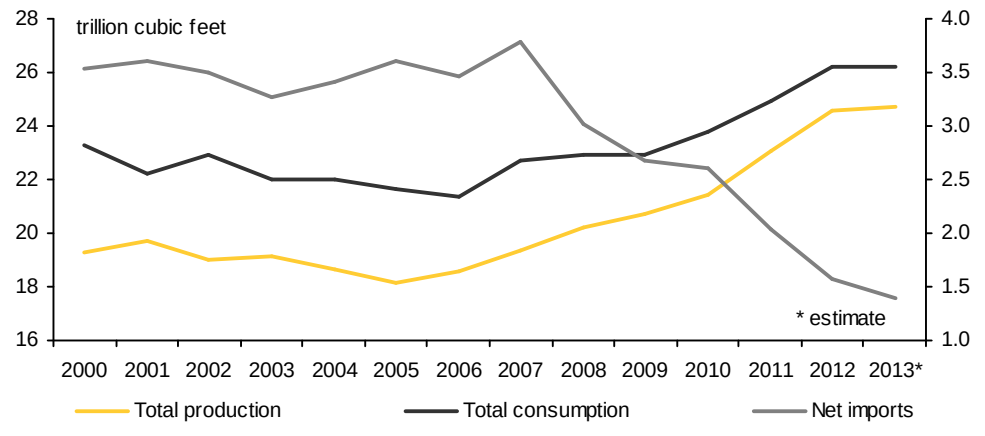
In future, the US intends to supply liquefied natural gas (LNG) to gas markets overseas. Even though the additional US supply is small by comparison with the volumes supplied by Australia (the second emerging major player on the LNG market), it might dampen international prices in the long term because it is not linked to oil prices and is more flexible. Since the US will additionally be stepping up its gas exports by pipeline, the Henry Hub price is likely to rise slightly. Thanks to the high availability of gas, however, the knock-on effect should be limited. What is more, the high conversion and transport costs of LNG are likely to preclude any levelling out of international prices.

Until the middle of the last decade, experts at the US Energy Information Administration (EIA) had still been expecting US gas import demand to continue growing for years. Fearing that the Canadian gas supply would decline at the same time, considerable investments were made in new import capacities: a total of five new regasification trains for importing liquefied natural gas (LNG) were created, the last of which was only completed at the end of the decade. As we all know, however, the shale gas boom has led to a trend reversal on the US gas market, causing imports of US gas to shrink (Chart 1). In its latest outlook for the American energy market, the EIA now envisages that the US may well be exporting LNG on balance from the year 2016. In this Commodity Spotlight we will be taking a look at what this reversal of the trend means for the global markets and which knock-on effects it is likely to have on the US market.

Following years of boom, growth in shale gas production has faltered, though lower availability is by no means to blame; on the contrary, the EIA had upwardly revised its estimates of proved gas reserves by almost a further 10% in the autumn. Raising its estimate by more than 30 trillion cubic feet, this was the second-highest increase – after the previous year – since 1977. At just shy of 350 trillion cubic feet, US proved reserves today are estimated to be 80% higher than ten years ago (Chart 2, page 2). Instead, the main reason for the stagnating production is more likely to be the saturation of the US market, as a result of which prices on the market had come under serious pressure. It is thus hardly surprising that American producers are keen to tap into new markets abroad. However, because the growth potential of foreign markets linked via pipeline (Canada and Mexico) is limited, producers hope that liquefying natural gas will allow them to exploit new markets overseas.

LNG was already established as a new transport technology fifty years ago.

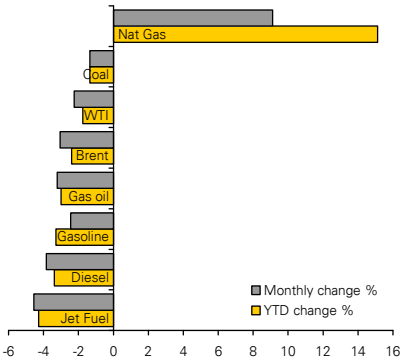
CHART 1: **US gas market: Production progress causes import demand to shrink**



Source: EIA (AEO 2013 resp. AEO 2014 Early Release), Commerzbank Corporates & Markets

Commerzbank Forecasts

	Q1 14	Q2 14	Q3 14
Brent Blend	108	105	105
WTI	97	99	100
Diesel	960	920	910
Gasoline (95)	940	950	970
Jet fuel	1000	970	960
Natural gas	4.0	3.5	4.0
Coal (API #2)	85	85	90
EUA (€ per t)	5.0	5.5	6.0



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Approving a liquefaction terminal is a lengthy process
The fact that only one liquefaction terminal has so far been granted full approval is partly due to the lengthy processes involved. In principle, there are two key hurdles that need to be overcome:
1) Approval of the export of LNG by the US Department of Energy; this decision hinges on how important the raw material is in terms of foreign trade and involves a straightforward approval process for countries with which the US has a free trade agreement (FTA) because this means that there is a "public interest" in the export being approved. South Korea is the only country that has an FTA with the US and imports larger quantities of LNG. Greater potential demand is however seen in countries that do not have a free trade agreement with the US. Although export licences can be withdrawn in principle, the likelihood of this actually happening is fairly small.
2) Permission to build a liquefaction plant, granted by the "Federal Energy Regulatory Commission" (FERC). The focus here is on the design of the plant and its environmental impact. This part of the process is complicated, expensive and time-consuming.

Strongly rising LNG trade

In recent years in particular, however, this sales channel has become considerably more important. Last year, LNG trade accounted for 32% of global gas trade. A good 70% of global LNG trade was attributable to Asia, with Japan and South Korea accounting for three quarters of imports. That said, the US has also already left a significant footprint on this market: besides the small LNG exports which flowed in the past from Alaska to Japan but have declined significantly recently due to the exhaustion of the reservoirs, the US had consolidated its position above all on the demand side: with a capacity of around 140 mmpta[1], the United States has the second-largest regasification capacities after Japan, though their utilization last year was virtually zero on account of the decline in import demand.

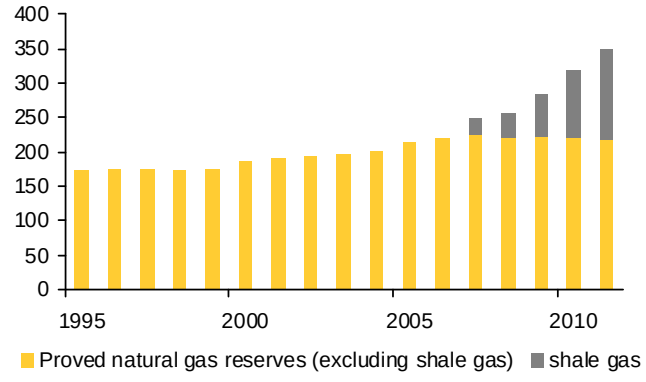
Many applications for LNG liquefaction plants in the US

Now, however, the US is keen to enter the global LNG market on the supply side. In the autumn, a good 30 applications to have liquefaction plants approved had been filed in the US – in some cases for existing regasification plants and in some cases as greenfield projects. According to the IEA, total capacities would then exceed 250 million cubic metres per year or around 33 billion cubic feet per day, which would correspond to half of current US production. There is evidently great interest in profiting from the extremely high price gap that currently exists between the generally oil price-indexed LNG prices and the lower Henry Hub prices. That said, probably only a small part of the planned capacities will actually be realized.

Only one full approval so far

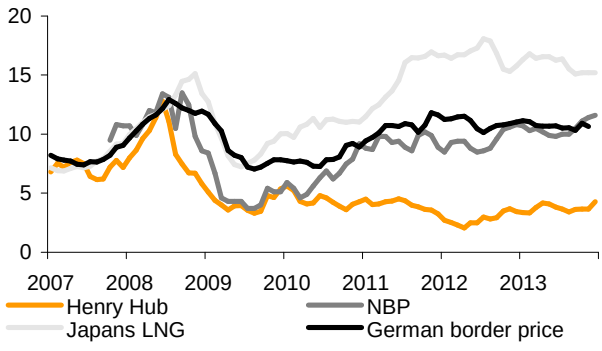
Most of the plants are planned at the Gulf of Mexico. The pilot project, the Sabine Pass LNG Terminal, is situated on the border between Louisiana and Texas on the Sabine river. The LNG terminal is already equipped with regasification systems and the corresponding infrastructure, for example a port with berths for two LNG tankers. In total, up to six liquefaction trains are already planned, with full approval having already been granted for four trains (see box). According to the annual LNG market report of the International Gas Union, many companies were hesitant to conclude fixed contracts with the operator Cherniere because Cherniere has little experience so far in this project field. Once an initial contract had been agreed with British Gas, however, other interested parties followed. According to Cheniere's timetable, the first liquefaction channel should go into operation in the fourth quarter of 2015.

CHART 2: **Considerably more gas reserves in US than previously thought thanks to shale gas**
Trillion cubic feet, proven reserves



Source: EIA, Commerzbank Corporates & Markets

CHART 3: **Marked spreading of international gas prices**
USD per mmBtu



Source: Bloomberg, BAFA, Commerzbank Corporates & Markets

[1] Natural gas tends to be measured by volume, where one cubic metre equates to 35.3 cubic feet. LNG, on the other hand, is measured in million tons per year (abbreviated as (m)mpta), where one million tons of LNG corresponds to roughly 1.38 billion cubic metres or almost 48 billion cubic feet of natural gas (source: EIA)

High costs of LNG transport logistics chain prevent a levelling out of prices

The stage has thus been set for the export of LNG, but what impact will US exports have on international prices, which are currently further apart than they have almost ever been (Chart 3, page 2)? The first part of this question is easy to answer: we will not be seeing any levelling out of prices (for the time being), for it is only worth US producers exporting LNG if the still high costs of transport logistics – i.e. liquefaction, transport and regasification – are covered. Admittedly, the US benefits from being able to use vacant regasification plants, which is up to 40% cheaper than building new plants. Nonetheless, according to consultant firm NERA the costs of liquefaction per unit sold – 9% of production is burned during the process itself – amount to a good $2.1 per mmBtu even in the US, as compared with costs of $2.80 in the Middle East and $4.2 in Oceania. In addition, there are the costs of shipping, which vary between $1.50 per mmBtu from the Gulf Coast to Europe and $2.80 per mmBtu to India /China. The third cost component involves the costs of regasification, which start at around $0.8 per mmBtu. In the best case scenario, in other words, costs would total a good $4 per mmBtu; in its latest World Energy Outlook 2013 the International Energy Agency IEA estimates that the costs of conversion and transporting LNG from the US to Europe in the year 2020 will be at least $4.3 per mmBtu and at least $5.3 to Japan (both prices quoted in 2012 US dollars).

High demand for new supply

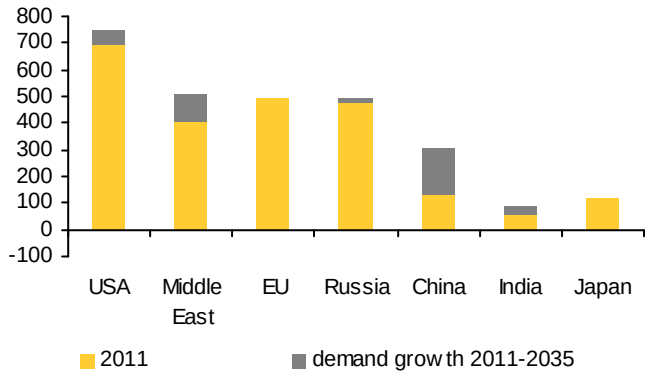
Complete levelling out of international gas prices, in other words, is not going to happen. But to what extent will prices converge at all? Looking solely at the demand side, one would initially presume that the high price gap may well remain in place. After all, especially since gas is one of the clean energy sources, most experts assume that demand will grow significantly, particularly in emerging economies. In China, for example, the IEA envisages gas demand doubling by 2020 (Chart 4). Even if domestic gas production there is hugely stepped up in the form of shale gas production and the existing pipeline network is simultaneously expanded, with an additional pipeline to be built from Burma, China will be increasingly reliant on LNG imports. At the same time, however, gas is also in increasing demand in the Middle East. This trend is expected to continue, meaning that the Middle East will probably be consuming more gas than even the European Union by the year 2025.

US: a small supplier at first but with a new pricing structure

The demand outlook is rosy, in other words, but will US exports change the supply side? If we look only at the (approved) volumes that the US will be placing on the market in the next five years, the answer is probably no: the four LNG trains of the Sabine Pass Terminal will account for less than 5% of global supply in 2017 (Chart 5). Until then, capacities are likewise being massively expanded, above all in Australia, and will exceed US capacities more than three-fold. Indeed, by 2020 it is likely that Australia will catch up with Qatar, to date the biggest LNG supplier with a current share of the global market in excess of 25%.

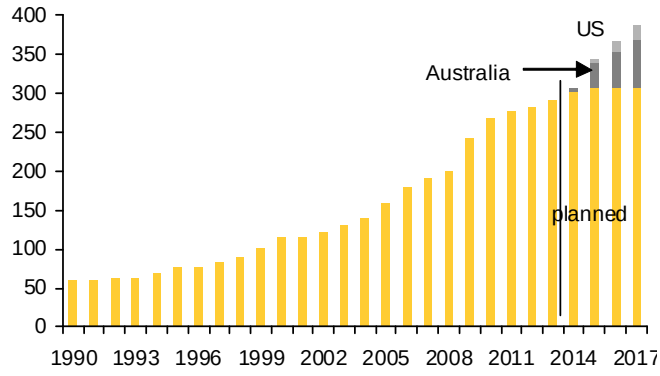
All the same, the US supply will shake things up on the market, for US LNG prices – unlike LNG prices elsewhere – are not linked to oil prices. Instead, contracts concluded to date have been based on the sale price of Henry Hub plus a “transport surcharge”.

CHART 4: **Sharp growth in demand, above all in China**
Billion cubic metres



Source: WEO 2013, Commerzbank Corporates & Markets

CHART 5: **US: Only small player on LNG market at first**
LNG liquefaction capacities in mmpta



Source: EIA, Commerzbank Corporates & Markets

How have LNG prices in Asia been determined up until now?
In Asia, LNG prices are generally linked to the oil price. As a rule, the reference price is the average Japanese import price, known as the Japanese Crude Cocktail. Price negotiations, however, are on the certain percentage (the "slope") the LNG price is derived from the oil price. Basically, one mmBtu of gas contains roughly 16% of the energy units contained in a barrel crude oil. In practice, the slope tends to be between 14 and 15%, sometimes also depending on the oil price level. In addition, contracts often contain a constant.

This breaks up the existing price structure on the LNG market, which could well drive down the price, as Chart 6 with its stylized supply-demand curves shows.

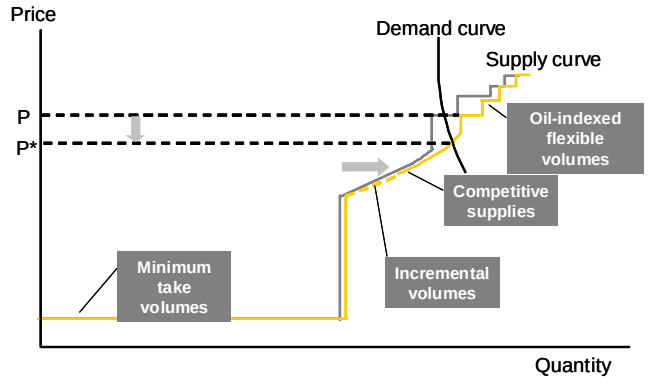
Moderate knock-on effect on the US gas price likely

Just how pronounced the price impact is will also depend without doubt on how significant the knock-on effects on the American gas price are. At the outset we had already pointed out that production prospects are basically comfortable given the ample availability. Nonetheless, increased sales potential or higher demand could result in rising prices, especially since pipeline imports from Canada are continuing to decline at the same time and pipeline exports – above all to Mexico – will be increased (Chart 7). On behalf of the US Department of Energy, US consultant firm NERA has attempted to quantify the price effects. When LNG exports begin, a maximum price effect of $0.33 per mmBtu is envisaged, though this effect will increase as LNG exports are stepped up. After five years, a maximum price rise of $1.1 per mmBtu is expected, assuming that international demand grows sufficiently fast and the rest of the world provides only limited additional supply in the meantime. The study emphasizes once again that the price effect is limited by the fact that a sufficiently large price gap is necessary to cover the costs of conversion and transport. If prices were to rise above this level, Asian buyers would no longer purchase US gas.

Low price of US gas (by international standard) is a prerequisite for US LNG exports

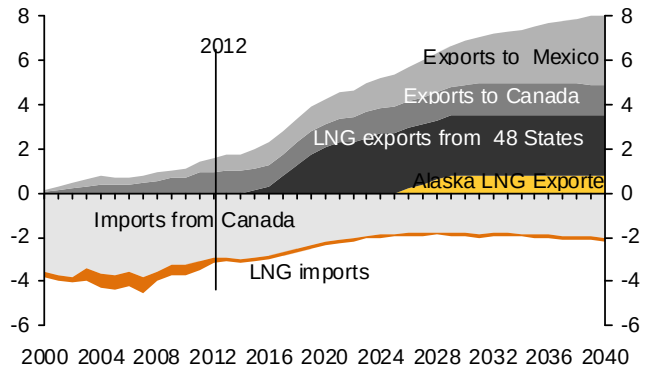
In short, the (by international standards) low price of US gas is a prerequisite for US LNG exports. However, a low US gas price level is not completely independent of the high oil price level. After all, drilling recently has taken place above all at sites where not only gas but also the so-called NGLs (natural gas liquids) are to be found. High profits of NGLs implicitly reduce the costs of gas production.

CHART 6: **Higher "competitive" supply should dampen price**
Stylized supply / demand curve for the gas market



Source: Deloitte Center for Energy Solutions,, Commerzbank Corporates & Markets

CHART 7: **New sales potential for US gas not only via LNG**
Trillion cubic feet



Source: EIA (AEO2014 Early Release) Commerzbank Corporates & Markets

At a glance

TABLE 1: **Our Forecasts**

		Forecasts								Yearly Average		
	22-Jan	1Q14	2Q14	3Q14	4Q14	1Q15	2Q15	3Q15	4Q15	2013	2014	2015
Brent Blend ($/bbl)	108.3	108	105	105	107	107	109	111	113	109	106	110
WTI ($/bbl)	96.7	97	99	100	102	102	106	108	108	98	100	106
Diesel ($/t)	926	960	920	910	960	970	960	970	1010	939	940	980
Gasoline (95 ARA) ($/t)	940	940	950	970	940	940	980	1020	980	987	950	980
Jet Fuel ($/t)	980	1000	970	960	1000	1010	1010	1020	1050	987	980	1020
Natural Gas HH ($/mmBtu)	4.69	4.0	3.5	4.0	4.5	4.0	4.0	4.5	5.0	3.7	4.0	4.5
Coal (API #2) ($/t)	81.8	85	85	90	90	90	95	95	100	82	88	95
EUA (€ /ton)	5.2	5.0	5.5	6.0	6.5	6.5	6.5	7.0	7.0	4.5	6.0	6.8

Source: Commerzbank Corporates & Markets, Bloomberg

TABLE 2: **Inventories and imports**

		Net change			% change		Comment
		1 month	1 year	vs. 5 -year-Ø	year	vs. 5 -year-Ø	
US inventories (mm barrels)							
Crude oil	350.2	-25.0	-10.1	9.4	-2.8	2.8	Tighter US-oil stocks: after sharp depletion US crude oil inventories now only slightly higher than usual, still extraordinary low US distillate stocks
of which: Cushing	40.9	-0.4	-11.0	4.0	-21.2	10.9	
Gasoline	233.1	14.0	-1.9	5.2	-0.8	2.3	
Distillates	124.0	5.9	-8.5	-25.2	-6.4	-16.9	
Natural gas (bn cubic feet))	2530	-1003	-638	-176	-20.1	-14.9	
ARA inventories ('000 tons)							
Gas oil	1953	237	-180	-526	-8.4	-21.2	Gasoil stocks in Western Europe well below the seasonal usual level
Gasoline	841	222	87	35	11.5	4.4	
Imports and production (mm bpd)							
US imports	6.9	0.0	-1.1	-1.8	-14.2	-20.9	US oil production exceeds US oil imports, Chinese imports increase to new record high
US production	8.2	0.1	1.1	2.5	15.9	43.2	
Imports China	6.3	0.6	0.7	1.5	13.1	31.2	
Refinery activity (mm bpd)							
Processing USA	15.7	-0.4	0.6	1.7	4.2	11.7	US crude oil processing extraordinary high
Processing China	9.9	0.1	-0.3	1.3	-2.6	14.9	

Source: Commerzbank Corporates & Markets, Bloomberg, US Energy Information Administration

TABLE 3: **Historic prices of energy commodities**

Energy	Latest	% change				1Q12	2Q12	3Q12	4Q12	1Q13	2Q13	3Q13	4Q13
		1 Week	1 Month	ytd	year ago								
Brent Blend ($/bbl)	108.3	1.0	-3.0	-2.4	-4.1	118	109	109	110	113	103	110	109
WTI ($/bbl)	96.7	2.7	-2.2	-1.8	1.5	103	93	92	88	94	94	106	96
Diesel ($/t)	926	0.4	-3.8	-3.4	-5.4	1010	943	979	984	974	889	949	944
Gasoline (95 ARA) ($/t)	940	0.4	-2.4	-3.3	-6.0	1053	1034	1061	983	1029	963	1010	946
Jet Fuel ($/t)	980	0.2	-4.6	-4.3	-7.1	1062	995	1027	1025	1038	931	992	989
Natural Gas HH ($/mmBtu)	4.69	12.6	9.1	15.1	37.0	2.5	2.3	2.9	3.5	3.5	4.0	3.6	3.7
Coal (API #2) ($/t)	81.8	-4.5	-1.3	-1.3	-7.2	101	91	91	89	86	80	77	84
EUA (€/t)	5.2	-0.6	4.9	3.4	10.1	7.9	7.0	7.7	7.6	4.8	3.9	4.6	4.7

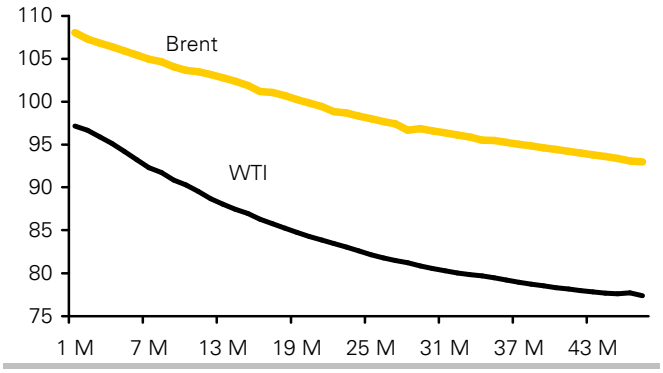
Source: Commerzbank Corporates & Markets, Bloomberg

TABLE 4: **Upcoming events**

23. / 29. Jan / 5. Feb	USA	US EIA oil inventory data
23. / 30. Jan / 6. Feb.	USA	US EIA gas inventory data
11. Feb / 11. March	INT	EIA Short term energy outlook
12. Feb / 12. March	USA	OPEC oil market report
13. Feb / 14. March	INT	IEA oil market report
11 June 2014	INT	OPEC meeting in Vienna, Austria

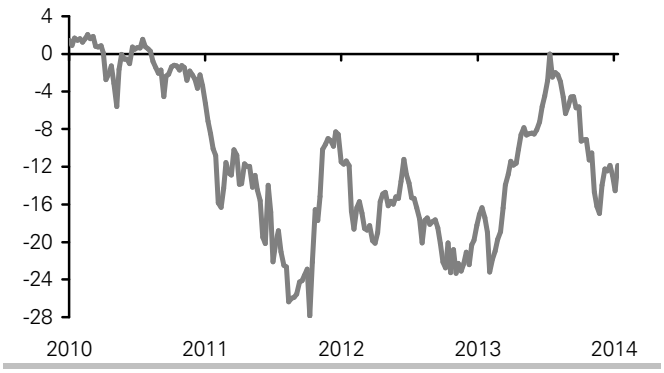
Source: EIA, IEA, OPEC, Bloomberg, Commerzbank Corporates & Markets, Bloomberg

CHART 8: **Crude Oil - Forward Curves in US$ per barrel**



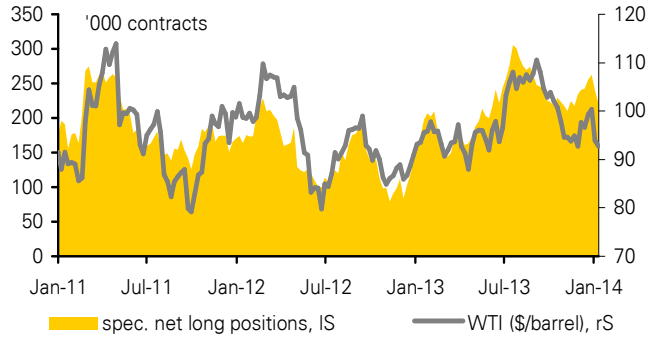
Source: Bloomberg, Commerzbank Corporates & Markets

CHART 9: **Price spread WTI and Brent Blend in US$/bbl**



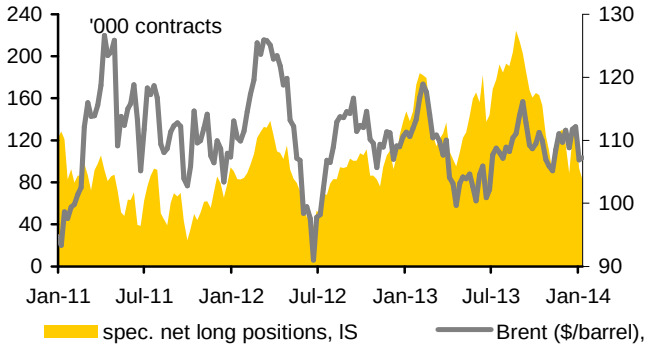
Source: Commerzbank Corporates & Markets

CHART 10: **WTI: managed money net-long positions**



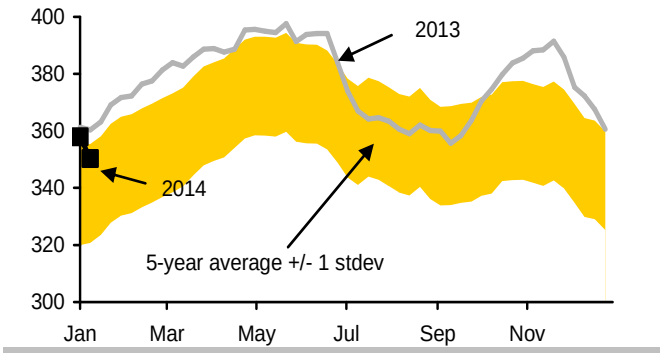
Source: CFTC, Bloomberg, Commerzbank Corporates & Markets

CHART 11: **Brent: managed money net-long positions**



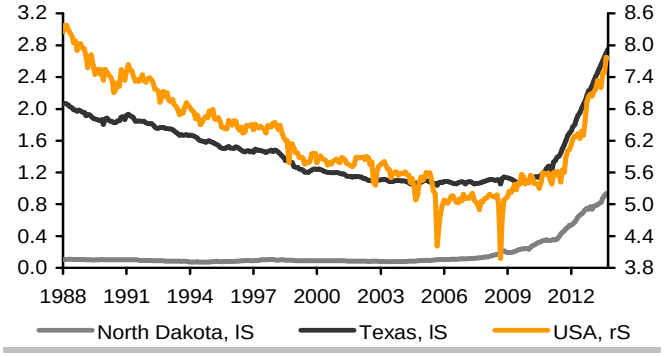
Source: ICE, Bloomberg, Commerzbank Corporates & Markets

CHART 12: **Crude oil: US inventories in mm barrel**



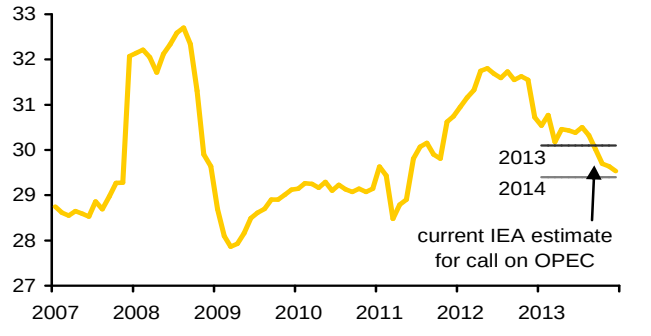
Source: EIA, Bloomberg, Commerzbank Corporates & Markets

CHART 13: **US oil production in mm bpd**



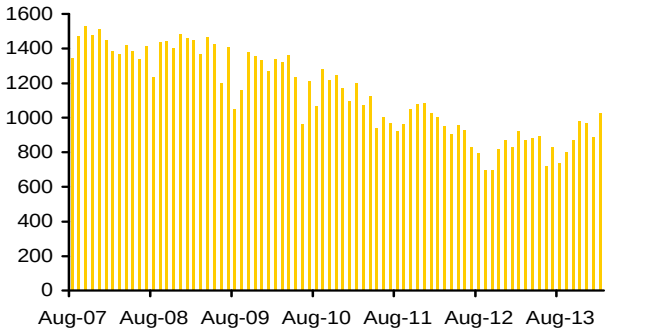
Source: EIA, Bloomberg , Commerzbank Corporates & Markets

CHART 14: **OPEC oil production in mm bpd**



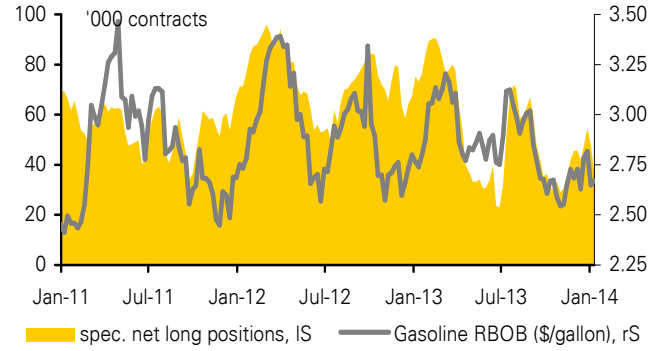
Source: Reuters, Bloomberg, IEA, Commerzbank Corporates & Markets

CHART 15: **Monthly loadings of North Sea crude oil (Brent, Forties, Oseberg and Ekofisk) in '000 bpd**



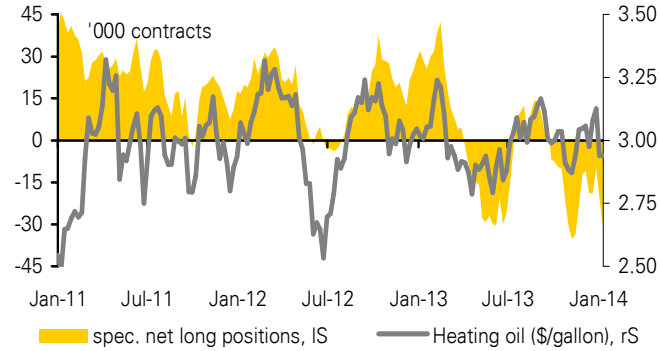
Source: Bloomberg, Commerzbank Corporates & Markets

CHART 16: **Gasoline: managed money net-long positions**



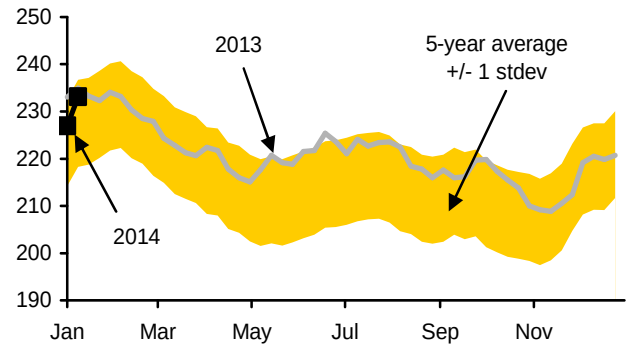
Source: CFTC, Bloomberg, Commerzbank Corporates & Markets

CHART 17: **Heating oil: non-commercials' net-long positions**



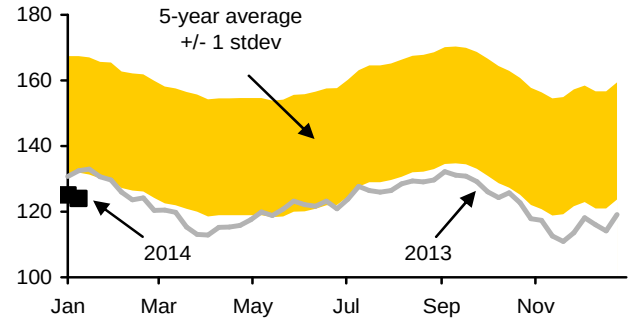
Source: CFTC, Bloomberg, Commerzbank Corporates & Markets

CHART 18: **Gasoline: US inventories in mm barrel**



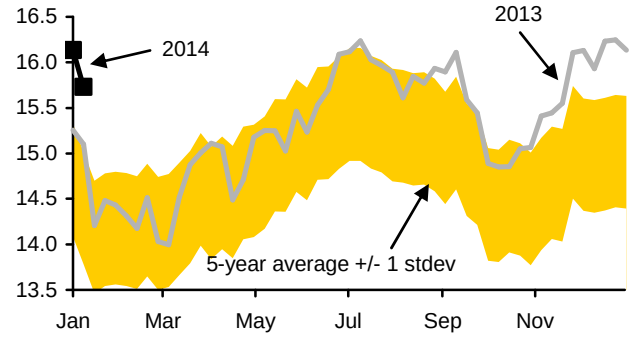
Source: EIA, Bloomberg, Commerzbank Corporates & Markets

CHART 19: **Distillates: US inventories in mm barrel**



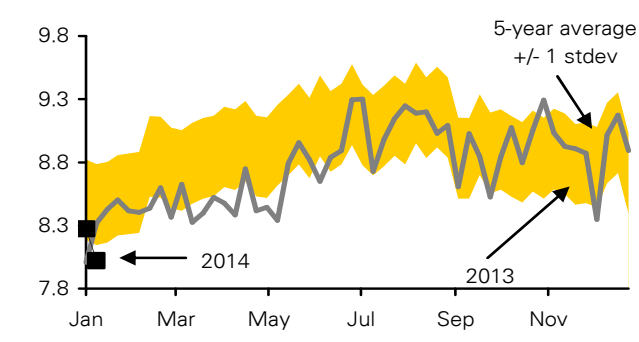
Source: EIA, Bloomberg , Commerzbank Corporates & Markets

CHART 20: **US crude oil processing in mm bpd**



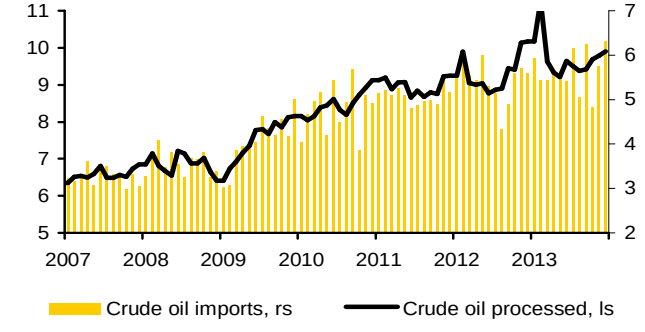
Source: EIA, Bloomberg, Commerzbank Corporates & Markets

CHART 21: **US gasoline demand in mm bpd**



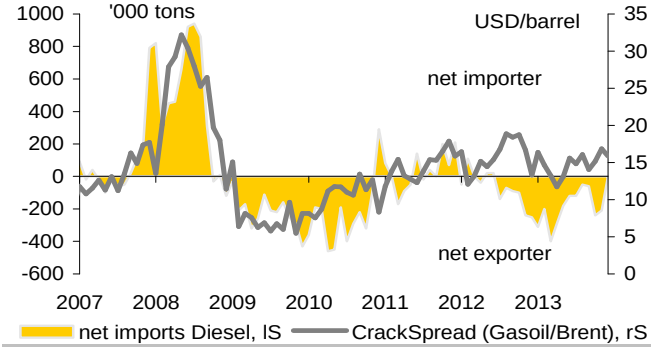
Source: EIA, Bloomberg, Commerzbank Corporates & Markets

CHART 22: **China: crude oil processed and imports**



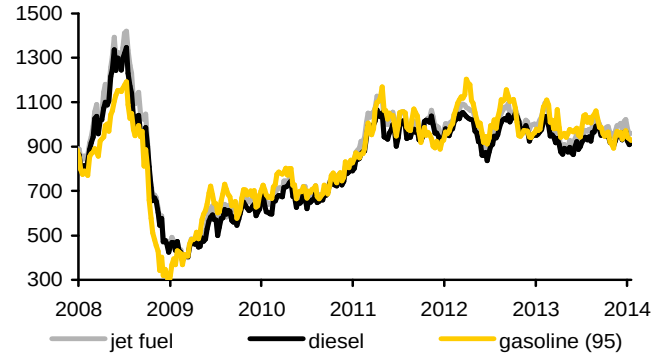
Source: China NBS, Chinese Customs, Commerzbank Corporates & Markets

CHART 23: **China: Diesel imports and gasoil crackspread**



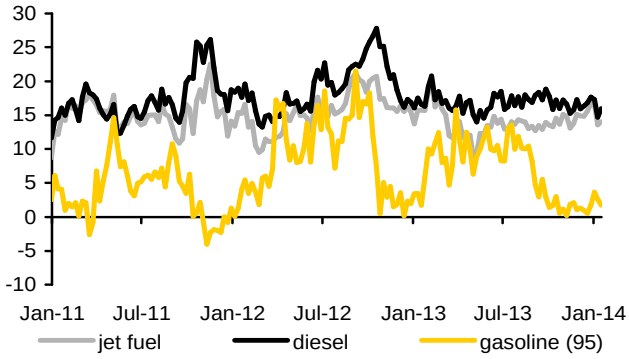
Source: Chinese Customs, Commerzbank Corporates & Markets

CHART 24: **Prices of oil products in US$ per ton**



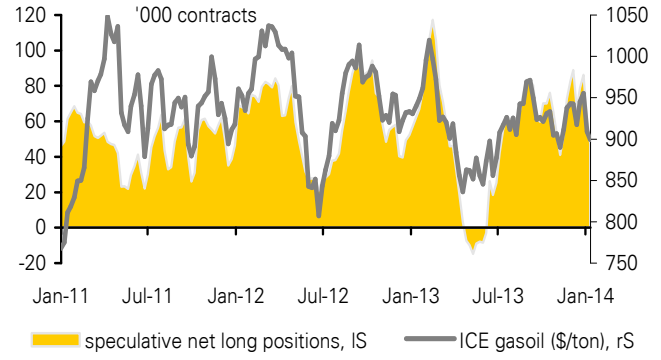
Source: Commerzbank Corporates & Markets

CHART 25: **Price spread products to Brent in $ per barrel**



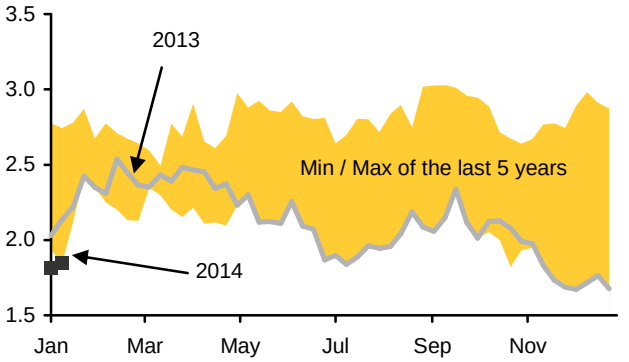
Source: Bloomberg, Commerzbank Corporates & Markets

CHART 26: **Gasoil: managed money net-long positions**



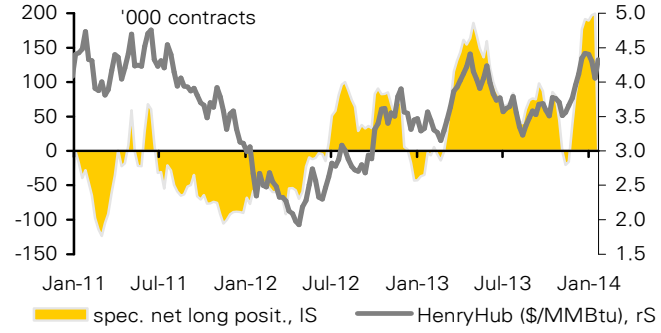
Source: ICE, Bloomberg, Commerzbank Corporates & Markets

CHART 27: **ARA Gasoil inventories in million tons**



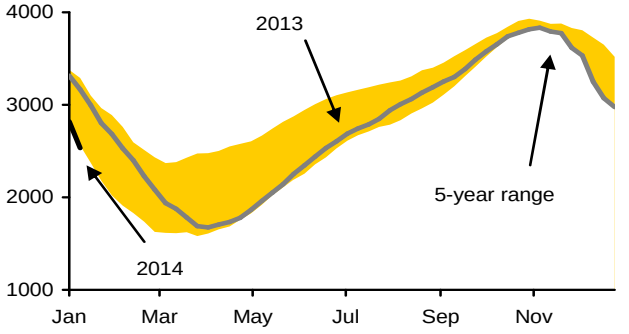
Source: PJK International, Bloomberg, Commerzbank Corporates & Markets

CHART 28: **Nat. gas: non-commercials net-long positions (Futures and swaps)**



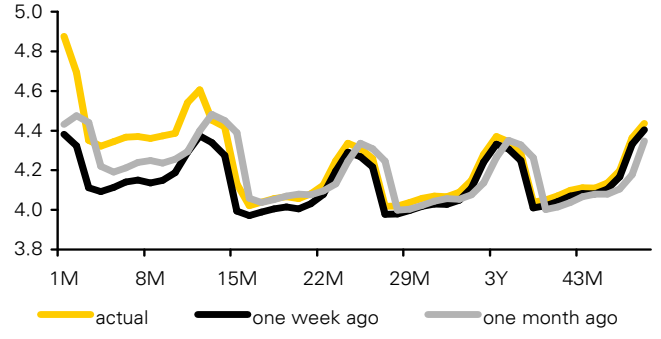
Source: CFTC, Bloomberg, Commerzbank Corporates & Markets

CHART 29: **Natural gas: US storage in bn cubic feet**



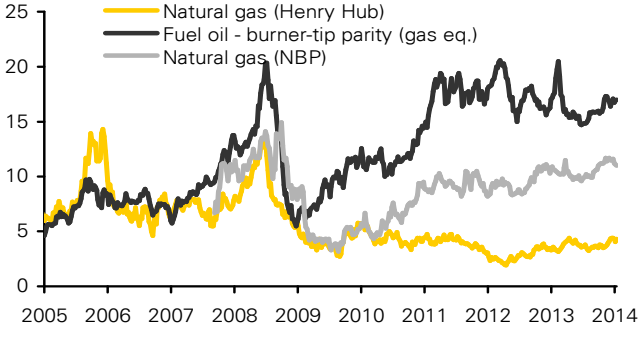
Source: EIA, Bloomberg, Commerzbank Corporates & Markets

CHART 30: **Natural gas – forward curve (Henry Hub) in USD per mmBtu**



Source: Bloomberg, Commerzbank Corporates & Markets

CHART 31: **Burner-tip parity (natgas vs. fuel oil no.6) in USD per mmBtu**



Source: Bloomberg, Commerzbank Corporates & Markets

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