ERSTE GROUP

"Nothing to spare" - Oil Outlook 2012

We see the risks for the oil price **heavily skewed to the upside.** At the moment, the market is well supplied, but the smouldering crisis in the Persian Gulf could easily push oil prices to new all-time-highs should it escalate. We believe that new all-time-highs can be reached in H1, at which point we could see demand destruction setting in. **We forecast an average oil price (Brent) of USD 123 per barrel between now and March 2013.**

Ronald-Peter Stoeferle, CMT
+43 (0)5 0100 - 11723
ronald.stoeferle@erstegroup.com

Thomas Unger, CFA
+43 (0)5 0100 - 17344
thomas.unger@erstegroup.com

All prices are as of Feb. 29th 2012

The latently smouldering Iran crisis seems to be close to escalation. The most recent manoeuvres, ostentatious threats, sanctions, embargoes and the shadow war currently ongoing, have heated up the situation further. It seems we may soon see the last straw that breaks the camel's back. Even though Iran could probably only maintain a blockade of the Straits of Hormuz only for a very limited period of time, the consequences would still be dramatic. **The oil price would definitely set new all-time-highs and could reach levels of up to USD 200.**

The still low reserve capacity makes the oil price vulnerable to geopolitical tensions. With the exception of Saudi Arabia, no country holds any significant reserve capacities. But since Saudi Arabia has never exceeded the barrier of 10 mbd on a sustainable basis, we harbor doubts as to whether the country can actually produce 12.5 mbd. Risks are that it will take a supply side crunch to find out whether the alleged reserve capacity actually exists to the extent proclaimed. **At any rate, the decision of IEA to tap the strategic reserves during the Libya crisis is a clear indicator of the strained supply situation.**

The belief in a quick substitution of fossil energy carriers by alternative forms of energy seems illusory and naïve, given the current investment volumes and lip service. **But we still believe that – much like Julian Simon forecasted– high oil prices cause shifts in efficiency and technology.** Or as Mark Twain said, *"The reports of my death are greatly exaggerated"*.

Further topics:

- High liquidity, low interest rates, and QE should create a positive environment for oil
- Does the skyscraper index signal a weaker oil price?
- Excursus: Oil price development from the perspective of the Austrian School of Economics
- Petrodollar exiting through the back door?
- Break-even oil price (BEOP) suggests rising "floor"
- Sharply rising oil consumption in the exporting countries could trigger shortages in the long run
- US natural gas has a attractive risk/reward profile
- "Clean fracking" will make shale gas production more efficient, cleaner and cheaper

Table of contents

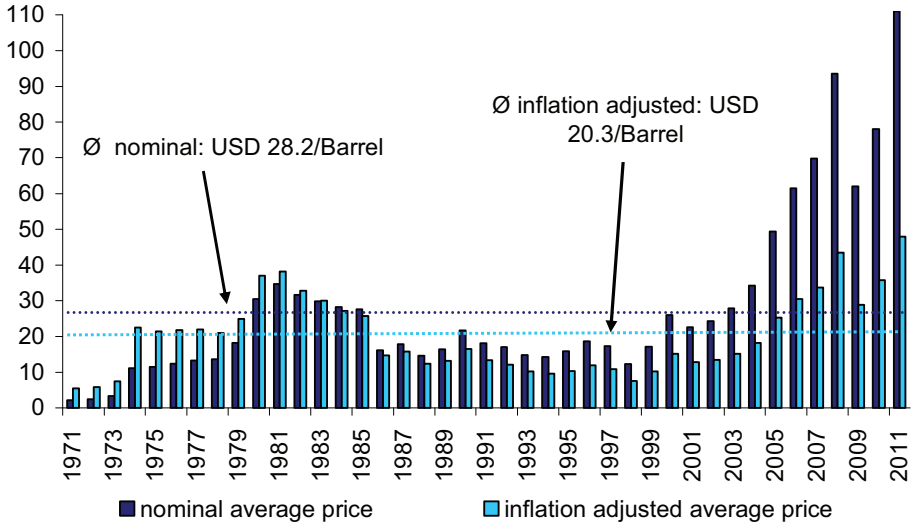
INTRODUCTION ... 3
Neo-Malthusians vs. Cornucopians ... 8
Economic consequences of the high oil price ... 12
Oil price – "always and everywhere a monetary phenomenon"? ... 15
Break-even oil price (BEOP) suggests rising "floor" ... 18
Subsidies a long term dilemma? ... 19
Supply ... 24
OPEC production ... 24
Crisis in Libya shows the effects of production downtimes ... 28
OPEC reserve capacity ... 30
Non-OPEC production ... 31
Inventories ... 35
Excursus: Oil price development from the perspective of the Austrian School of Economics ... 37
Power struggles at the Persian Gulf – is another Gulf war imminent? ... 40
The aorta of the oil business – How likely is a blockade of the Strait of Hormuz? ... 43
Petrodollar exiting through the back door? ... 46
Does the skyscraper index signal a weaker oil price? ... 48
Demand ... 51
A golden future for Natural Gas in the US ... 57
Shale Gas ... 63
The next generation: "Clean Fracking" ... 65
Shale gas in Europe: Poland and Ukraine as pioneers ... 66
Conclusion Shale Gas ... 67
Technical analysis ... 68
Sentiment does not (yet) signal any extreme form of optimism ... 68
Commitment of Traders Report signals further upward potential ... 71
Ratio analysis ... 74
CONCLUSION ... 78
Contacts ... 81
Disclaimer ... 82

INTRODUCTION

QE around the globe + political premium + squeeze on supply side = all-time-high of the average oil price in 2011

Brent oil set a new <u>average</u> all-time-high of USD 111/barrel in 2011. This price also exceeded the 2008 and even the 1979/80 referential values on an inflation-adjusted basis. The main drivers of the oil price last year were the supply side and the unrest in the MENA region. Not even the latent worries about an economic slump in Europe, the US or especially China had much of an impact on the oil price. The increasingly expansive monetary policy of the Federal Reserve, the ECB, the Bank of England, and the Bank of China also came with a stimulatory effect. Given that the Fed will now continue its zero-interest-rate policy at least until the end of 2014, this should support the entire commodity sector, oil and gold in particular. **This scenario seems to lay the basis for new all-time-highs.**

Nominal vs. inflation-adjusted average price since 1971



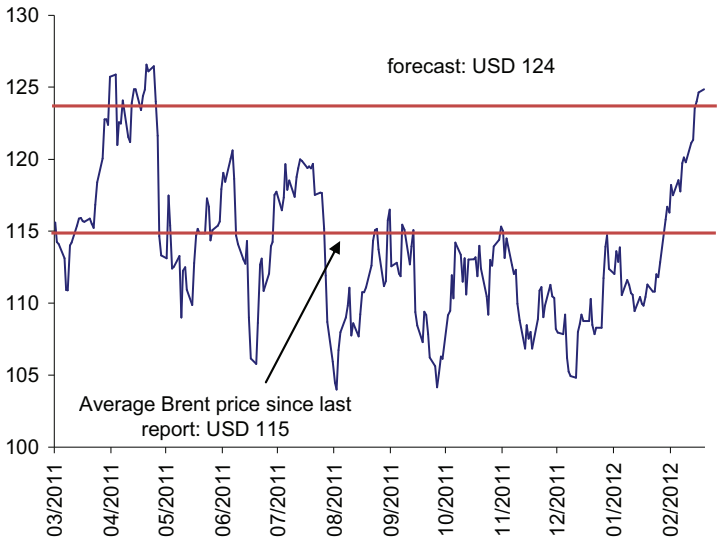
Sources: Datastream, Erste Group Research

Wave of revolutions suspended for now, but still poised to continue rolling

Last year, we saw mainly upside risks for the oil price, expecting the wave of revolutions to continue rolling across the MENA region[1] more vigorously than it ended up doing. For now the spill-over of the revolution has been prevented by appeasement measures worth billions taken by the various governments. However, the system-immanent problems have only been covered up, not resolved. **The initial euphoria of the Arab Spring has meanwhile given way to a sense of sobriety.**

[1] The entire MENA region produces more than 30mn barrels/day and exports more than 21mn barrels/day.

Average Brent price since the previous report vs. forecast



Sources: Datastream, Erste Group Research

Iran conflict could escalate in 2012

The latently smouldering Iran crisis seems to be close to escalation. The most recent manoeuvres, ostentatious threats, sanctions, embargoes and the shadow war currently ongoing, have heated up the situation further. On top of this, the situation in Iran seems tense, with a cut in subsidies and the onset of hyperinflation exacerbating the crisis. **It seems that we may soon see the last straw that breaks the camel's back.** We will discuss the political risks and their effects on the oil price in the following pages.

The cure for high prices is high prices

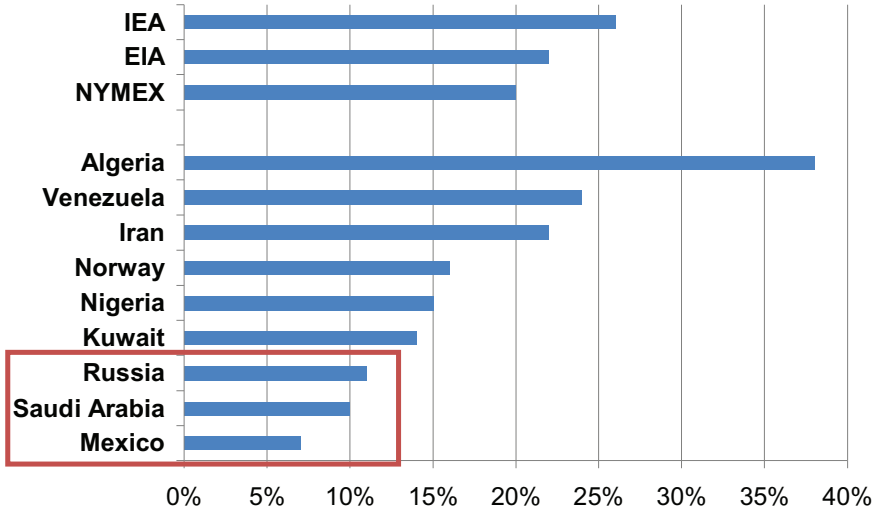
On top of the aforementioned issues, it seems that OPEC currently controls the price more tightly than ever before. In the current environment, prices of USD 90-110 should not (yet) create any form of demand destruction. It seems as if the oil price were to test the precise price level of that critical threshold and then rise a bit higher with every attempt. They say that the cure for high prices is high prices, as a result of which both demand in the OECD countries and supply (unconventional oil, new production methods, etc.) seem to adjust.

Price forecast of oil producers suggest significantly higher oil prices

A comparison of the oil price forecasts from various oil producers reveals that, in the period of 1999 to 2010 Mexico, Saudi Arabia, and Russia made the most accurate forecasts. All three of them also came closest to the actual price last year, which is why it makes sense to listen to their expectations. For 2012 they predict substantially higher oil prices. Saudi Arabia expects an average WTI price of USD 97, Mexico forecasts USD 116, and Russia USD 120/barrel. Iran has given the highest forecast at USD 137/barrel[2].

[2] Please refer to "Oil Price Forecast for 2012 – What best performing forecasters think", Roland Berger Strategy Consultants, February 2012

Average deviation of the oil price forecast from the actual oil price (1999-2011)



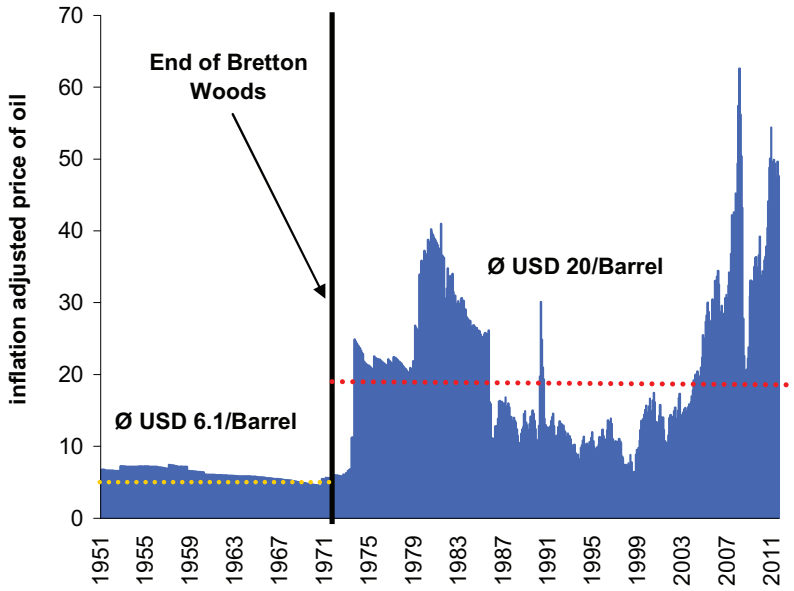
Source: Roland Berger Strategy Consultants

Increase in money supply as crucial factor of the rising oil price

The Austrian School of Economics offers investors a new angle on forecasting asset and commodity prices. In contrast to traditional economists, "Austrians" do not regard the rising demand for oil or other commodities as determining factor for rising prices. Rather, they view the ongoing increase in money supply, which in our partial reserve bank system entails an expansion of credit, as the crucial factor of rising prices. **For Austrians, one thing is certain: the more monetary units circulate, the lower their intrinsic value.** As a result, the substantial increase in oil prices in the past year has come as no surprise, as for Austrians it is not so much the demand for a good such as oil that determines a price increase, but simply the fact that, especially since 1971, more and more paper and digital money has been circulating globally. The following chart supports this fact impressively. **While the average inflation-adjusted oil price had been USD 6.1/barrel within the framework of the Bretton Woods agreement, it embarked on a rapid increase once gold had been discarded as monetary basis. Since the end of the gold standard the price of one barrel of oil has averaged USD 20.6 per barrel.**

Inflation-adjusted oil price on significant rise since the end of Bretton Woods

Inflation-adjusted oil price since 1950

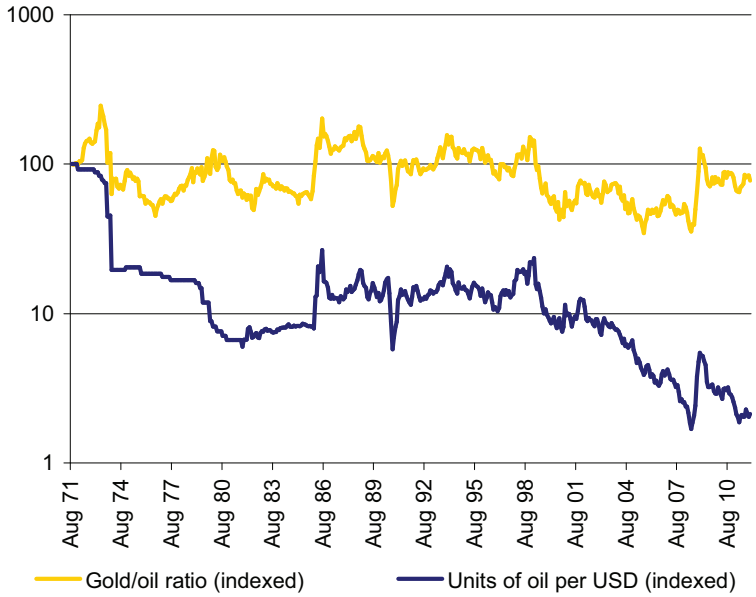


Sources: Bloomberg, Erste Group Research

Eroded purchasing power of the US dollar vs. stable purchasing power in gold

The following chart also illustrates the fact that the purchase power has been gradually eroded since 1971. It describes the gold/oil ratio (i.e. how many barrels of oil does one ounce of gold buy) as well as the inverted oil price (i.e. how many units of oil do I get for one US dollar). To make things more straightforward both values are based on the index value of 100, and the axis is on a logarithmic scale. **Whereas the oil price has been stable in terms of gold, the dollar has lost more than 98% of its purchasing power vis-à-vis oil.**

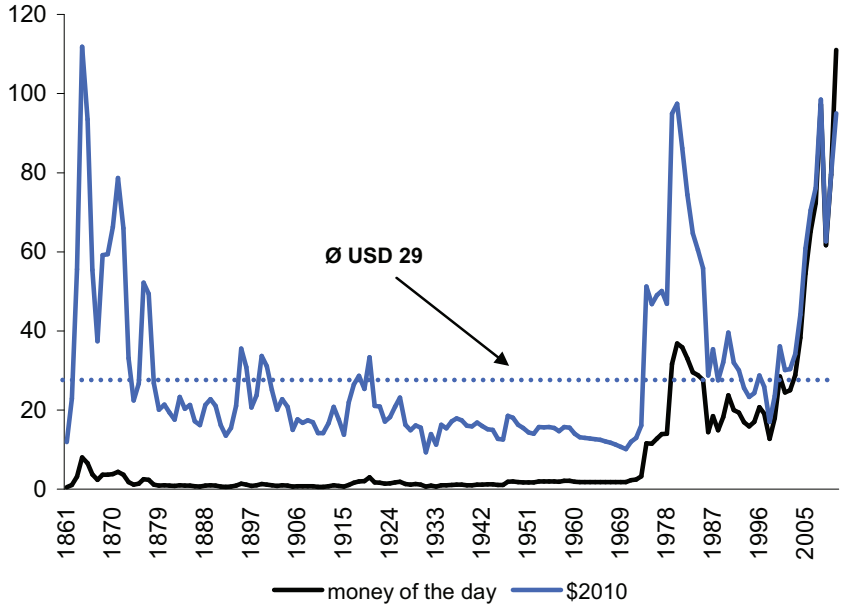
Gold/oil ratio and units of oil per USD – both indexed and on a logarithmic scale



Sources: Datastream, Erste Group Research

The long-term (150Y) chart highlights the substantially **increased volatility since the end of the Bretton Woods** agreement in 1971. Prior to that, prices had been stable for a relatively long period of time.

Oil price from 1861 to 2010 (in USD based on 2010) and nominal



Sources: BP Statistical Review 2010, Erste Group Research

Neo-Malthusians[3] vs. Cornucopians[4]

"No matter how closely it is defined, the physical quantity of a resource in the earth is not fully known at any time, because resources are sought and found only as they are needed. Even if the quantities of a particular resource were exactly known, such measurements would not be meaningful, because humans have a near-limitless capacity for developing additional ways to meet our needs: developing fibre optics, for instance, instead of copper wire" Julian Simon, The Ultimate Resource

Boomster vs. Doomster

Julian Simon is one of the most famous representatives of the "Cornucopians" and has severely criticised the classical Malthusian scenarios. According to (Neo-) Malthusians, a global collapse is unavoidable due to the limited nature of our natural resources, if the prevalent growth trends of the world population and the global economy cannot be broken by (political) intervention[5]. **Malthusians hold that population growth leads to the over-consumption of commodities and ends up in a collapse.**

"Simon's Axiom"

According to "Simon's Axiom", however, the quality of life and life expectancy have increased dramatically in the past decades not *in spite of*, but *because* of population growth (average life expectancy has tripled since the Industrial Revolution). **Temporary problems, the axiom claims, create a threatening level of pressure, which is released through creative innovations that spawn improved solutions.**

***"Both the jayhawk and the man eat chickens, but the more jayhawks, the fewer chickens, while the more men, the more chickens."* Julian Simon**

Simon points out that, as a result of a short-term shortage in a resource, new and improved resources have been discovered in the long run. He uses the shortage of firewood in the 16th century, of coal in the 19th century, and of oil nowadays as examples. All these crises triggered the discovery of new technologies, which in turn spawned new energy carriers[6].

The value of resources is de facto always contingent upon human inventiveness. For example, the oil under the Arabic peninsula was useless for the ancient Egyptians since they did not have the technology to make use of it. It was only after the combustion engine had been invented that oil turned into a precious resource.

"The Stone Age didn't end because we ran out of stones. The oil age will not end because we've run out of oil. It will end because people invent alternatives." (Ahmed Zaki Yamani, former Saudi-Arabian Oil Minister)

According to Simons, inflation-adjusted commodity prices decline in the long run

According to Simon, our concept of worsening resource shortages ignores the fact that, in the long run and on an inflation-adjusted basis, commodity prices are falling. In his book "The Ultimate Resource", Simon explains why natural resources are always available at similar prices in the long run. He investigated into the price development of commodities over extended periods of time and concluded that they hardly increased over time

[3] Malthus (1785): food scarceness triggered by population growth, 1972: Club of Rome: The Limits of Growth
[4] Greek – cornucopia of abundance. Problems of shortage can be solved by innovation (fertiliser, industrial farming).
[5] Please refer to "From Malthus to the greenhouse effect - Agriculture and the world food supply as a prediction problem", Markus F. Hofreither
[6] Please refer to "Alles wird gut, Julian Simon und die Pessimisten", ("Everything will be ok, Julian Simon and the pessimists"), NZZ Folio 1995

on an inflation-adjusted basis, in fact some of them actually declined. This hypothesis became famous with the **"Simon-Ehrlich wager"**, where he publicly entered into a bet[7] with the entomologist Paul Ehrlich, who had been know for his drastic predictions of famine and his scarceness theories. In this bet, Simon claimed that the inflation-adjusted prices of commodities would fall over a 10Y horizon. **Simon won the bet.**

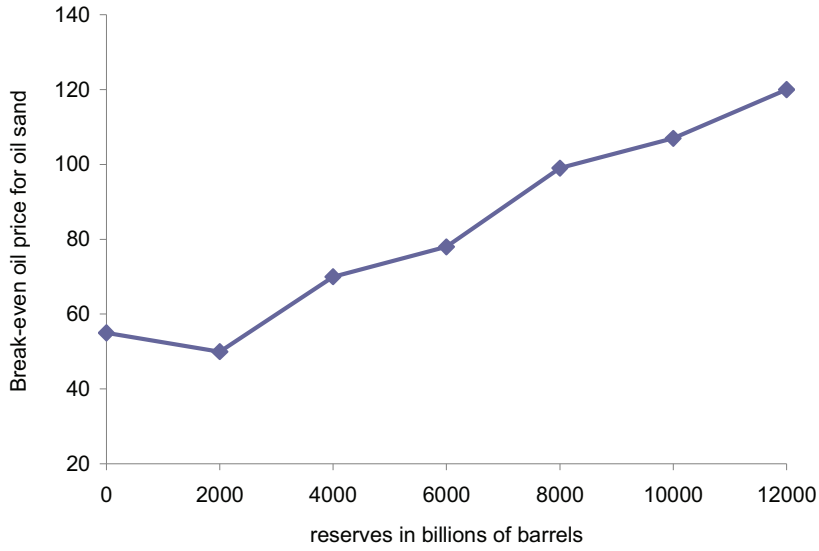
The bet is symptomatic for the divergence in opinion and the discussions between Malthusians and Cornucopians, environmentalists and economists, extrapolists and contrarians as well as futurologists and historians[8]. **Natural scientists make up the lion's share of the Malthusians, whereas the Cornucopians are mostly represented by economic scientists (among others, Hayek).**

Rising prices trigger an intensive search for substitute resources – the hypothesis is supported by the crude oil constant

According to the hypothesis, rising commodity prices lead to an intensified quest for substitutes, which results in a price decline, causing reserves to remain constant in terms of time until depletion. The crude oil constant currently supports this notion. We have been at 35 to 40 years worth of statistical oil reserves for decades. This is on the one hand due to the newly discovered reserves in the form of oil (off-shore, oil sands, and shale oil), on the other hand the market mechanism induces lower consumption , due to higher prices among industrialised countries.

According to Simon, the "fossil window" will remain open as long as new technologies will be able to cover the energy needs. As an example, the following chart illustrates the vast availability of oil sands. The same holds true for shale oil, shale gas etc.

Break-even oil price for oil sands and resulting reserves in billions of barrels



Sources: Wood Mackenzie, Erste Group Research, Bloomberg

[7] Please refer to „Simon-Ehrlich bet", Wikipedia
[8] Please refer to "The Natural Resource Curse", Jeffrey Frankel, Harvard Kennedy School

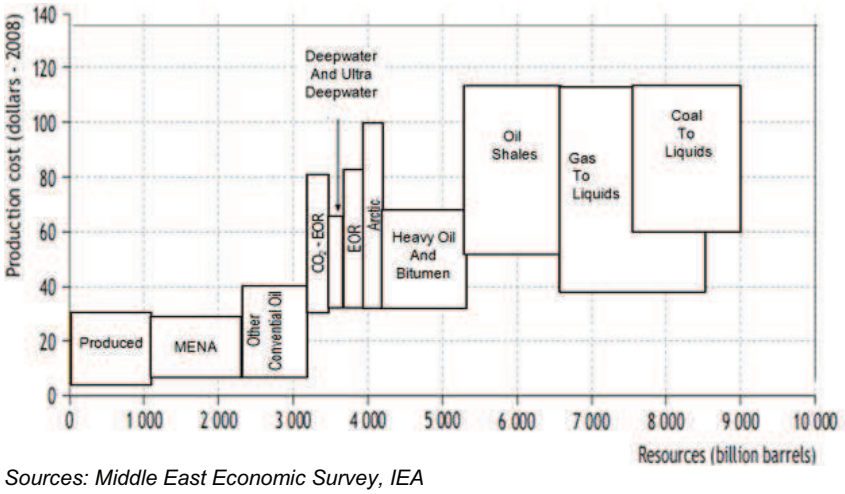
"Jevons Paradox"

According to "Jevons Paradox"[9], technological progress that permits more efficient use of a commodity, eventually causes higher usage of the commodity, rather than lower. Cheap commodity prices boost demand, whereas supply is struggling to keep up, causing prices to rise. Higher prices in turn fuel innovation and an increase in efficiency. Thus, efficiency on the supply side is mainly boosted at low prices, whereas efficiency on the demand side rises on the back of high prices. More efficient use of the commodity leads to increased productivity, which in turn causes prices to drop and demand to rise. As a result, the increase in efficiency is offset.

Enhanced oil recovery, shale oil, oil sands, …

The following graph illustrates the structure of productions costs of various fossil fuels. More than 1.1bn barrels were produced at less than USD; in the Middle East and Northern Africa (MENA), production costs average USD 30/barrel at current production rates. The easily and economically extractable reserves have been largely depleted. As soon as 50% of an oilfield has been extracted, the production curve declines sharply and the costs rise at an exponential rate. As a result, tertiary production methods are needed – "Enhanced Oil Recovery" (EOR) – which pushes up production costs. Among those are the injection of gas, chemicals, various ultrasound methods, the injection of microbiological cultures, and thermal extraction.

Production costs vs. disposable resources



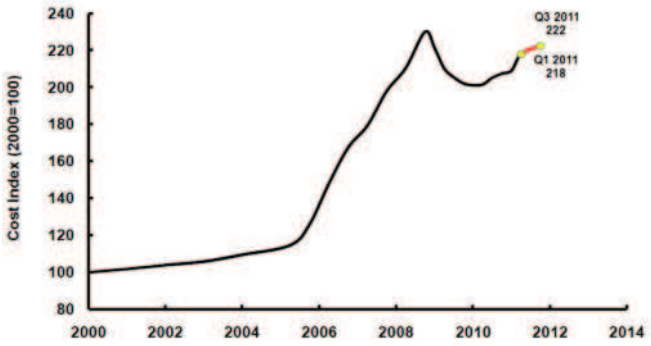
Sources: Middle East Economic Survey, IEA

[9] http://de.wikipedia.org/wiki/Jevons%E2%80%99_Paradoxon

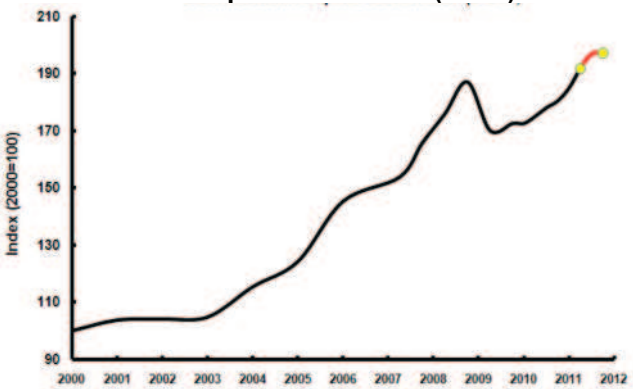
The increased costs both upstream and downstream are best illustrated by the IHS Cera indices. Both indices contain the costs of equipment, facilities, material, and personnel (both skilled and unskilled labour).

IHS CERA Upstream and Downstream indices since 2000 clearly on the rise

Upstream Capital Cost index (UCCI)



Downstream Capital Cost index (DCCI)



Source: IHS Cambridge Energy Research Associates

Are we past peak oil for <u>conventional</u> crude yet?

As already pointed out in the two previous special reports, we believe that we may either soon see peak oil for conventional crude or that we have indeed already seen it. Without a doubt peak oil is more than just fearmongering. The production profile of certain fields, regions, and countries has the same structure all over again, i.e. that of a bell curve. According to Robert Hirsch more than 64 countries have reached their maximum production level on a sustainable basis (i.e. peak oil). IEA reported in its Energy Outlook 2010 that peak oil had been reached for conventional oil in 2006. According to an article by Professors King and Murray[10] in the renowned Nature Magazine peak oil in this category had been reached in 2005. **This would explain the volatile price action – a substitute for demand.**

Countries that have reached their peak production

	Peak year	Production peak (mbpd)	Production in 2010 (mbpd)	Depletion from peak
Russia	1986	11.4	9.67	-15.10%
US	1970	9.64	5.51	-42.80%
Mexico	2004	3.38	2.58	-23.90%
Norway	2000	3.2	1.87	-41.50%
UK	1999	2.68	1.21	-54.80%
Oman	2000	0.97	0.86	-10.90%
Argentina	1998	0.85	0.64	-24.30%
Egypt	1998	0.92	0.52	-43.40%
Colombia	1999	0.82	0.79	-3.70%
Australia	2000	0.72	0.44	-39.70%
Syria	1996	0.58	0.37	-36.90%

Sources: EIA, Weeden & Co, Charles T. Maxwell

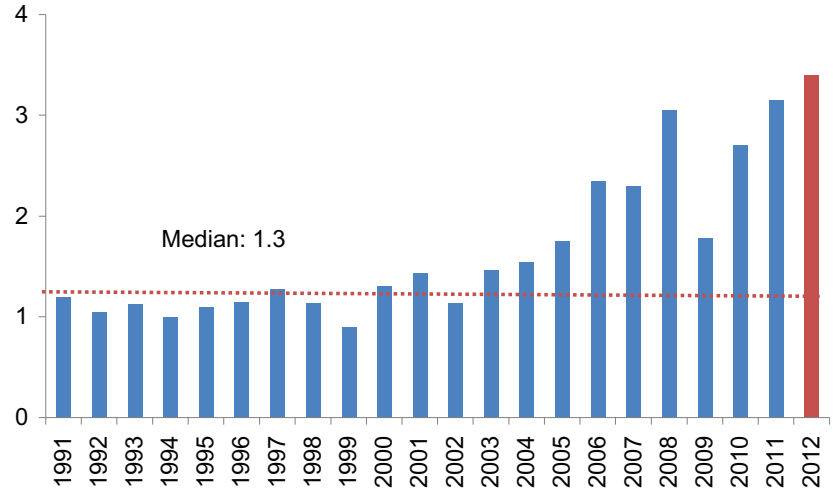
[10] The Oil Age, "Nature Magazine: peak oil production reached in 2000"

Economic consequences of the high oil price

All-time-high of average January petrol price in the US

The average January petrol price in the US set a new all-time-high. The high petrol price acts like an additional tax for US consumers. An increase of 10 cents per gallon translates into an additional burden of USD 14bn per year for US households. Therefore we expect the high petrol prices in the US to affect the economy (even though the extent remains unclear).

Average January petrol price in the US (USD per gallon)

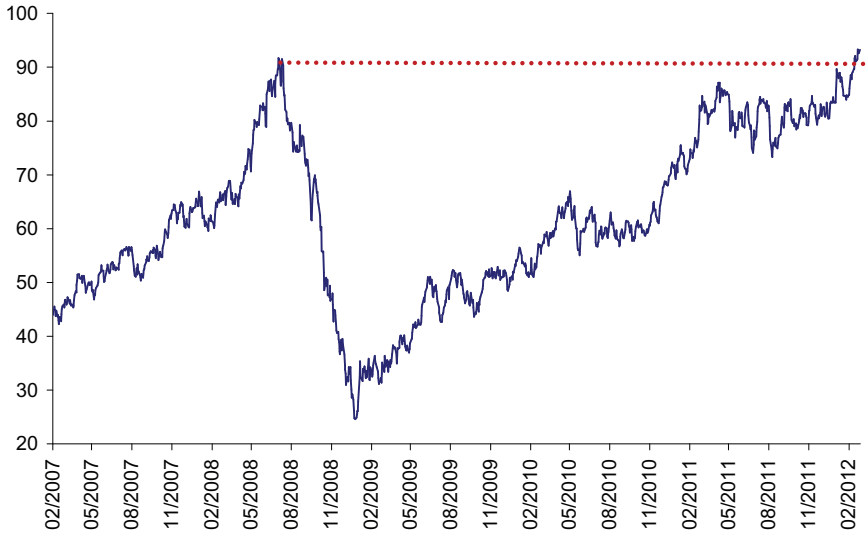


Sources: Zerohedge, Gasbuddy, Erste Group Research

Brent in EUR at new all-time-high

In Europe, too, the higher oil price could soon trigger economic consequences. **The price of Brent has already set new all-time-highs in euro.** In this context, fears of deflation seem unfounded.

The price of Brent in EUR

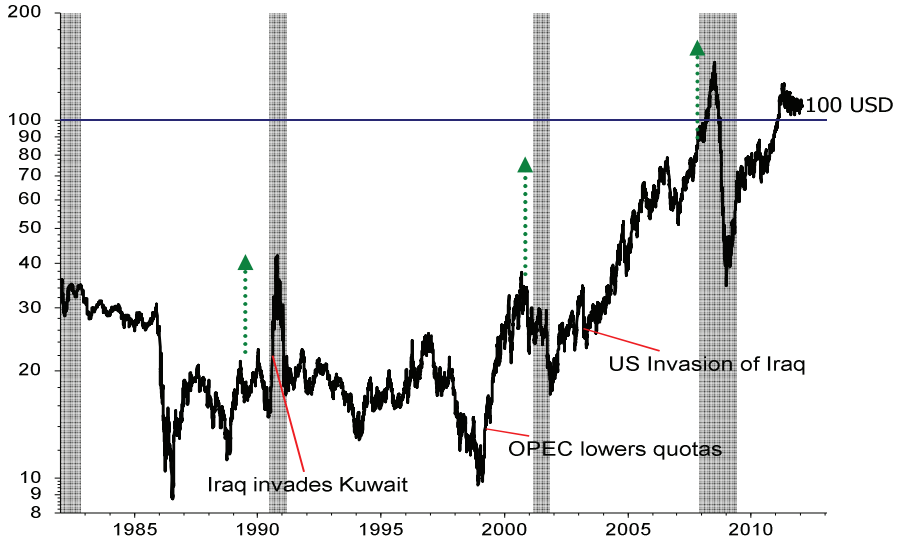


Sources: Datastream, Erste Group Research

Will the oil price trigger the next recession?

The OECD countries imported almost USD 1 trillion worth of oil in 2011. This represents an increase of USD 200bn on 2010. According to Jeff Rubin, the oil price increase in 2008 triggered the financial crisis, and the mortgage crisis was only a symptom of the high oil prices. Rubin claims that high oil prices have caused four of the five most recent global recessions[11]. This is on the one hand due to consumption, which suffers, and on the other hand to the transfer of assets to exporting countries. The transfer of petrodollars in 2008 amounted to USD 700bn, 400bn of which were going to OPEC countries.

Oil price (logarithmic scale) and recessions (shaded)



Sources: Datastream, Erste Group Research

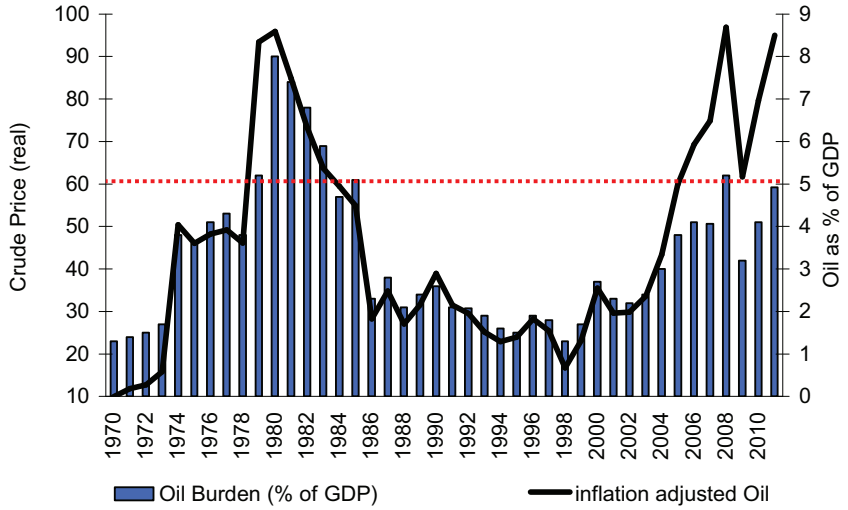
However, of course, there is clearly also causality the other way around, and recessions have likely contributed to the subsequent oil price decreases.

Oil burden at 5% - we are at the critical level

According to IEA, worldwide expenditure on oil accounted for almost 5% of global GDP in 2011. An "oil burden" (i.e. oil demand multiplied by the oil price divided by the nominal GDP) of 5% has been a critical value for the economy, historically speaking. At an average price of USD 150/barrel the share would amount to 7.5% in terms of GDP.

[11] Please refer to Jeff Rubin "Oil Prices caused the current recession"

Oil price burden (% of GDP) vs. inflation-adjusted oil price 1970-2011



Sources: IEA, Datastream, OECD, Bloomberg, Erste Group Research

Baltic Dry index at its lowest level since 2008

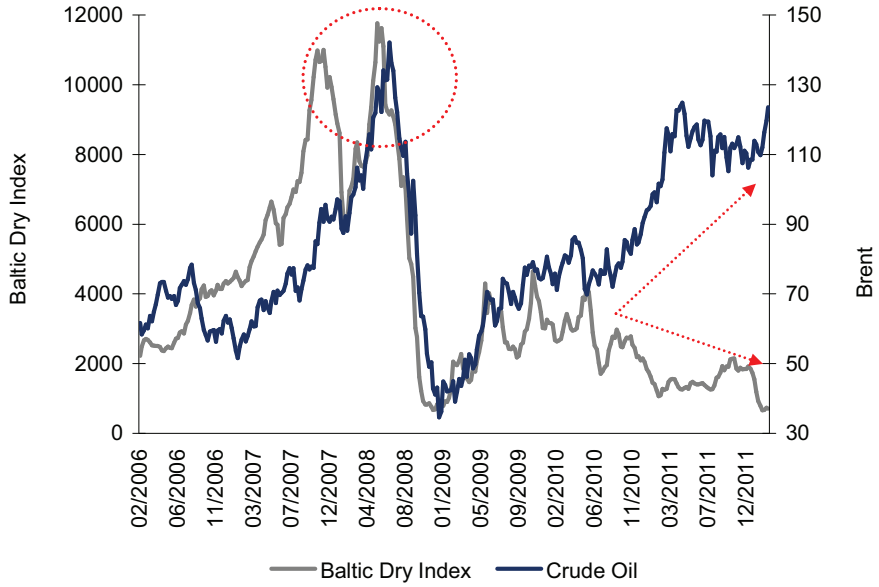
The Baltic indices have not recovered so far. The Baltic Dry index has fallen by more than 70% since November 2011. This means it is now at its lowest level since 2008 and 2000.

The Baltic Dry index is the benchmark index for global freight rates of bulk goods (among others iron ore, copper, gravel, grain, coal) and has thus traditionally been an important indicator for global trade. It therefore also served as reliable leading indicator for the oil price. The following chart shows that the Baltic Dry index has developed a massive divergence to the oil price, which has been widening.

Capacities of shipping companies have increased significantly

To be fair, though, the capacities of the big shipping companies have increased significantly, which puts the reliability of the Baltic Dry index as a leading indicator for global trade into question. However, the Harper index, which reflects the global development of prices on the charter market for container ships, shows a similar negative tendency. Hence, it is unclear if the increases of the oil price are purely demand driven, or if other factors – e.g. monetary - have contributed.

Baltic Dry index vs. Brent



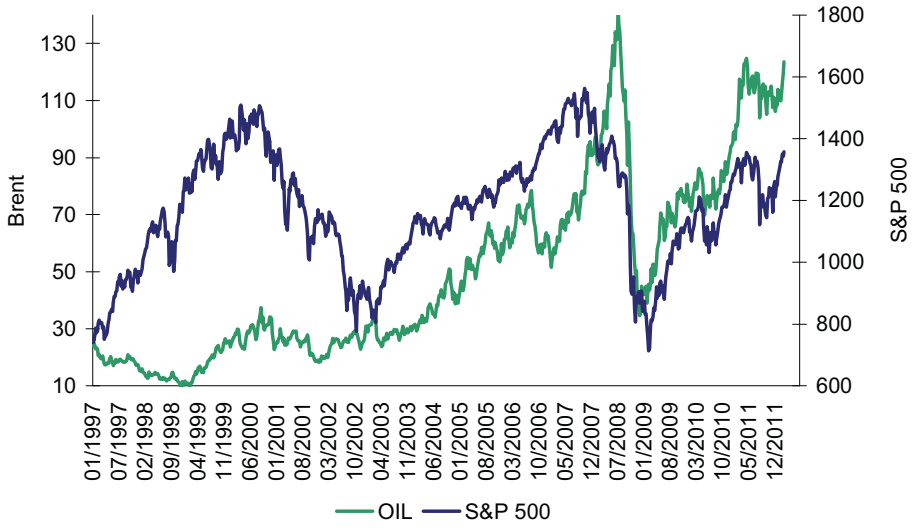
Sources: Bloomberg, Erste Group Research

Oil price – "always and everywhere a monetary phenomenon"?

"Bernanke put" as price driver on the commodity markets

We believe that the "Bernanke put" is the main culprit for the price premiums in the commodity sector. The US central bank has repeatedly pointed out the positive effects of higher share prices, although this could trigger unsolicited secondary effects. The improved wealth (and increased optimism) boosts the propensity to consume among households and the propensity to invest in the corporate sector, which in turn supports the economy. The improved growth perspectives also lead to a decline in risk aversion. Commodities, too, benefit from the increased willingness to assume risk, as the following chart illustrates impressively. The extremely high positive correlation between equity market and oil price is hardly explained by ordinary supply/demand patterns; the monetary policy seems to have contributed significantly. **The liquidity provided by the central bank may have been invested directly in these segments** (i.e. commodities may have been bought on a speculative rationale rather than on the basis of demand from producers) due to the global growth *expectations*. **It is therefore fair to assume that the rally is primarily driven by liquidity.**

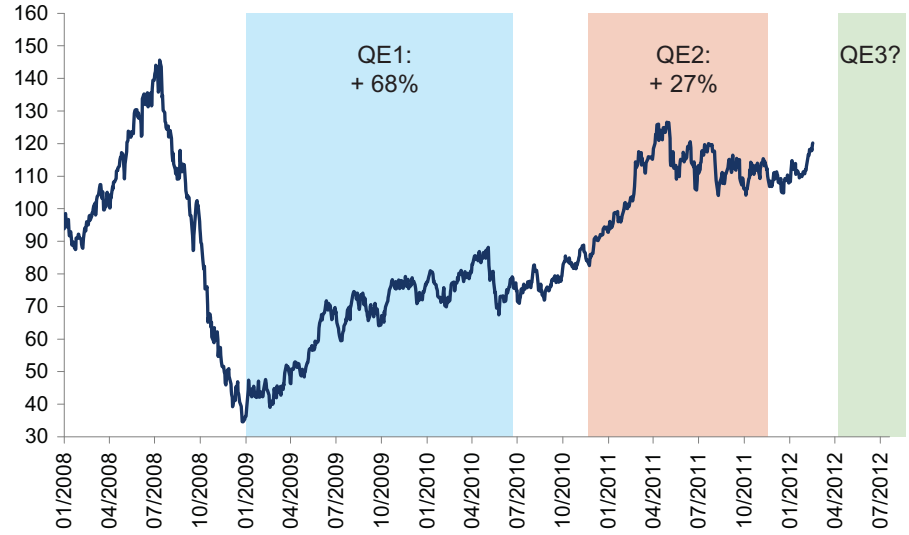
Oil (left scale) vs. S&P 500 (right scale) since 2001



Sources: Datastream, Erste Group Research

The fact that the oil price seems to have responded to previous QE rounds by the Fed also raises the question to what extent Central Bank easing (in particular, the Fed) is likely this year?

The price of Brent and QE phases (from the announcement of the respective new purchase programme onwards)



Source: Datastream, Erste Group

Fed, ECB, BoJ – who is pursuing the most expansive policy?

The question whether the Fed will launch a new purchase programme (QE3) this year remains dubious, from our point of view – but the balance sheet would remain constant (refinancing of expiring papers). In the last Fed minutes only a few members stated that the current and expected economic development could soon necessitate further purchases. Others regarded that step as only necessary in case of a slowdown in growth or inflation rates below 2%. The latest economic forecasts by the Fed seem on the optimistic side, even slightly lower growth would not entail a slowdown, and the labour market has recently seen some good

development (newly created jobs, unemployment rate). We do, however, envisage intermittent setbacks and persistent structural problems (long-term unemployment, discouraged jobseekers etc), which the Fed has also pointed out. The Fed believes that this situation is strongly connected to the housing market (jobs in the construction industry, dampened demand). Purchases, if any, should therefore take place in the MBS segment.

Purchases in the MBS segment at a volume of about USD 600bn in the first half of the year possible

Bernanke had already analysed the efficiency of the measures available beyond the Fed funds rate back in 2004: verbal intervention (promise to leave the interest rates low for a long time in order to push the long-term rates down), quantitative easing (expansion of the central bank's balance sheet via an expansion of liquidity and/or bond purchases), and credit easing (purchases in specific market segments, e.g. Operation Twist or MBS purchases). From Bernanke's point of view, the latter constituted more efficient support for the economy, and according to NY Fed President William Dudley it helped avoid potential "dislocations" on the Treasury Markets. On the basis of QE1, we expect that the possible volume of purchases could be in the vicinity of USD 600bn. **Overall, therefore, further purchases by the Fed remain uncertain, but if they were to come through, they would 1) happen in the MBS segment, 2) amount to about USD 600bn, and 3) take place presumably in the first half of 2012.**

New FED-members rather in favour of purchases:

S. Pianalto: ***"…*** *some economic policy models indicate that* ***monetary policy should be even more accommodative*** *than it is today. And this is true even after accounting for the LSAPs the FOMC has initiated to compensate for the fact that the federal funds rate cannot go below zero."*
D. P. Lockhart: "*I think slow progress toward full employment justifies* ***continuing consideration of whether more can and should be done. So for me as a policymaker, now is not a time to lock into a rigid position.*****"**
J.C. Williams: "*I expect inflation to come in under 1.5% this year and next.*" Following the speech, he mentioned to reporters that this implies that he that he sees a "strong" case for new purchases of mortgage bonds.

ECB, BoJ, and Bank of England follow their own QE schemes as well

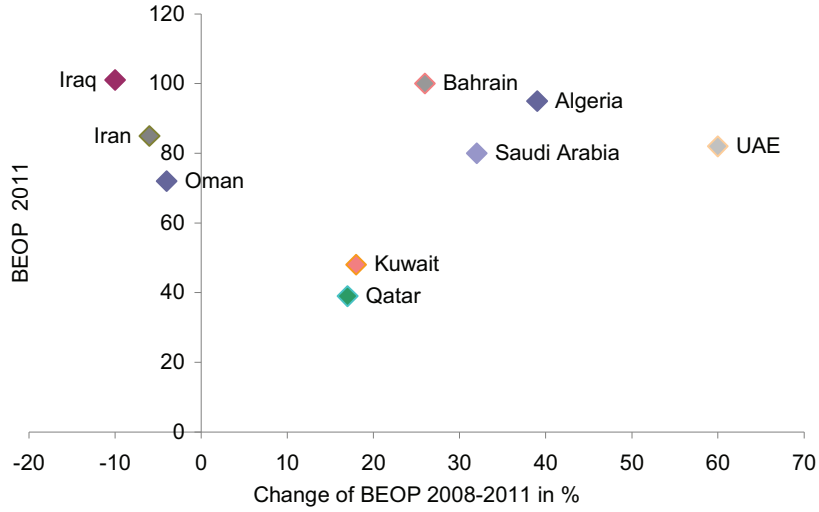
It is important to bear in mind though that the Fed is not the only central bank to follow the "Bernanke Program". The 3Y operations of the ECB, which have so far seen demand worth EUR 500bn, are of the quantitative easing category (albeit with an expiry date – 3Y!), and the Securities Markets Programme is a form of credit easing. The expansion of the ECB liquidity should last about as long as the government debt crisis is dragging on (i.e. potentially for quite a while). And, of course, the Bank of Japan is the QE trendsetter, having just decided on an expansion. **It offers an interesting example that an increase in central bank liquidity can contribute to price increases in some market segments, but does not have to cause inflation every time and everywhere.**

Break-even oil price (BEOP) suggests rising "floor"

Oil-producing countries require significantly higher oil price in order to balance their budgets

The IMF[12] believes that Saudi Arabia already needs an oil price of USD 80 in order to balance its budget. Only a few years ago, the price was USD 40/barrel. According to the IMF, the BEOP will rise to at least USD 98 by 2016, but we regard this estimate as too low. The BEOP has increased by 60% in UAE in the past three years, and by 40% in Algeria. Bahrain and Iraq need oil prices of at least USD 100, and Iran close to USD 85/barrel in order to balance their budgets[13]. In Russia the BEOP was USD 110 last year. According to Alfa Bank[14], this price will rise to USD 126 in 2012 (not the least because of the expected subsidies in the run-up to the presidential elections). This means the BEOP is three times as high as in 2007.

The following chart illustrates the current BEOP and the development since 2008



Sources: IMF, Bloomberg, ERSTE Group Research

"Appeasement packages" worth billions have caused higher BEOP

Many oil exporters have used their income in order to cover up the "Arab Spring" and the increasingly bleak social situation by handing out billions worth of gifts. As a result many OPEC countries have a clear incentive to keep the oil price high. In addition this also means that the investment incentive for the construction of additional production capacities is often limited.

High "fiscal vulnerability"

Many exporters therefore need a price level of at least USD 80-90. If the price were to fall significantly below that threshold, Saudi Arabia would have to sell substantially more oil in order to offset temporary gaps, which in turn would dampen the price; or it could cut the production drastically, which with a time lag would cause prices to rise, but it would burden public revenues in the short run. Therefore it comes as no surprise that Saudi Arabia and the OPEC now regard USD 100 as target price, whereas the "optimal" oil price used to be USD 75 not so long ago. So we are faced with a predicament. On one hand a clearly lower oil price would make it impossible for many oil exporters to meet their financial needs. On the other hand, too high an oil price causes recessions in the importing countries. Therefore we believe that **USD 100-120 currently represents a "fair price corridor".**

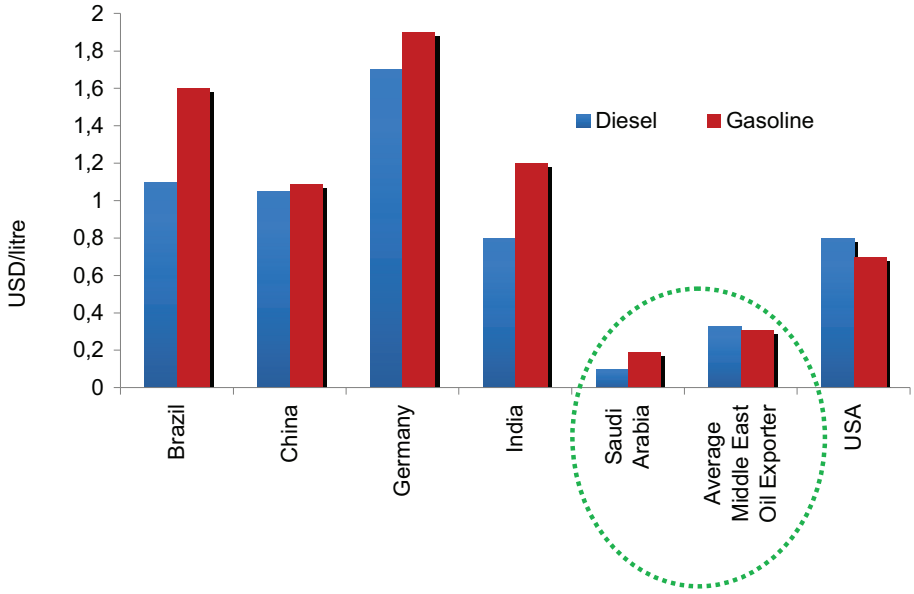
[12] http://www.imf.org/external/pubs/ft/scr/2011/cr11292.pdf
[13] Please refer t. Norbert Rost, „Warum der Benzinpreis nicht sinken darf" (*Why the petrol price must not fall*)
[14] "Russian elections: pork and the oil price", FT.com

Subsidies a long term dilemma?

High subsidies cause wasteful consumption and high demand in exporting countries

In 2010, global governments spent USD 409bn in order to subsidise fossil energy carriers. OECD countries accounted only for a tenth of that volume. In most repressive regimes, generous subsidies on fuel and food are a favourite way of securing the support of the people. In Saudi Arabia, 1 litre of petrol currently costs about 13 cents, which of course leads to wasteful consumption and high demand. The same is true for the subsidies for water (about USD 22bn) and electric power (USD 14bn), where inefficient use is also subsidised by the government.

Petrol prices in comparison

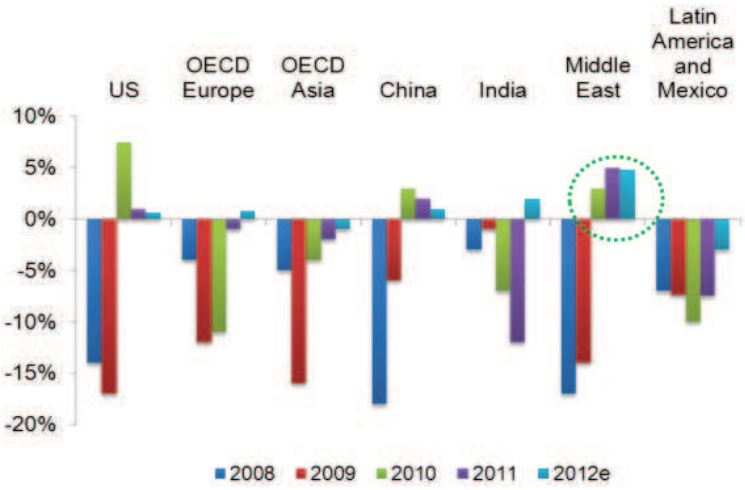


Sources: Bloomberg, World Bank, Deutsche Bank

The generation of electric power constitutes the most important part of oil demand

According to the IMF, the MENA region should record GDP growth of 4% p.a. until 2015. Saudi Arabia is expected to grow by 6%. Power generation is one of the most important factors on the demand side for oil. In the Middle East 35% of power is generated by oil, and in Saudi Arabia this share is a massive 60%. As a result, oil consumption is going to rise much more strongly than in all other regions. This is also a result of the low prices and the high subsidies.

Global petrol demand 2008 to 2012e



Source: IEA, Erste Group Research

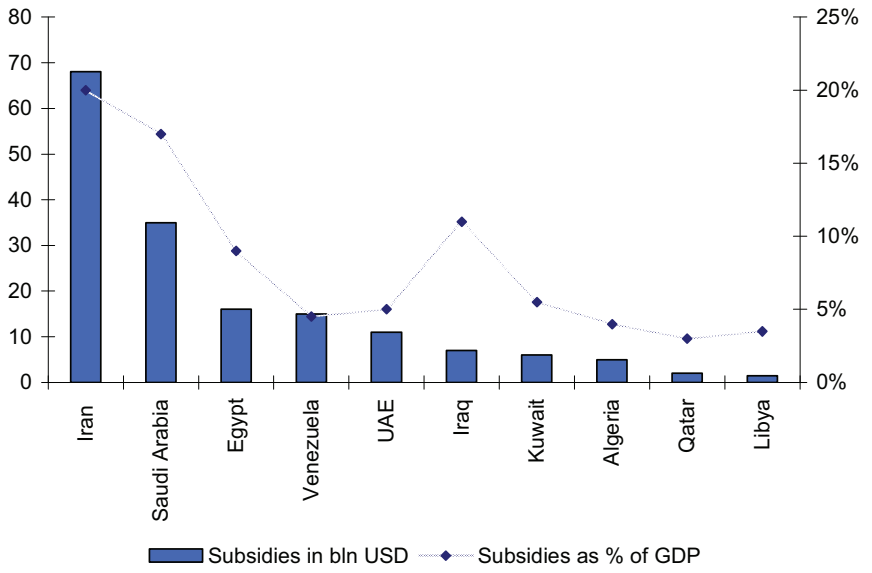
The Saudi Arabian "Day of Rage" in March was without any consequences due to the generous governmental handouts. The economic stimulus package worth USD 130bn contained a wage increase of 15% for civil servants, an increase in the minimum wage, cheques for two months' salary for civil servants, and an unemployment program. Almost USD 70bn will be invested in the construction of 500,000 social flats, and all mosques across the country will be renovated.

20%-stimulus package to appease the population

Overall, the package equals more than 20% of the Saudi Arabian GDP (by comparison, TARP in the US accounted for 5% of GDP). However, we believe that the government has only bought (very expensive) time, and that the short-term appeasement measures in the shape of billions worth of gifts will only calm people at the surface. Thus the Saudi Arabian royal family is more than ever dependent on a high oil price. Oil production generates more than 90% of export revenue and 80% of the budget. If the oil price were to fall significantly, the social measures could hardly be financed anymore.

In Kuwait stimuli worth 3.5% of the GDP were promised, among other things cash donations of USD 3,600 to every Kuwaiti citizen, as well as free staple foods.

Subsidies in USD bn vs. share of subsidies in % of GDP



Sources: IEA World Energy Outlook, Bloomberg, OPEC, ERSTE Group Research

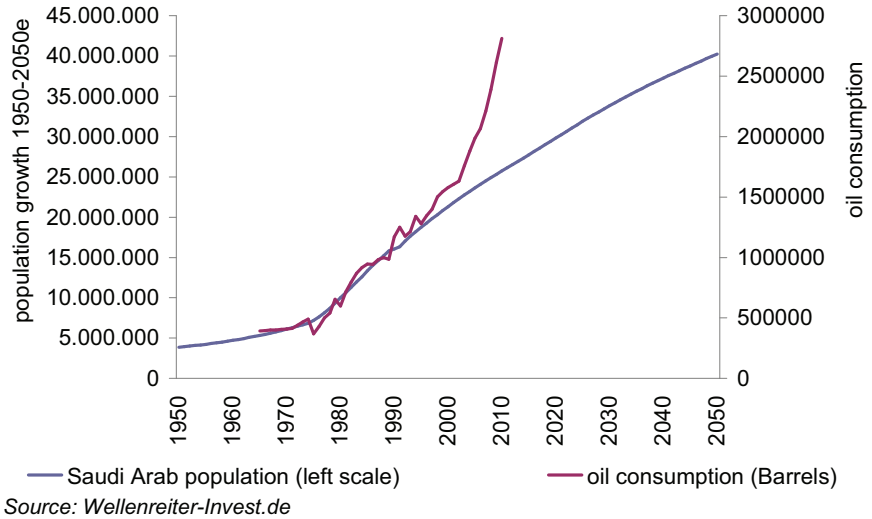
High preference of the present over the future with devastating long-term effects

The long-term effects of the subsidies are devastating. The high preference of the present over the future[15] of the regime causes a lack of long-term investment in refineries, new oilfields and infrastructure. On top of that, the recipients of subsidies tend to expand consumption and thus cause the dilemma to deteriorate.

Demographic development suggests strong domestic consumption

The demographic development is another problem. Half of the Saudi Arab population is less than 23 years old. The unemployment of the 20 to 24 year old is above 40%, which is why plans are to create 5mn jobs by 2030. The following chart shows that oil consumption has increased at a disproportionately high rate relative to population growth.

Population growth 1950-2050e vs. oil consumption



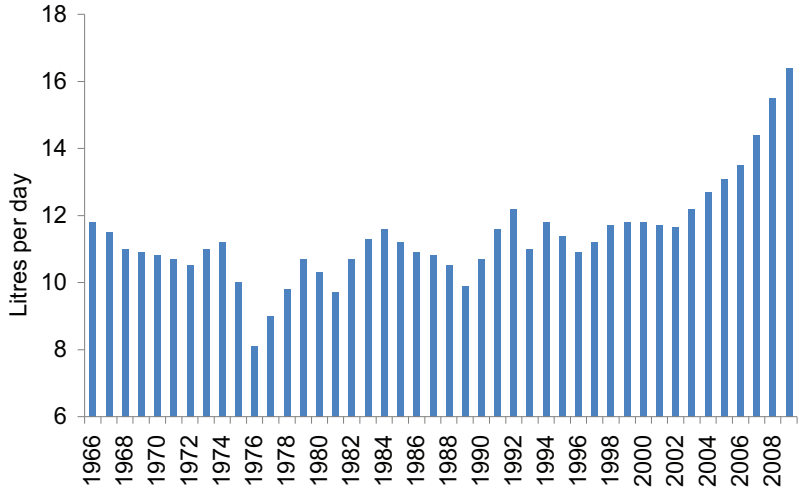
Source: Wellenreiter-Invest.de

[15] "Time preference is the assumption that people prefer a given end to be achieved sooner rather than later. In the Misesian school it is derived from the assumption about *human action*", Mises.org

Strongly increased per capita consumption

Per capita oil consumption in Saudi Arabia is currently 17 litres per day, which represents a doubling since 1975. The low price promotes wasteful consumption. By comparison, in the US, per capita consumption is 9 litres, in Germany it is 5 litres, and in China it is 1 litre[16]. In terms of global consumption, Saudi Arabia accounts for 3.1% of global demand at the moment. Ten years ago it was only 2%.

Oil consumption per capita in Saudi Arabia (litres per day)



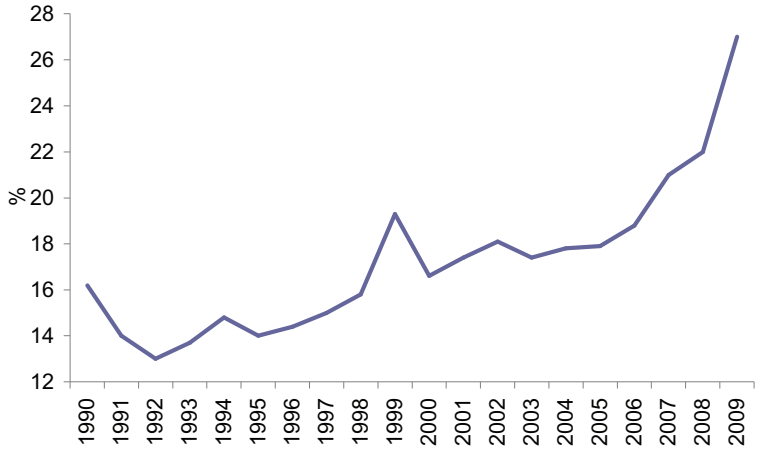
Sources: Wellenreiter-Invest.de, Bloomberg, Erste Group Research

The share of domestic consumption in total Saudi Arabian production has been on the rise

Worryingly, the share of domestic consumption in total Saudi Arabian production has been on a continuous rise. At the moment, some 29% of Saudi Arabian production is consumed domestically. At the beginning of the 1990s, that percentage was 13%. The high population growth has an additional effect on oil consumption. According to US census the Saudi Arabian population will have grown from 26 to 30mn by 2020 and further to 40mn by 2050[17]. In the past decade alone population growth has reached 2.5% p.a., which means it has been twice as high as in the emerging markets and four times that of industrialised nations.

[16] Wellenreiter-Invest.de, "Saudi-Arabien als Schlüsselstaat", (*Saudi Arabia as key country*), 19 March 2011

Domestic Oil consumption as percentage of total Saudi Arabian oil production



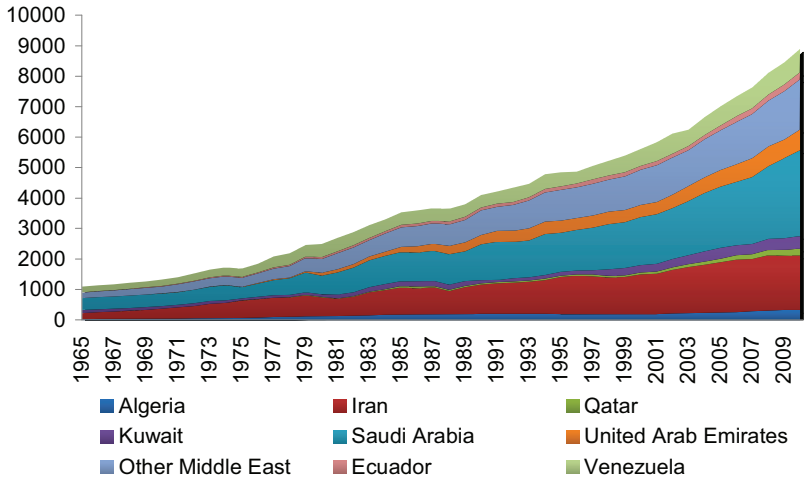
Sources: Wellenreiter-Invest, Bloomberg, Erste Group Research

Falling export quota could cause shortages in the long run

Due to population growth and the still rising per capita consumption we believe that the export share will continue to drop. This comes with far-reaching consequences. If the development were to continue at the same speed, less than 50% of Saudi Arabian oil production would be available for exports in ten years. According to Hashim Yamani, Saudi Arabian oil consumption is supposed to increase to 8mn barrels/day by the year 2028. **Given constant production levels, the room for manoeuvring would become almost non-existent in the export segment. This would on the one hand cause the budget to blow up, while on the other hand Saudi Arabia is the only significant swing producer and thus essential to global oil supply. In the absence of any major discoveries or massive capacity expansions, the rising domestic consumption in Saudi Arabia could cause shortages in the long run.**

Saudi Arabia is not the only one whose pattern is symptomatic for the gradually falling export quotas of the large producing countries; Almost all OPEC countries are faced with this dilemma – rising domestic demand vs. falling exports.

Rising oil consumption in almost all OPEC countries



Sources: BP, Erste Group Research

Supply

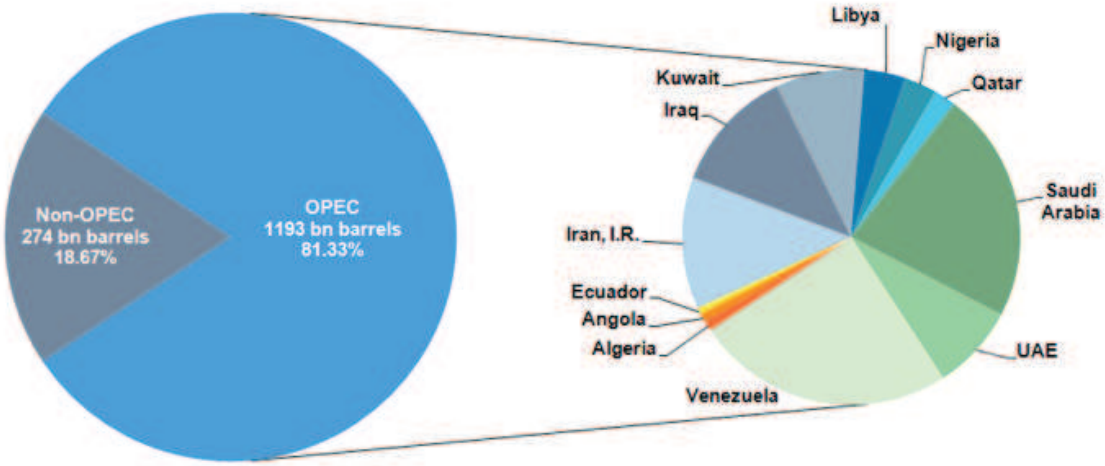
The focus will remain on the supply side, with the market reacting very sensitively to even the slightest production downtime

The oil market was dominated by turbulences last year, due largely to frictions on the supply side. 2011 indicated how sensitively the market reacted even to minor production downtimes. The reason is that the current supply and demand are very closely matched, and the former cannot be expanded at will. **We believe that the supply side will remain in the focus of the market participants in the future.**

OPEC production

Given that, according to official statements, the OPEC controls more than 80% of the global oil reserves and the only significant reserve capacity, the markets look at the organisation's general direction as soon as production downtimes occur.

OPEC share of global reserves, 2010



OPEC proven crude oil reserves , end 2010
(billion barrels)

Venezuela	296.50	24.8%	Iraq	143.10	12.0%	Libya	47.10	3.9%	Algeria	12.20	1.0%
Saudi Arabia	264.52	22.2%	Kuwait	101.50	8.5%	Nigeria	37.20	3.1%	Angola	9.50	0.8%
Iran, I.R.	151.17	12.7%	United Arab Emirates	97.80	8.2%	Qatar	25.38	2.1%	Ecuador	7.21	0.6%

Source: OPEC Annual Statistical Bulletin 2010/2011

Discord among OPEC countries

In spite of the civil war in Libya, which had caused a complete standstill in Libyan oil production in the first quarter of 2011, OPEC failed to agree on a consensus as to how the situation should be handled. Led by Saudi Arabia, numerous members tried to assert a production increase in order to offset the Libyan quota. However, they clashed with other countries (especially Iran and Venezuela), which are unable to raise their output and can thus only increase their revenues via higher prices. The top priority goal of the OPEC, i.e. the stabilisation of the oil market, was not achieved due to the discord among the members. In fact, the opposite was the case: the significant fluctuations in the oil price continued, dealing a blow to the reputation of the organisation. At the second attempt (December meeting) the pressure on the OPEC was on to raise the quotas that had been in place (but were ill-observed) for three years, and the members agreed on a production level of 30mn barrels/day. **Actually, this**

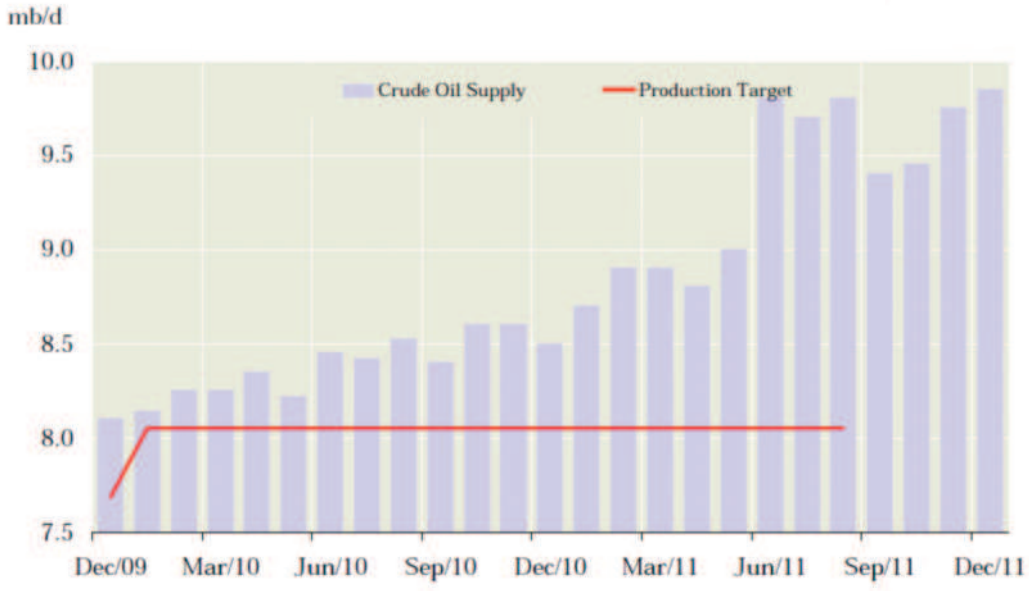
was only an adjustment to the level that was already being produced at the time.

New overall quota comes with numerous advantages for the organisation

The new production target does not consist of quotas for the various members anymore, but it is an aggregate number that applies to the total production of OPEC, including Iraq. The new overall quota comes with numerous advantages for the organisation: the lack of discipline of some members (excessive production) can be offset as well as production downtimes of other members. The natural decline in production in certain countries can be covered better, and Iraq gets the chance to step up production at the same time. Also, the new aggregate quota makes sure the OPEC retains its most important tool for controlling the oil price, i.e. the production level. **Whether or not the market participants will pay attention to the OPEC quotas in the future depends on the credibility of the organisation, which has suffered from the lack of agreement of the June 2011 meeting, which yielded no results.**

Building on the example of Saudi Arabia, the graph shows that the old OPEC production quotas have not been obeyed for a while. It also clearly illustrates the fact that the Kingdom had already stepped up its production substantially in June, in spite of the lack of agreement with the OPEC in order to absorb the disruptions in Libya.

Saudi Arabian production vs. OPEC output target



Sources: IEA OMR

The oil production of the OPEC countries averaged some 30mn barrels/day in 2011, which represented an increase of about 0.5mn barrels/day relative to 2010; at the same time, it was exactly equal to the current quota. As the following table highlights, the lost output in Libya was offset by larger production volumes in Saudi Arabia, UAE, and Kuwait.

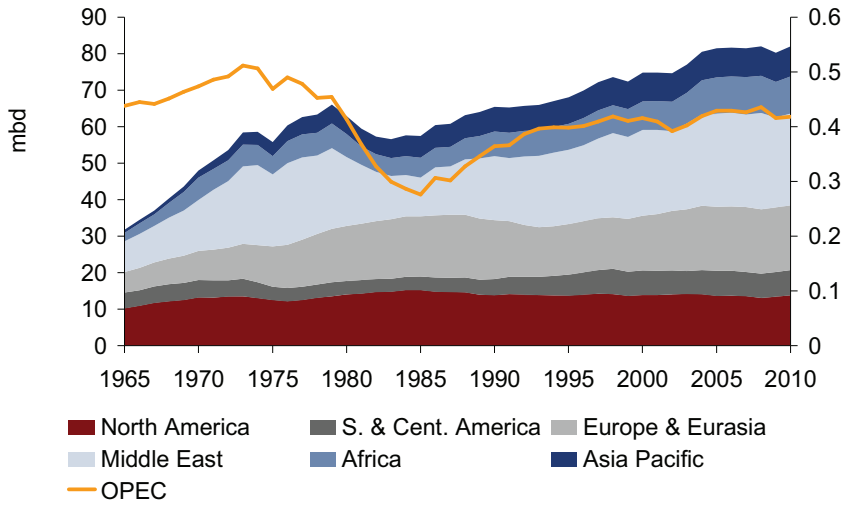
OPEC oil production (mn barrels/day)

	Oct. 2011	Nov. 2011	Dec. 2011	Sustainable Capacity	Spare Capacity Dec. 2011	Average 2011	Change 2010 vs. 2011
Algeria	1.29	1.29	1.29	1.3	0.01	1.28	0.02
Angola	1.72	1.69	1.75	1.9	0.15	1.64	-0.09
Ecuador	0.5	0.5	0.48	0.51	0.03	0.5	0.03
Iran	3.53	3.55	3.45	3.51	0.06	3.58	-0.13
Kuwait	2.65	2.67	2.62	2.84	0.22	2.5	0.21
Libya	0.35	0.55	0.8	0.75	-0.05	0.46	-1.09
Nigeria	2.02	2.1	2.06	2.48	0.42	2.18	0.1
Qatar	0.81	0.82	0.82	0.9	0.08	0.8	0.02
Saudi Arabia	9.45	9.75	9.85	12	2.15	9.34	0.95
VAE	2.51	2.52	2.58	2.74	0.16	2.5	0.19
Venezuela	2.55	2.53	2.5	2.55	0.05	2.52	-0.01
OPEC-11	**27.38**	**27.97**	**28.2**	**31.48**	**3.28**	**27.3**	**0.2**
Irak	2.69	2.68	2.69	3.21	0.53	2.67	0.31
OPEC Total	**30.07**	**30.65**	**30.89**	**34.69**	**3.81**	**29.97**	**0.51**

Sources: IEA OMR, Erste Group Research

The share of OPEC production in terms of total global oil production has settled at around 42% in the past years.

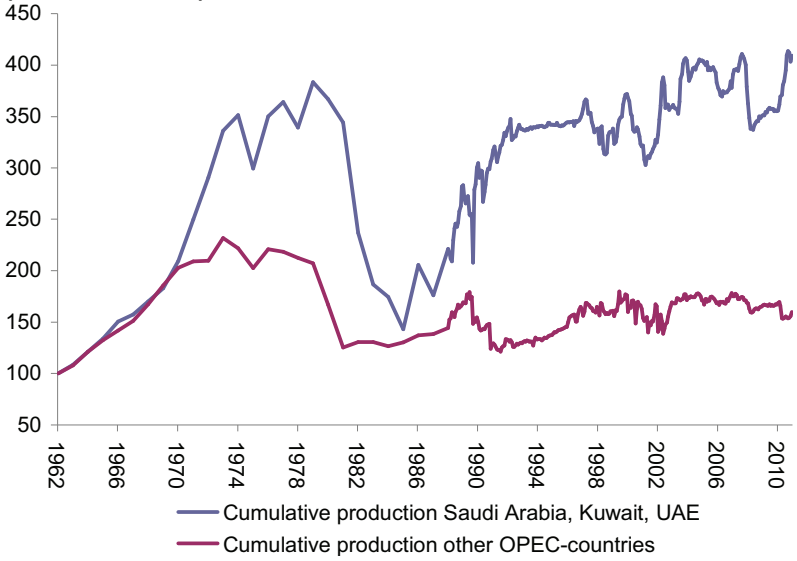
Global oil production, OPEC share (right scale)



Sources: BP Statistical Review 2011, Erste Group Research

The following chart illustrates that the big jumps in production in the past years have been largely due to Saudi Arabia, Kuwait, and the United Arab Emirates, whereas the other OPEC countries have been stagnating in terms of output volumes.

Cumulative production within OPEC (indexed to 100)



Sources: Bloomberg, BP, Erste Group Research

Iraq as the big hope – the low hanging fruit has been picked

Even though Iraqi production increased by 310,000 barrels in 2011, it seems that production growth is now starting to falter, with the low hanging fruit already picked. The Iraqi government expects to be able to raise production by an additional 9.9mn barrels/day by the year 2017. We continue to regard this assumption as illusory. The lack in infrastructure, inhuman resources, and the drastic shortfall in CAPEX would clearly suggest otherwise. Iraq holds enormous oil reserves, but the royalty agreements – except for Kurdistan – remain unfavourable for Western oil companies, which as a result have no incentive to step up exploration. BP expects Iraq to produce 4.5mn barrels/day by 2020 and 5.5mn barrels/day by 2030. However, this best-case scenario would require the political situation to stabilise further, corruption to subside, and sustainable peace to take over. **Given the history of the country. all these requirements come with a big question mark.**

Crisis in Libya shows the effects of production downtimes

Influence of downtimes on the oil price does not only depend on the quantity of the production shortfall

The spill-over of the political revolutions from the neighbouring countries to Libya and the resulting civil war have highlighted the threat caused by production downtimes in politically unstable countries. Although with an oil production of about 1.65mn barrels/day (2010; some 1.5mn barrels/day of those were exported) the country accounts for only 2% of global production, the price of Brent increased by about 25% between February and April last year. The influence of downtimes on the oil price does not only depend on the quantity of the production shortfall, but on many factors[18]:

- **Quantity vs. quality:** The quality of the lacking oil is a crucial element in the establishment of the price after the downtime. The Libyan oil is of high quality (light, low sulphur content); most of the local blends (e.g. Es Sider, El Sharara, Sirtica) are comparable to the benchmark blends Brent and WTI and cannot easily be replaced. Here the downstream segment plays an important part: if the refineries are focused on oil that can be easily processed (i.e. high grade), much like in the case of many European refineries, it has to be substituted on the world market, which pushes up the price of these specific brands. In addition, the reserve capacity of OPEC consists mainly of heavy, sulphuric brands (mainly from Saudi Arabia), which cannot fully offset the loss of light crude oil.

- **Global consequences:** Since crude oil can be shipped worldwide, downtimes do not only affect the immediately next member of the value chain. Because they will buy other brands on the world market in order to make up for the non-delivery, they will pay a higher price and thus force other buyers to source elsewhere.

- **Distance between producer and buyer:** The closer the downtime to the buyer country, the faster the effects of the disruptions. At the same time, the distance to alternative sources is relevant. Due to the proximity of Libya to Europe, the downtimes came with a direct effect on the European oil market.

- **Crude oil vs. oil products:** The consequences of crude oil production downtimes are not limited to the crude oil market, they also extend to the market of oil products beyond. Even if the affected country does not directly influence the oil product market with its delivery disruptions, the market may be affected all the same. Italy, for example, is the biggest importer of Libyan crude oil, but at the same time it also exports many of the finished oil products and thus passes on the distortions.

- **Market environment:** The market environment existing at the time of the supply outage is a crucial factor. Supply and demand, as well as inventories, reserve capacity, and refinery capacity play a role. At the moment of the Libyan downtime, many inventories were well-stocked (e.g. in the US), whereas the European ones were running at substantially lower volumes. This is another reason for the drastic price increase in Brent.

[18] EIA, This Week in Petroleum, March 2, 2011

- **Strategic reserves:** Some countries have to decide whether, in case of downtimes among their suppliers, they want to tap their strategic reserves as was the case in the US in June 2011.

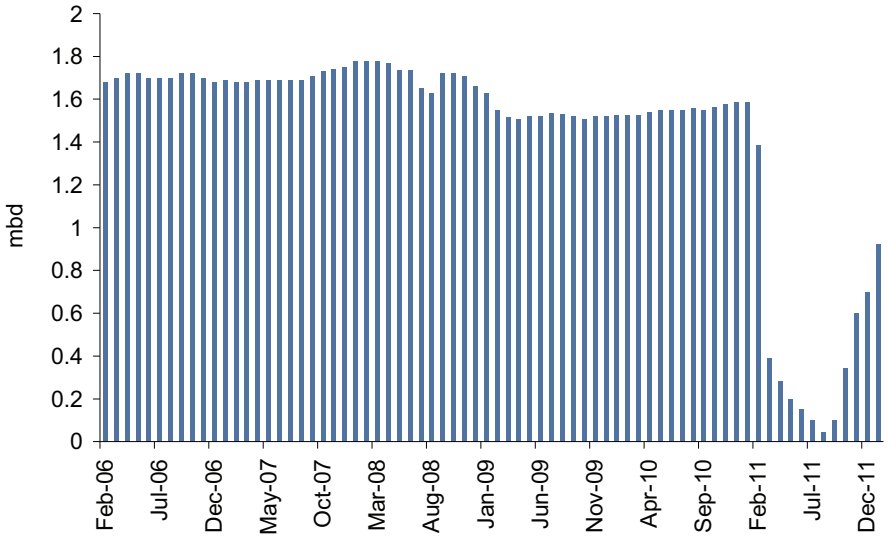
- **Blockade of transit routes:** Supply disruptions do not have to be limited to production as such, but can also be caused by the blockade of important transit routes. We will discuss the risk of a blockade of the Strait of Hormuz in the following pages. Given the revolution in Egypt, a potential blockade of the Suez Canal or sabotage to the SUMED pipeline constituted further risks.

- **Risk of contagion:** The fear that the unrest in one country could also affect others was a crucial driver of prices in spring 2011. A spillover of the unrest to the Kingdom of Saudi Arabia was by far the biggest risk, and the oil producers Algeria and Iran were also under threat of contagion.

Libyan production might be back at pre-war levels in 2013

The following graph shows the time series of the Libyan oil production. After an abrupt decline in production (international oil companies were withdrawing their personnel) and months of minimal output (during the civil war), production rebounded massively. It would not have been possible to resume production that quickly if the oil and gas industry had not been largely spared by the civil war. It seems as if the warring parties had made an effort not to damage the country's most important source of income (oil and gas accounted for 95% of export revenues in 2010). **It will take a while to reach pre-war production levels; we expect to see this level in 2013 at the earliest.**

Slump and rebound of oil production in Libya

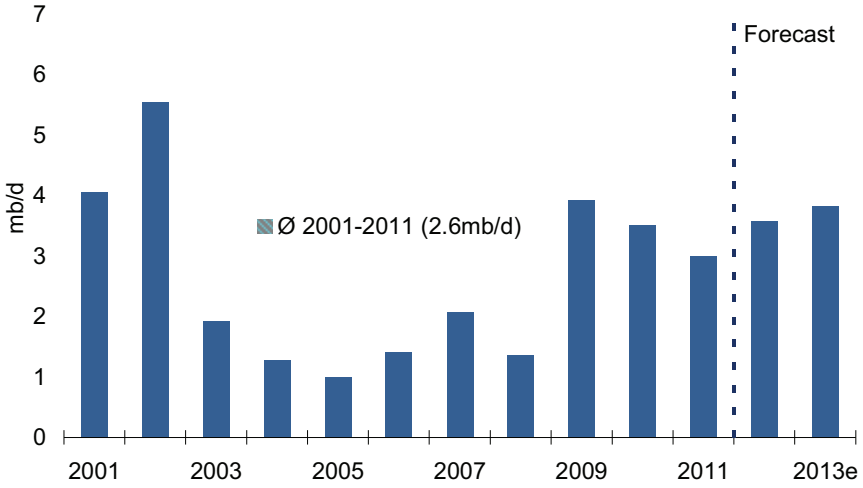


Sources: Bloomberg, Erste Group Research

OPEC reserve capacity

In times of uncertainty on the supply side, reserve capacity assumes a pivotal role. It is supposed to neutralise shortfalls and have a stabilising effect on the market. Unfortunately, it is not possible to give detailed figures for the size of OPEC's reserve capacity, since some member countries would have to expand their production to record levels and since it is not even sure this levels could actually be reached.

OPEC crude oil reserve capacity 2001-2011, outlook

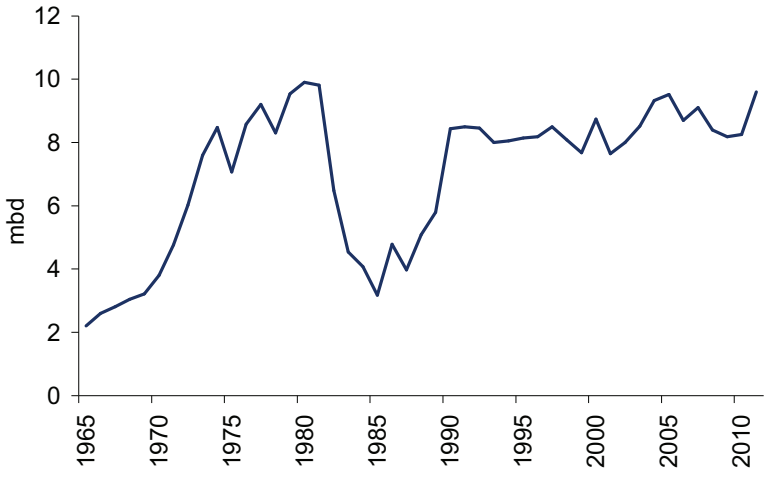


Sources: EIA Short-Term Energy Outlook, February 2012, Erste Group Research

Saudi Arabia is credited as holding 75% of total reserve capacity

According to data provided by EIA, the oil spare capacity of OPEC amounted to 2.6mn barrels/day in 2011 to 2011. Last year, Saudi Arabia had to step up its production in order to offset the lost volume in Lybia. This caused reserve capacity to decline in the second half of the year (2.55mn barrels/day vs. 3.46mn barrels/day in the first half of 2011). With Libyan production online again, the puffer should get replenished. Saudi Arabia is credited as holding 75% of total reserve capacity – a good reason to look at the production development in the Kingdom in more detail.

Oil production in Saudi Arabia



Sources: Bloomberg, Erste Group Research

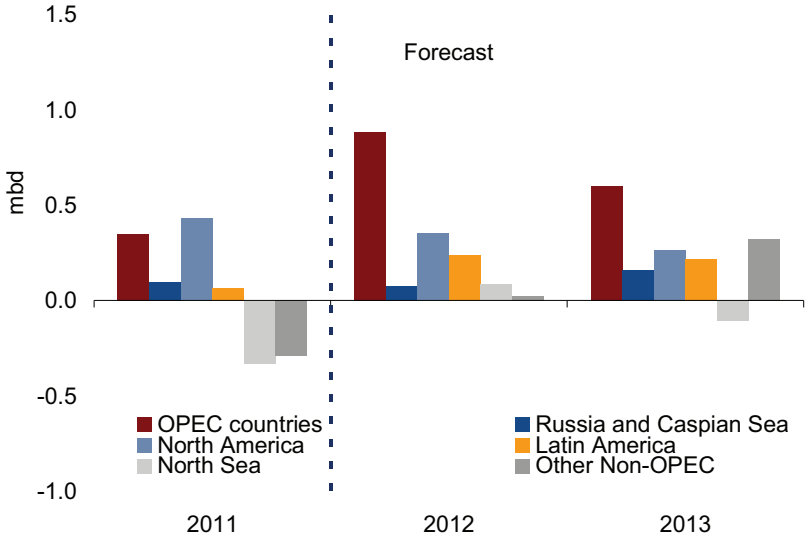
Will we only find out in an actual emergency whether the reserve capacity exists?

The assumption regarding the OPEC reserve capacity is based on the fact that Saudi Arabia can expand its production at short notice to 12mn barrels per day. However, the above graph shows that the country has never exceeded 10mn barrels/day on a sustainable basis. In 2011 average production was at 9.6mn barrels/day. In order to make up for the Libyan downtimes representatives of the Arabic country had promised to increase production to above 10mn barrels/day. However, the data at hand for 2011 reveal that production peaked at 9.94mn barrels/day in August 2011 (according to EIA). **This means there is no proof that Saudi Arabia can actually step up its production, which puts a question mark behind the actual existence of the reserve capacity.** OPEC stands by it and wants to double reserve capacity by 2015; to this end, the organisation wants to invest USD 300bn. **We fear that we will only find out in an actual emergency whether the spare capacity exists at the estimated volume.**

Non-OPEC production

While production outside OPEC had been recording substantial growth as recently as 2010, this momentum clearly declined in 2011. The estimates of the increase in oil supply by non-OPEC countries last year fluctuated between 0 and 130,000 barrels/day, which was clearly short of the approx. 850,000 barrels/day recorded in 2010.

Global production growth rates (relative to the previous year)

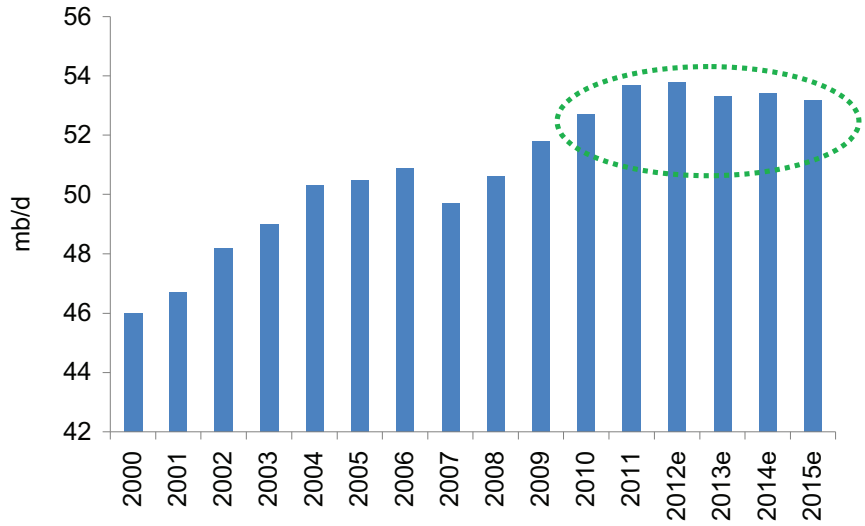


Sources: EIA Short-Term Energy Outlook, February 2012, Erste Group Research

Increase in North American production compensated for setbacks

The production growth in non-OPEC countries incurred particularly strong declines in Q2 and Q3 2011. Whereas the Q1 2011 suggested that the 2010 growth rates might be achieved again, expectations quickly had to be revised downwards following a number of unplanned downtimes (especially in the North Sea), political unrest, and disruptions due to bad weather. Along with the North Sea, the main regions affected were the Middle East, the region around the Caspian Sea, Brazil, and China. The above graph shows that the increase in North America compensated for the setbacks. Last year the production increase in his region exceeded the one in the OPEC countries.

Non-OPEC production until 2015e



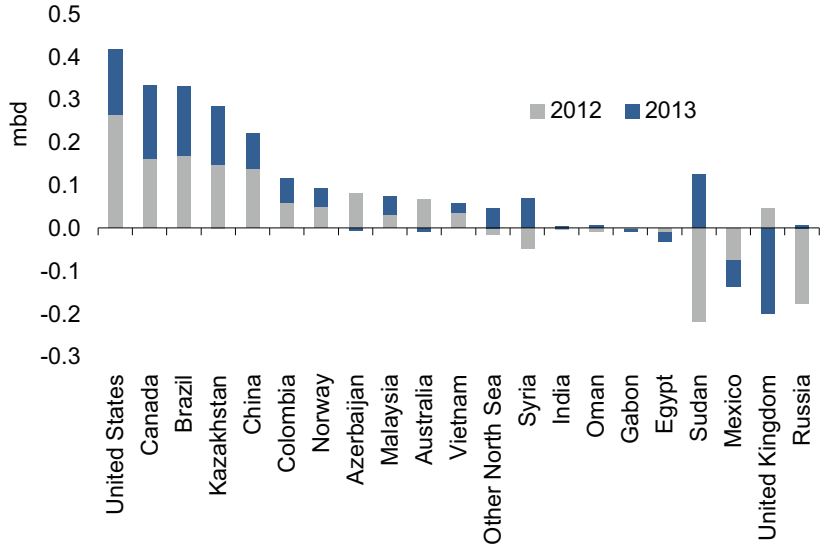
Sources: IEA, Blackrock, Erste Group Research

US and Canada will continue to show highest growth rates

The 2012 and 2013 estimates also expect the highest growth rates outside of OPEC in the US and Canada. In Canada, this is largely due to the unconventional extraction of oil from oil sands. Most of the estimates envisage production growth in Brazil over the next couple of years to be neck-to-neck with the two North American countries. The higher production volumes should be reached on the back of further exploration and additional oilfields in the Santos and Campos basins and offshore close to the Brazilian Atlantic coast. The giant Kashagan oilfield in the Caspian Sea (whose operational launch was delayed again[19]) is supposed to contribute to production growth. **One issue that catches one's eye in the following chart is the fact that EIA (and others) expect(s) the supply hailing from the UK to drop significantly in the coming years.**

[19] The Kazakh oilfield Kashagan was discovered in 2000 and seems to be a symbol of the problems the sector has in developing large projects. Kashagan is one of the biggest discoveries in the past decade and will produce more than 1mn barrels/day in stage 1. Whereas initial estimates put costs at USD 10bn, total costs are now expected to reach almost USD 140bn. The delay is symbolic as well. Previously production was supposed to commence in 2005, now the first barrel is scheduled for production for the second half of 2012. Plans were to produce 370,000 barrels by 2013, and to ramp up production to 1.5mn barrels/day by 2017 (stage 2), but this seems illusory at the moment.

Non-OPEC production growth



Sources: EIA Short-Term Energy Outlook, February 2012, Erste Group Research

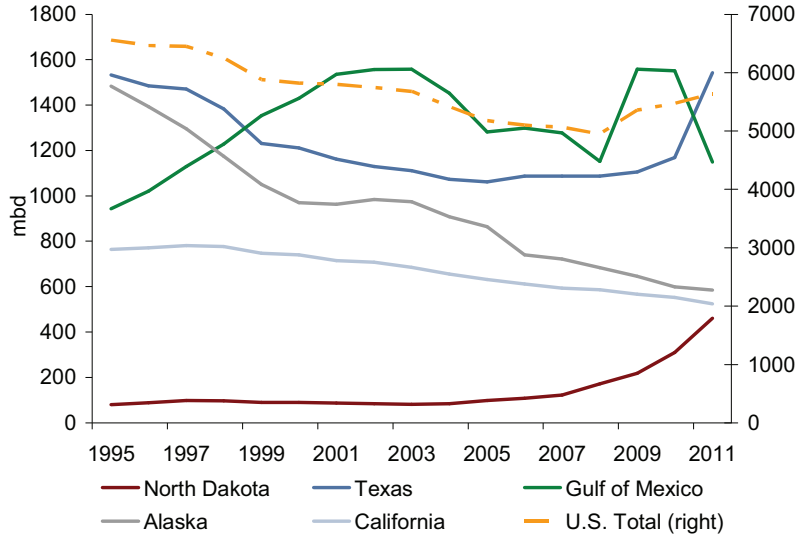
Trend reversal in US

US production has rebounded drastically because of shale oil

In the US, we have seen a dramatic trend reversal: the oil production, on the decline since 1970, has rebounded drastically since its low in 2008. The reason: shale oil. While the old oilfields in Alaska and Texas are apparently way past their prime, unconventional production methods have caused the State of North Dakota, which used to be of no relevance in terms of oil production, to skyrocket to the top league of oil producers in the US. North Dakota is home to the Bakken Formation, which for years has been known to hold vast shale gas reserves and which now has begun to see a rapid increase in oil production from shale oil as well. As a result, oil production in that State increased from 98,000 barrels/day in 2005 to more than 460,000 barrels per day in September 2011, which almost matches the output of the OPEC member Ecuador. IHS CERA estimates that the Bakken Foundation will produce about 1mn barrels of oil per day. The youngest star among the US oilfields is the Eagle Ford Formation in Texas, which according to estimates, could produce up to 750,000 barrels/day by the year 2013. Texas has been facing decreasing oil production for a while, and the trend was only broken when the unconventional drilling methods for shale oil had come along. According to the latest numbers by EIA the output in the US State increased enormously in 2011. **For the whole of the US, IHS CERA expects aggregate oil production from unconventional sources to rise to 3mn barrels/day by 2020, whereas the US National Petroleum Council expects that volume only for 2035.**

Some five years after the shale gas boom, sharp increase in unconventional oil could make the Western hemisphere self-sufficient

US oil production (1995-2011*)



2011 data are based on September 2011 values
Sources: EIA, Erste Group Research.

North Dakota produces almost as much oil as OPEC member Ecuador

In shale oil production ("tight oil"), the disputed fracking technology is used. This method has been used in the production of shale gas for a number of years, but has only recently been introduced for (an economically viable production of) shale oil. Some five years after the shale gas boom, experts now predict a sharp increase in unconventional oil production, which could make the Western hemisphere self-sufficient on the energy front until 2030 (according to BP). **The biggest producers claim that oil production from shale is profitable from an oil price of about USD 60/barrel onwards.** Given the current oil price of about USD 100/barrel (WTI) the boom of the new oilfields is understandable.

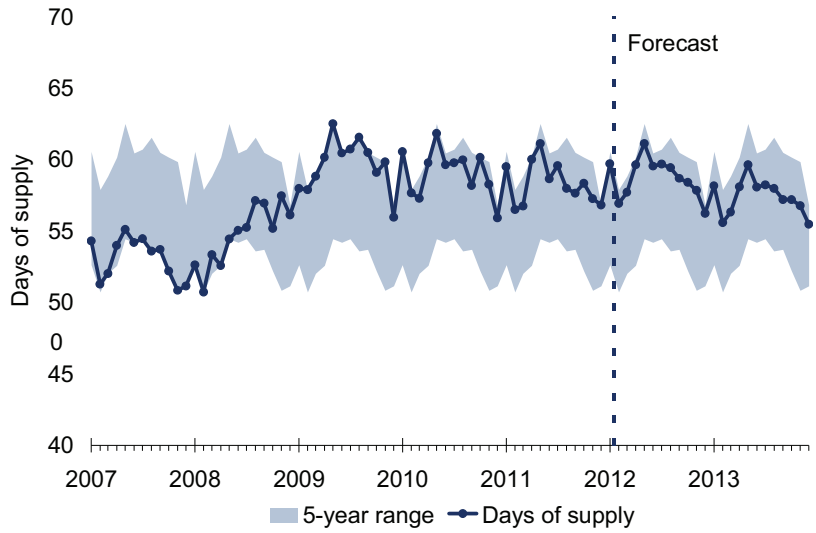
The above chart also clearly illustrates the fact that oil production was strongly receding in Mexico in 2011. After the Deepwater Horizon disaster, the regulations concerning deep-sea drilling were tightened, the consequences of which are obvious.

Inventories

OECD inventories well stocked, but…

The level of inventories in crude oil can affect the short-term development of the oil price in a certain region and thus merits attention. The following chart highlights the fact that the OECD inventories are well-stocked; they cover about 60 days' worth of consumption at current consumption rates.

Commercial inventories in oil in the OECD

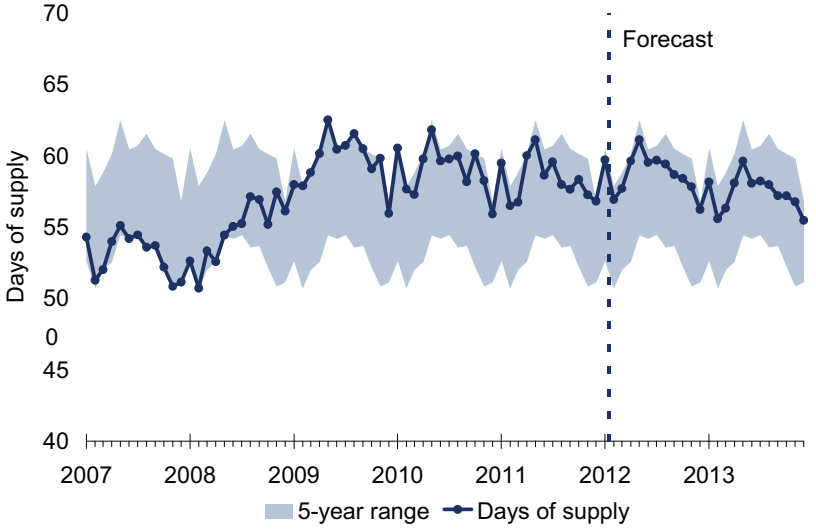


Sources: EIA Short-Term Energy Outlook, February 2012, Erste Group Research

…only in the US

However, a regional breakdown reveals a different picture. Whereas the inventories are filled to the brim in the US, their European counterparts in the OECD countries are below the 5Y bandwidth.

US oil inventories

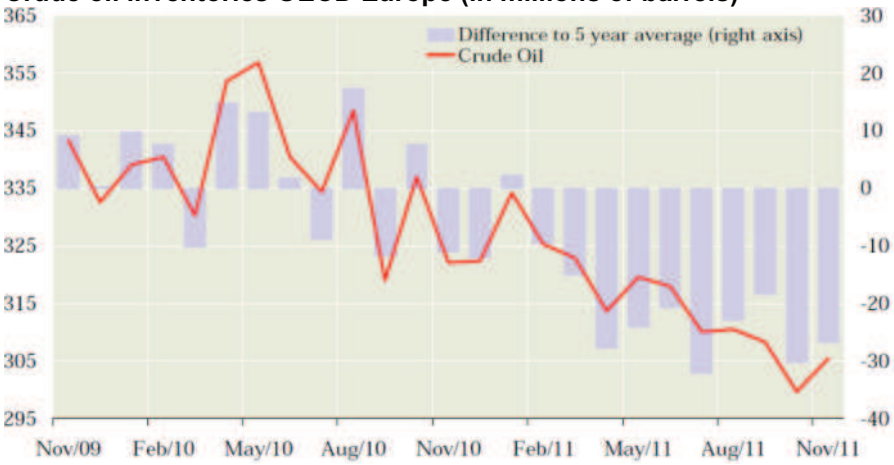


Sources: EIA Short-Term Energy Outlook, February 2012, Erste Group Research

Currently inventories in Europe are substantially below the 5Y average

The above chart shows that the oil inventories in the US were well stocked and above the 5Y bandwidth at the end of 2011. The opposite is the case in Europe. The chart below clearly illustrates the fact that inventories were continuously falling over the last year and that the current value is substantially below the 5Y average, after hitting the lowest value since 2003 in November. One reason for this situation is surely the crisis in Libya; the lack of high-quality oil from Libya led to inventories being tapped. The divergence in inventories in the US and Europe has also contributed to the widening of the spread between the now more expensive European Brent and the US WTI to a record size in 2011. **In Europe the current data suggest that the price of Brent will remain high. However, the comeback of the oil production in Libya should facilitate the re-stocking of inventories in Europe in 2012.**

Crude oil inventories OECD Europe (in millions of barrels)



Source: IEA Oil Market Report, January 2012

Excursus: Oil price development from the perspective of the Austrian School of Economics

Austrians with an alternative view on the development of the oil price

The Austrian School provides a new angle on the development of the oil price. We already discussed the oil price development from the perspective of the Austrian School of Economics in our Oil Reports 2010 and 2011. The recent economic events have caused a renewed interest in the ideas of the Austrian School. The purpose of our Oil Report is to provide the reader with a better basis for decision-making on the back of the facts and analyses presented in this write-up.

Focus on price and market

Mises would focus on price and market

If we had the chance to meet Ludwig von Mises in a Vienna café in order to discuss the current oil market and the development of the oil price, he would, having ranted at length about current political events, draw our attention to two basic aspects: 1) price and 2) market. Von Mises would explain to us that the price in its original, pure form is nothing but the expression of a barter ratio of goods or services. In this original form prices send correct signals about the actual availability of real goods to the market participants. These participants can take correct production decisions on the basis of the availability of real goods**. In a free market society money itself would be a good, which would ensure that all prices are always the manifestation of barter ratios.**

Let's assume for example that in a free village economy about 10,000 ounces of silver are in circulation, and that the market participants use this silver as currency (N.B. most marketable good) in their transactions. At the moment the following exchange rates for barter transactions have established for 1kg of potatoes and 1kg of tomatoes:

Barter table – starting point

1 kg of potatoes	½ ounce of silver
1 kg of tomatoes	1 ounce of silver

Let's assume the village is gradually discovering the blessings of crop rotation in agriculture, as a result of which the crop of potatoes and tomatoes doubles after five years at a constant input of labour and land. The exchange ratios of silver, potatoes, and tomatoes would settle according to the following table:

Barter table – after the discovery of crop rotation

1 kg of potatoes	¼ ounce of silver
1 kg of tomatoes	½ ounce of silver

This development would correctly signal an excess of potatoes and tomatoes to the market participants. The barter/exchange ratios of all food would gradually decline, making other activities (e.g. livestock breeding) more attractive. In the opposite case, where the crop decreases (e.g. because of erosion) the barter ratios would shift in favour of potatoes and tomatoes (and other food).

Barter table – after soil erosion

1 kg of potatoes	1 ounce of silver
1 kg of tomatoes	2 ounces of silver

Natural order of money sends price signals

This increased barter rate of tomatoes and potatoes would induce the villagers to invest more resources (labour, brain power) in agriculture in order to keep famine at bay. **It is important to realise that the natural order of money sends the right signals to the villagers with regard to the stock of real goods in the village economy, thus enabling them to live and survive in harmony with the available resources.**

Fiat money – "the magic wand"

Fiat money disturbs the natural order of prices and its signalling effects

A natural monetary system, where money itself is a good, is a closed system, within which all market participants are forced to take either/or decisions all the time. In order to obtain money (i.e. the most marketable good) every market participant has to enter a good into a barter transaction (or of course steal – but that, too, keeps the money supply constant). The cunning aspect of this system is the fact that in every transaction every market participant has to subject himself to the actual stock of real goods.

Fiat money is backed by "nothing" and thus breaks the closed circle of a natural money system

However, as soon as the price is expressed in terms of fiat money, the natural way of establishing the price loses its basis. Fiat money is by definition created from "nothing" and thus breaks the closed circle of a natural monetary system. Those institutions and persons with the biggest influence on the fiat monetary system can thus shake off the shackles of the natural, limiting money and are not confined to either/or decisions anymore. Rather, they can fulfil all their wishes at the same time – of course at the other members of society's expense, as the material limitations have not changed. The consumption preferences of those controlling the fiat money therefore also have the biggest influence on the price system in the economy. This influence comes with grave consequences: due to the signalling effect that the prices have for the market participants (tomorrow's production decisions are based on today's prices) it is possible to influence the entire production and consumption structure of an economy via the introduction and control of fiat money.

Price fluctuations are also caused by changes in the money supply

In a fiat monetary system it is therefore crucial to consider not only the development of the two components' supply and demand, but also that of the fiat money supply. **If for example the money supply in circulation rises more quickly than the oil supply, the oil price – expressed in fiat money – will probably rise although the demand situation has not changed.** Price fluctuations are then not only caused by changing supply and consumer preferences anymore, but also by changes in the money supply. This makes everything much more complicated. Ludwig von Mises would therefore advise us to study the money supply statistics in detail and also to think about what institutions exert a dominant influence on the fiat monetary system and closely monitor their interests.

Development of the monetary supply essential for price forecasts

The second essential point is the structure and the system of the market where supply and demand meet and prices are established as the outcome of the process. In order for the price to actually reflect the supply and demand situation, the market has to be transparent and the process of price discovery has to be retraceable for all participants. Historically speaking, prices used to be very regional, and prices used to be established on the basis of the very regional physical supply and demand situation. The technological progress in information technology and transportation has furthered the global integration of markets.

In addition, so-called forward exchanges have developed over the centuries. This development has led to a situation where there are not only daily prices for numerous commodities, but also prices for delivery at some future date. Basically the question emerges how daily prices (spot prices) and future (forward) prices influence each other. For example if the forward price is clearly above the spot price (in a way where inventory and financing costs are more than covered) commodity producers will not sell on the spot market, but will prefer to sell forward and thus postpone delivery. This reduces the physical supply on the spot market; at constant demand, the spot price will rise and follow the forward price. Given that the forward market is a "paper market", where contracts are traded on margin, it is possible to gain substantial control over forward prices, with very low amounts of money. **Ludwig von Mises would therefore strongly advise to take this fact into consideration in forming one's price expectations, especially in the short run.**

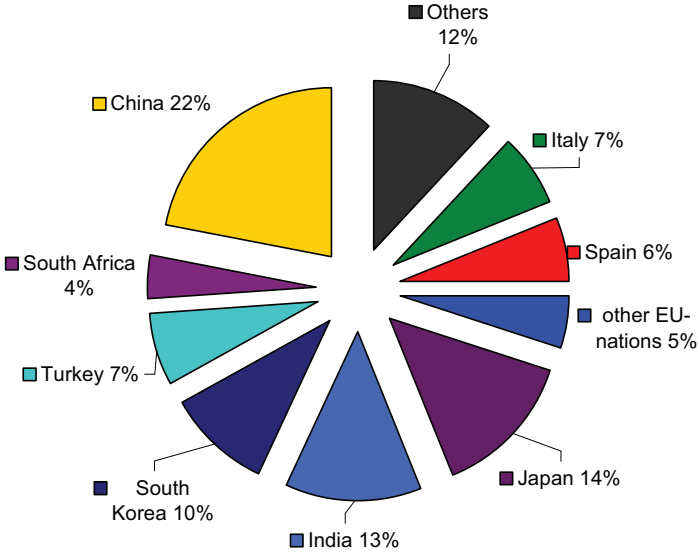
Excursus by Gerald Walek, CFA

Power struggles at the Persian Gulf – is another Gulf war imminent?

Iran is the third-largest oil exporter worldwide, with Asia being its most important export market

Iran is currently the fifth-largest oil producer in the world, the second-largest producer in the OPEC, and the third-largest oil exporter worldwide. Of the total production of almost 3.5mn barrels/day, 2.285mn barrels/day were exported last year. 0.8mn barrels/day are shipped to the OECD countries in Europe, 0.6mn barrels/day of those to the EU and 200,000 barrels/day to Turkey (50% of the Turkish demand). But Asia is the most important export market at 1.5mn barrels/day, with China alone accounting for 550,000 barrels. Japan, India, and South Korea are also important trading partners.

Destinations of the Iranian oil exports

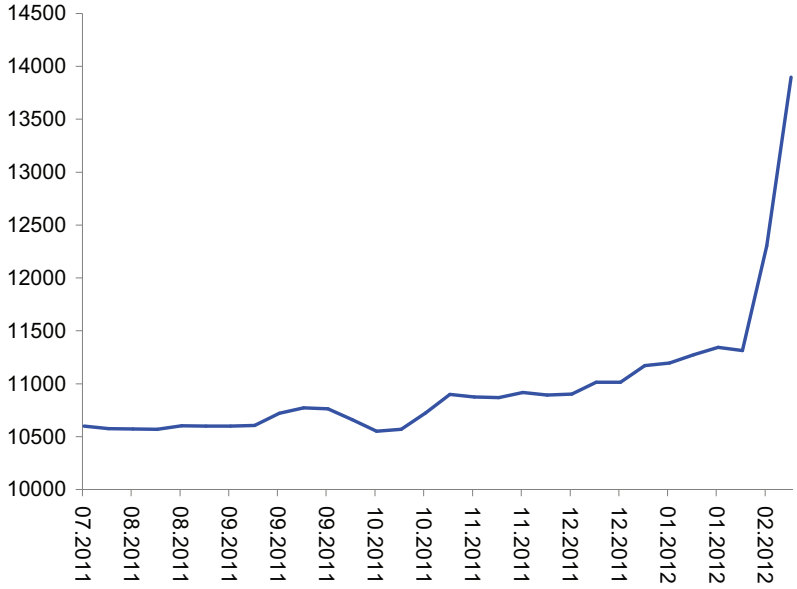


Source: EIA

US sanctions mean Iran has effectively been excluded from the US dollar system

On 31 December, US President Obama ratified a law that was intended to step up the pressure on Iran. In their strictest sense, the economic sanctions imposed against the Iranian central bank and the financial sector mean that international banks will be excluded from the dollar system if they maintain their business relations with the Iranian central bank. The measures are aimed against foreign private banks, state-controlled institutes and central banks.

Exchange rate US dollar / Iranian rial



Sources: Bloomberg, Erste Group Research

US sanctions causing inflation and the collapse of the Iranian rial

This has resulted in an immediate isolation of Iran from the dollar system. Due to the dollar shortage, the Iranian rial depreciated by 30% against the US dollar within a matter of days[20]. Due to the strong dependence on imports in most sectors, inflation has begun to turn into hyperinflation. The sanctions have already had a drastic effect on everyday life. Since the imports of commodities cannot be paid anymore, grain imports (among others) are now paid in gold[21]. Oil has also been offered as currency in barter transactions. The price of rice has doubled since the beginning of the sanctions and the price of corn has tripled. It is impossible to get foreign exchange on the black market. Iranian banks increased interest rates to 20% in order to slow down the bank run.

Domestic situation on the verge of escalation

The government knows that the level of discontent due to the drastic price increase of food and energy is enormous and might escalate soon. Given that parliamentary elections are imminent (i.e. to be held in March) the opposition might now call for mass demonstrations. Therefore we do not expect the situation to relax in the near future.

McCollum's memo as blueprint?

Within a few weeks, the US have thus isolated Iran from the international banking sector, destroyed the currency, and induced hyperinflation. In terms of military strategy, the US seems to be following "McCollum's memo" [22] – many details are a 1:1 copy of the oil embargo against Japan that was imposed on 25 July 1941, which pretty much meant a stab in the back to the Japanese, because of their extremely high dependence on oil imports. On 7 December 1941 Japan eventually attacked Pearl Harbor[23].

On 1 July, the EU also imposed a complete embargo on oil and oil products. Deliveries of equipment for the Iranian oil industry and

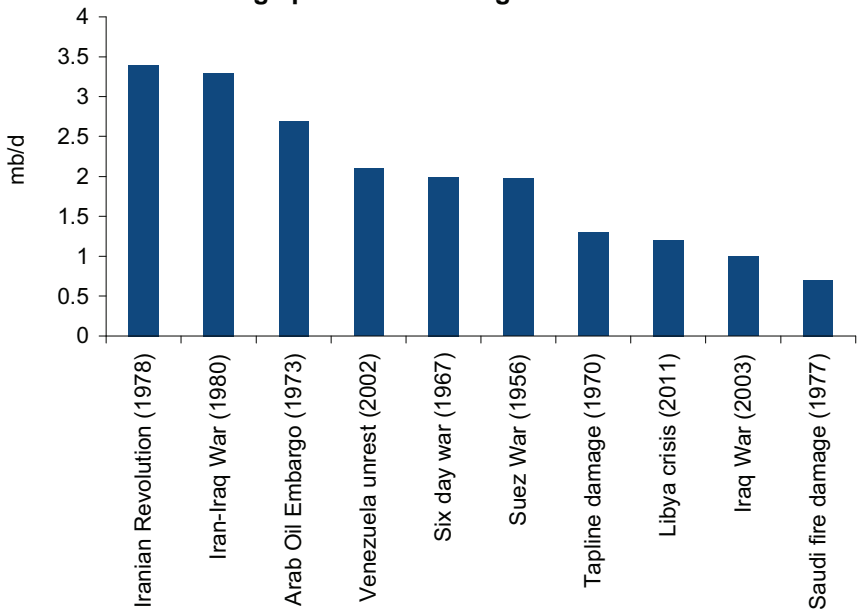
[20] Jim Rickards: Iran, The Dollar And Financial Warfare
[21] "Iran paying for grain with gold, oil", Reuters
[22] http://en.wikipedia.org/wiki/McCollum_memo
[23] Please refer to "Silberjunge", 21 January 2012

investments in Iranian oil companies have also been disallowed. And for the first time, sanctions against the Iranian central bank have been imposed: its assets were frozen in the EU. We believe that eventually the sanctions will just turn into oil price subsidies for Asian buyers. China and India will be happy to fill in at significantly better terms for the European importers. **We think that the consequences will not only harm Iran, but ultimately the entire world.**

Oil crises caused price increase of 30-70% and US recession

A look into history supports this view. The Yom Kippur War in 1973, the Iranian Revolution in 1978, the first Gulf War from 1980 onwards, and the first war at the Persian Gulf from August 1990 onwards all led to a decline in global oil production of 4-7%. **As a consequence, the oil price increased by a minimum of 30% and a maximum of 70%. Each one of those wars was followed by a recession in the US.**

Oil crises and average production outages



Sources: EIA, ML GCR, Hinde Capital

Sanctions will cause a drastic decrease in production

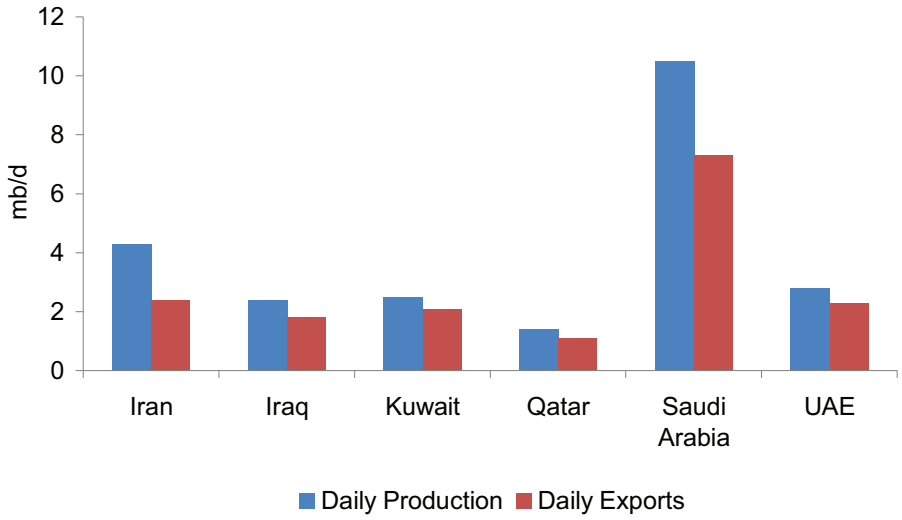
The sanctions will also expedite the downward trend of Iranian oil production. Numerous foreign project managers will leave the country and the access to capital, technology, and human resources will gradually dry up. According to National Iranian Oil Company, USD 30bn would have to be invested annually in order to achieve the production target of 5.15mn barrels/day until 2016. We believe this is unrealistic. Therefore we expect production to fall to slightly less than 3mn barrels/day by 2014. **If domestic demand continued to develop as dynamically as in the recent past (which, however, is doubtful, due to the recent cuts in subsidies), oil exports would drop below 1mn barrels/day by 2015.**

The aorta of the oil business – How likely is a blockade of the Strait of Hormuz?

***"If the world makes the region insecure, we will make the world insecure",* Parwis Sawari**

The more and more explicit nuclear rhetoric and the threats of a blockade of the Strait of Hormuz may soon cause the conflict to escalate. We described two years ago what the temporary shutdown of this neuralgic location of global energy trade would entail. The Strait of Hormuz connects the Persian Gulf in the West with the Gulf of Oman and the Indian Ocean in the East. The strait is about 180km long and, at its narrowest point, only 55km wide. Almost 35% of the oil shipped by sea and 20% of global oil production is transported through this maritime eye of a needle on a daily basis.

Production and exports at the Persian Gulf



Sources: IEA, Bloomberg, Datastream, Erste Group Research

A blockade would come with dramatic short-term consequences. **China would be particularly hard hit.** More than 40% of the Chinese oil imports pass through the Strait of Hormuz. This means that Iranian oil is more important to China than Saudi Arabian oil is to the US.

***"Closing down the strait is easier for the Iranian military than drinking a glass of water"* Habibollah Sajjari, commander of the Iranian Navy**

When comparing the military capacities, we do not believe that Iran is able to block the strait for an extensive period of time. According to the Economist Intelligence Unit, Iran may have a large (about 520,000 soldiers), but outdated army. The military budget amounts to about USD 13bn (by comparison, the US defence budget is USD 554bn)[24]. According to International Institute of Strategic Studies the Iranian Navy, which is based at the estuary of the Strait of Hormuz, is currently about 190,000 men strong. It owns many small and manoeuvrable torpedo boats and patrol boats. The strait does not favour large war ships by definition, in the New York Times a US military official has called a military confrontation in that region a **"knife fight in a telephone booth"**. The biggest threat on the Iranian side is probably posed by the three highly advanced submarines of Russian design, which can deploy sea mines. At the moment Iran owns about 2,000 sea mines and a fleet of mini-submarines of its own production.

[24] Economist Intelligence Unit, Iran risk: Alert – Dire Straits

Iran clearly inferior in military terms

By comparison, the US clout is enormous. The Fifth Fleet is based in Bahrain and usually comes with 1-2 aircraft carriers, 6 cruisers, and 7 destroyers. Capacities are being expanded as we speak. In addition, the UK has dispatched the HMS Daring, one of the world's most modern anti-air warfare destroyers. The Iranian air force would probably have a hard time trying to defend itself in this uphill battle.

USD 150-200 temporarily likely in case of a blockade

Even if Iran managed to maintain a blockade for only a short while, the consequences would be dramatic. The oil price would definitely set new all-time-highs and might reach USD 200. The long-term effects are difficult to assess. Iran would retaliate and probably attack the pipeline infrastructure as part of their guerrilla tactics, and generally try to destabilise the region. This would also come with a huge impact on the freight industry in the region, because sea shipments could hardly be insured any longer.

Pipelines and strategic oil reserves would mitigate the oil crisis temporarily

We regard doomsday scenarios as exaggerated given that the oil reserves of almost 1.5bn barrels (1.27bn of which crude) could offset supply outage for a couple of weeks. On top of that, Saudi Arabia is slightly more flexible with regard to its export routes. Three pipelines go to Yabu at the Red Sea, with a capacity of 4.5mn barrels/day. In addition the UAE is planning to complete a pipeline with a capacity of 1.5mn barrels/day from Abu Dhabi to the Gulf of Oman by summer. The pipelines would definitely mitigate the effects on the oil market, but not fully neutralise them.

Cui bono?

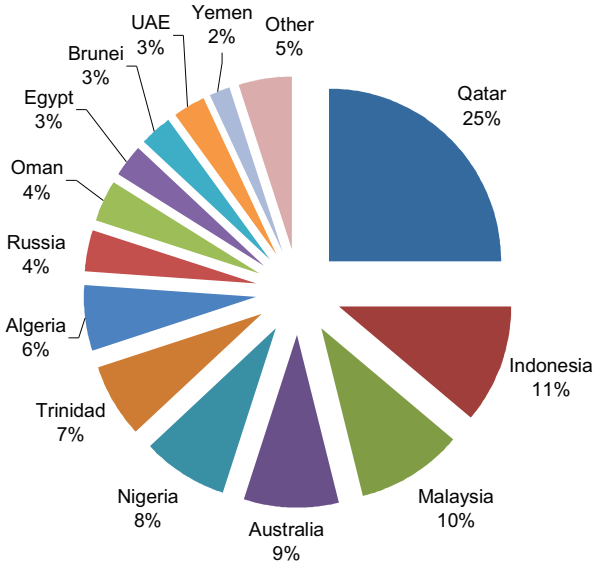
A blockade would also massively affect Iran itself

Iran would score an own goal with a blockade. The fact that all important tanker terminals are located on the side of the Persian Gulf means that a blockade of the strait would affect the Iranian oil exports just as much. Iran is hugely dependent on the oil sector. The sale of oil accounts for more than 60% of tax revenue and 80% of export revenue. Due to the lack in refinery capacity Iran also has to import the majority of its petrol and heating oil.

Blockade would have grave effects on the LNG market

Although the first thing that comes to mind in connection with a possible blockade is the shortfall in oil, we believe that the impact on the LNG market would be substantially more severe. Qatar is by far the biggest producer of LNG with a market share of 25%. But in contrast to oil, there is no way of avoiding the Strait of Hormuz for LNG. This means that more than a quarter (Qatar and UAE) of global LNG capacity would be affected.

Breakdown of LNG producers in terms of total production

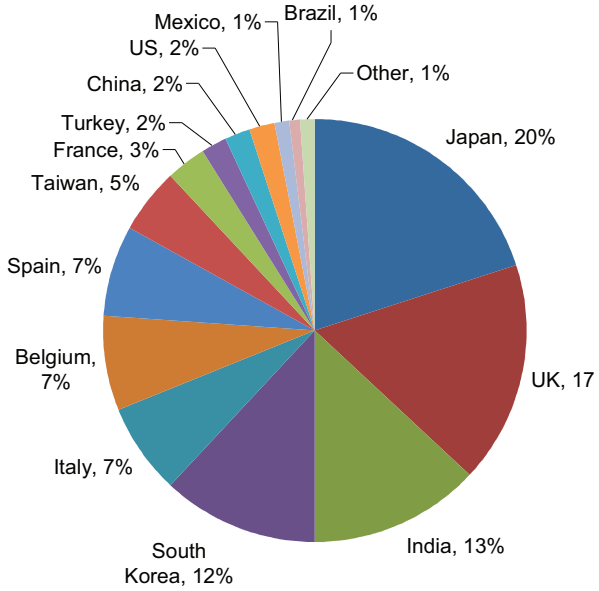


Sources: BP Statistical Review of Energy 2011, Erste Group Research

A "double whammy" for Japan

The majority of exports of liquefied natural gas cross the Persian Gulf on its way to Asia. Japan, India, and Korea are the most important buyers. Consequentially these countries would be hit on both ends by a blockade – on one hand by a decrease in LNG deliveries, on the other hand by the drastically rising oil price. Japan would be particularly hard hit, having switched largely to gas after the Fukushima disaster. Also, Japan is one of the last industrialised countries to still use high quantities of oil in its power production. **Japan would probably have to ration energy if the supply chain of oil or LNG were to be disrupted**[25].

LNG deliveries from Qatar and UAE



Sources: BP Statistical Review of Energy 2011, ERSTE Group Research

[25] Please refer to "Qatari There Yet? What a Hormuz Closure would mean to the Global LNG Market", Raymond James

Petrodollar exiting through the back door?

"When the dollar collapse comes, it will happen two ways – gradually then suddenly. That formula, famously used by Hemingway to describe how one goes bankrupt, is an apt description of critical state dynamics in complex systems. The gradual part is a snowflake disturbing a small patch of snow, while the sudden part is the avalanche. The snowflake is random yet the avalanche is inevitable. Both ideas are easy to grasp. What is difficult to grasp is the critical state of the system in which the random event occurs."
Jim Rickards, Currency Wars

US dollar hegemony subject to increasing erosion

As already published in the previous Oil and Gold Reports, the US dollar hegemony has been subject to increasing bouts of criticism. China, Russia, and India, but also Japan, are the countries that have gradually been switching the settlement of their bilateral trade in their own currencies or in commodities in order to circumvent the US dollar. This is a clear sign of a paradigm shift, especially since more than two thirds of the US currency is held abroad.

S&P threatening another downgrade

Last year, the Chinese rating agency Dagong Global Credit raised eyebrows when it downgraded the rating of the US to A and reduced the outlook to "negative". According to Dagong, the QE scheme has sustainably eroded the legitimacy of the US dollar as global reserve currency. The rating agency regards the lack in willingness to pay off the government debt as ignorance vis-à-vis the creditors. **In 2011 S&P downgraded the US rating to AA+. Since the, according to S&P, reckless budget policy continues, and a further downgrade is possible. Since Barack Obame took office, the US government debt has increased by 50%.**

"*Cross the river by feeling for the stones*" (Chinese saying)

The Chinese policy of small steps signals the increasing intention to turn the renminbi into a freely convertible currency and to gradually liberalise the capital market[26]. By 2020, China wants to have turned Shanghai into an international financial centre.

China wants to settle 50% of its foreign trade in yuan by 2016

The open criticism vis-à-vis US politics is becoming louder even as we speak[27]**.** And the fact that China wants to achieve full convertibility for the yuan in the long run is becoming clearer by the day. This would be a big step towards a new global leading currency. China is preparing for the post-USD era at full speed. The yuan should outrank the US dollar in terms of global relevance within but a few years. Yi Gang, the co-chairman of PBoC has recently made reference to a liberalisation within the next five years. Li Xiaojing, Managing Director of Bank of China in New York, has already mentioned the preparation work for the day that the Chinese currency will be fully convertible. He regards this as one of the highest priorities[28]. The plans are more than just ambitious, but China has a track record of showing that it is possible to achieve ambitious goals if the political will is there. At the moment only 0.4% of all foreign exchange transactions are settled in Chinese currency. The US dollar has recently accounted for 43% of total transaction, the euro for close to 20%, and the Japanese yen for 10%. **This**

[26] Please refer to "Chinas Renminbi ist auf dem Weg zur neuen Weltwährung" (*The Chinese renminbi on its way to becoming the new world currency*), Frankfurter Allgemeine Zeitung
[27] Please refer to our Special Report Gold Gold 2011, "China on the way to a global currency?", Erste Group, July 2011
[28] Wall Street Journal, "Experts' View on a Free-Floating Yuan: Slowly but Surely", January 2011

means that the yuan is clearly underrepresented in view of the already central relevance of China for the world's economy.

China is preparing for the post-dollar era

Currently, numerous smaller agreements are being signed that reveal the overall long-term strategy. We assume that this is how China wants to gradually boost demand without achieving outright convertibility right away. Within the framework of the new five-year plan, China wants to settle almost 50% of foreign trade in yuan by 2016. It wants to invoice in yuan in the bilateral trade transactions with African or Latin American countries that are rich in resources. Iran for example is said to supply oil for yuan. In addition, the PBoC has allowed almost 70,000 companies to invoice its foreign business worth almost USD 70bn in yuan.

Numerous further examples indicate the fact that the dollar scepticism is growing:

- India wants to pay in gold for Iranian oil[29]. And, according to reports in the media, China may soon follow suit. The two countries together account for almost 40% of Iranian oil exports and are at the same time by far the biggest consumers of gold.
- In October, China reported that it had signed a free **trade agreement with the ASEAN[30] members,** in the framework of which **transactions would be settled in yuan**. China also announced that a central bank for the entire ASEAN region would be set up and the yuan should be the reserve currency. In addition to the ASEAN countries, Japan and South Korea would also be invited to participate in the central bank. Since the bilateral free trade agreement ratified in 2010, trade between China and the ASEAN members has increased substantially. The ASEAN group has meanwhile become the third most important trading partner for China, after US and the EU. **By 2015 ASEAN wants to create a common market for its 600mn citizens.**
- Ecuador announced it was going to settle its debts owed to China (almost USD 5bn) through future oil deliveries.
- At the beginning of January, Iran and Russia agreed not to trade in US dollar anymore, but instead to resort to rouble and rial.
- India and Japan signed a currency swap agreement worth USD 15bn in order to facilitate bilateral trade.
- In July 2011, China and Iran agreed on a barter set-up for Iranian oil and Chinese goods[31].
- Japan and China, too, want to circumvent the US dollar even farther[32]. In December Prime Minister Wen Jiabao and the Japanese Prime Minister Noda agreed to promote trade in yuan and yen. China has become Japan's most important trading partner (USD 340bn per year). Both countries hold the highest volumes of US Treasuries, which is why the symbolic meaning of this agreement cannot be over-emphasized.

[29] "India to pay gold instead of dollars for Iranian oil", Debka
[30] Member states: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, VietNam
[31] "Iran, Russia, Replace Dollar with Rial, Ruble in Trade, Fars say", Bloomberg
[32] "China, Japan to Back Direct Trade of Currencies", Bloomberg

Does the skyscraper index signal a weaker oil price?

"The construction of skyscrapers that qualify as the "World's Tallest Building" tends to coincide with major downturns in the economy" Mark Thornton

Urban hubris heralding an overheating economy?

The "skyscraper index" is a reliable warning signal of the end of an economic cycle. Even if the indicator, created by Andrew Lawrence and developed further by Mark Thornton, looks like a contrived correlation at first glance, it turns out to be a close reflection of the boom & bust cycle. The construction of the highest building does of course not cause an economic slump, but it illustrates the economic connection between construction booms and financial crises. **The skyscraper megalomania is thus tangible proof of the astuteness of the theory of economic cycles as put forth by the Austrian School of Economics.**

Flawed entrepreneurial decisions are mercilessly uncovered in the bust phase

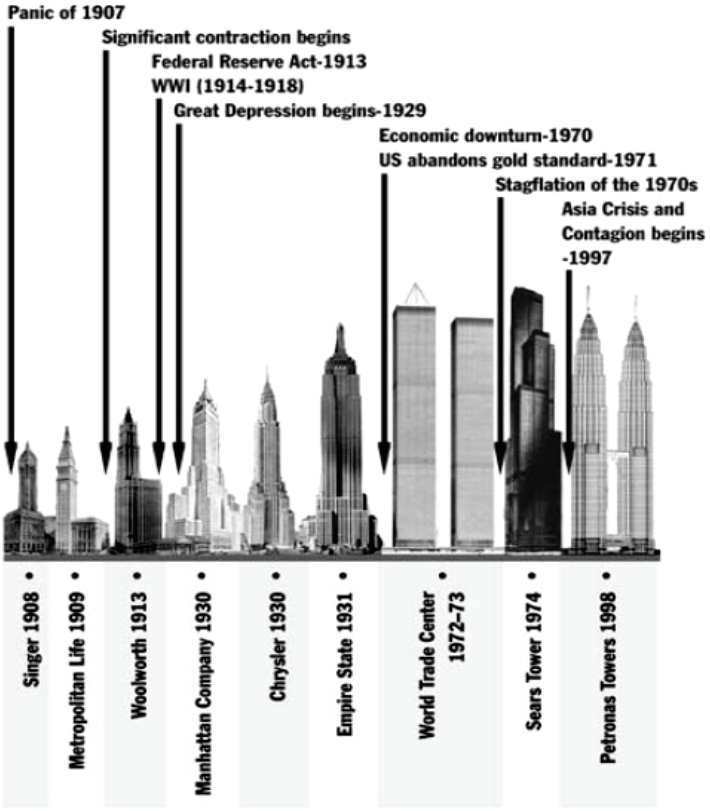
The construction of the highest building in the world symbolises inefficient resource allocation and an irrational assessment of the future. The dire situation starts with (too) low interest rates, the expansion of the money supply, and excessive speculation. This results in an extrapolated sense of euphoria, economic arrogance, and megalomania as well as a "this time it's different" mentality at the end of the cycle, each of which is supposed to justify the enormous investment outlays required for the construction of the highest building in the world. Due to the long planning and construction period of such projects, the skyscraper is only completed once the boom has yielded to the bust phase. These flawed entrepreneurial decisions and misallocations are mercilessly uncovered in this phase. **According to the Austrians, the bursting of the bubble and the recession are the unavoidable consequence of these bad investments.**

Excellent track record of the skyscraper index

Even if the indicator is not 100% reliable, its track record is still impressive. For example, the Great Depression was heralded by the completion of the Chrysler Building (1930) and the Empire State Building[33] (1931). The World Trade Center was completed amid the oil crisis in 1973, and the Petronas Towers in Malaysia were finished at the beginning of the Asian crisis. In Madrid three of the four highest skyscrapers in Europe were completed when the Spanish property bubble was about to implode[34]. The Burj Khalifa in Dubai supports the hypothesis as well. It is an impressive symbol of excessive real estate speculation in the Middle East, which was abruptly cut short in 2010. The completion of the status symbol was only possible because of a generous capital injection by neighbouring Abu Dhabi.

[33] Later also known as "Empty State Building"
[34] "Hybris lässt grüssen" ("Regards from the hubris"), Institutional Money, March 2010

Major Economic Downturns



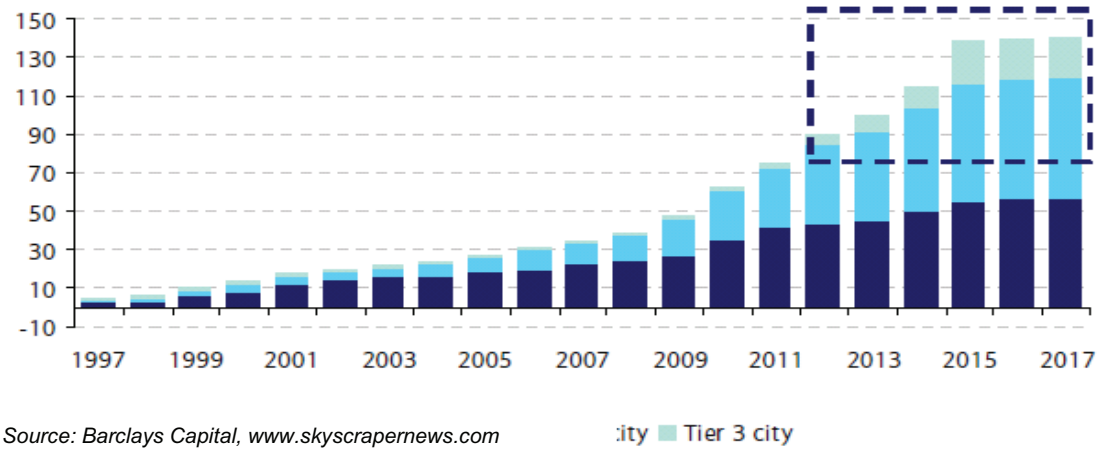
Source: Mises.org

Does the index suggest an imminent collapse in China?

A substantial part of the skyscrapers currently under construction is located in China and India. According to Barclays[35], the construction boom in India and China anticipates a significant slowdown in the economic expansion of the emerging countries. India is currently only home to 2 of the 276 skyscrapers that are higher than 240 metres. However, 14 more skyscrapers are scheduled for completion within the next five years, among those the "Tower of India", the second-largest building in the world. **In China, more than 50% of the 124 skyscrapers that are currently under construction will be completed within the next six years.** According to Barclays China could therefore be faced with an economic collapse, should the skyscraper index hold again.

[35] *Barclays Capital, Skyscaper Index,"Bubble building", 10 January 2012*

Number of Chinese skyscrapers to grow by 87% until 2017



Source: Barclays Capital, www.skyscrapernews.com

Azerbaijan planning highest building in the world – bad omen for the oil and gas sector?

The world's highest skyscraper is currently in the planning stage in Azerbaijan. The "Azerbaijan Tower" will be 1,050 metres high and thus overtop the Burj Khalifa by 222 metres. The skyscraper will be built on one of 41 artificial islands in the Caspian Sea. Azerbaijan wants to become the "Dubai on the Caspian Sea". Construction is to commence in 2013, and the tower is scheduled for completion in 2019. Total costs have been calculated to amount to USD 100bn.

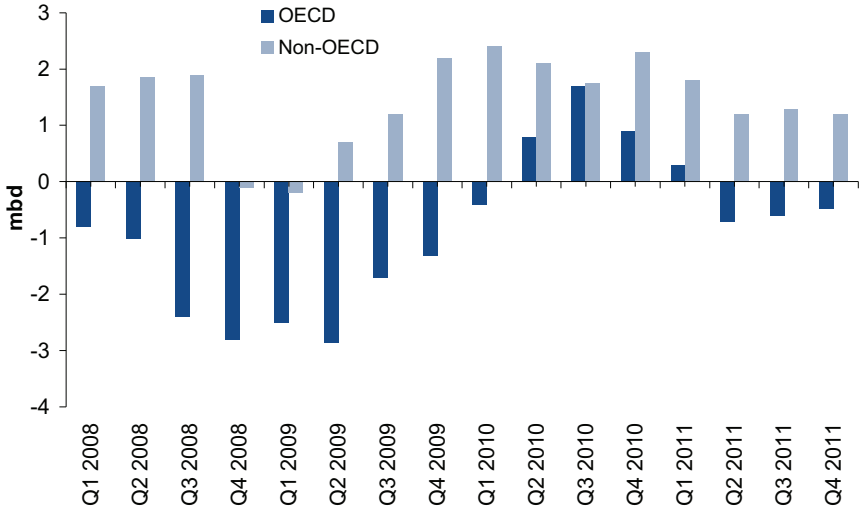
We are sceptical about such megalomaniac projects. If skyscrapers are built because of the high demand for space and high property prices, they can be very profitable over their useful life. However, if the project is just a symbol of the "greatness and pride of a nation", alarm bells should be ringing. **The extrapolation of eternally high oil and gas prices may end in a (c)rude awakening. Given that the oil and gas sector accounts for more than 50% of the country's GDP, one could interpret this situation as long-term warning signal for the oil price.**

Demand

Global oil demand reached 87.8 mn barrels/day in 2011

Growth in global oil demand slowed considerably in 2011. While an increase of 2.88mn barrels/day was recorded in 2010, last year's rise was approximately 0.8mn barrels/day. One of the main reasons for demand growth being subdued in 2011 was the record level of oil prices, which surged from an average of USD 79.5/barrel in 2010 to USD 111.26/barrel in 2011 (+40% y/y, Brent). According to OPEC's latest estimates, global oil demand reached 87.8mn barrels/day in 2011.

Change in quarterly oil demand 2008-2011(y/y)

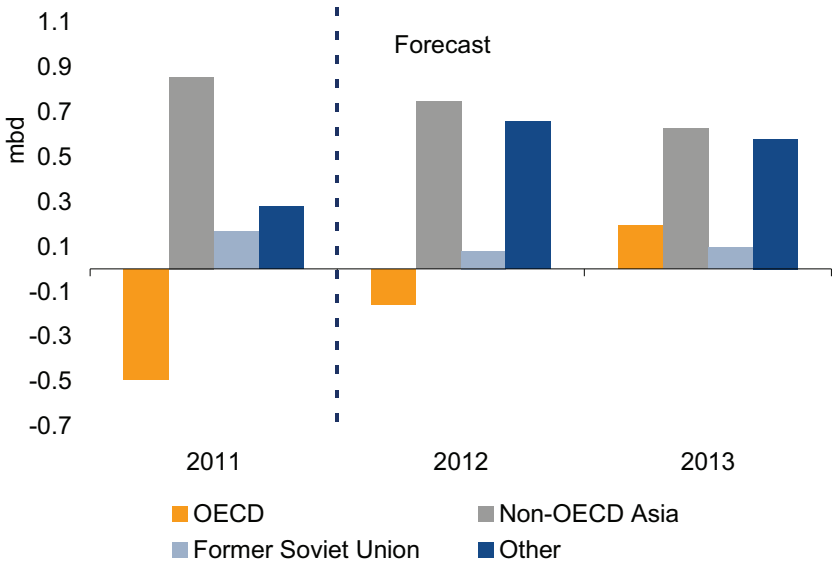


Source: Bloomberg, Datastream, Erste Group Research

Two speed development: OECD vs. China and India

A closer look at the composition of the demand side growth over the past years reveals a development in two speeds: while the OECD countries are battling a marginally increasing to declining demand, actual growth is generated in the developing countries, first and foremost China and India. The sovereign debt crisis in Europe has burdened economic growth in the region, leading to a substantial decrease in oil consumption. The European OECD countries registered a negative oil demand growth rate in 2010 as well as 2011 with a sharper decline (-1.9%) in the more recent period (in 2010 it was -0.5%). According to EIA's estimates this is not about to change over the next few years, demand in the OECD countries is forecasted to remain subdued. **In 2012 and within the OECD, the European countries are expected to continue to experience the highest decline rates in oil consumption while the retreat in North America is projected to be less pronounced and the Pacific region is anticipated to maintain its current level.**

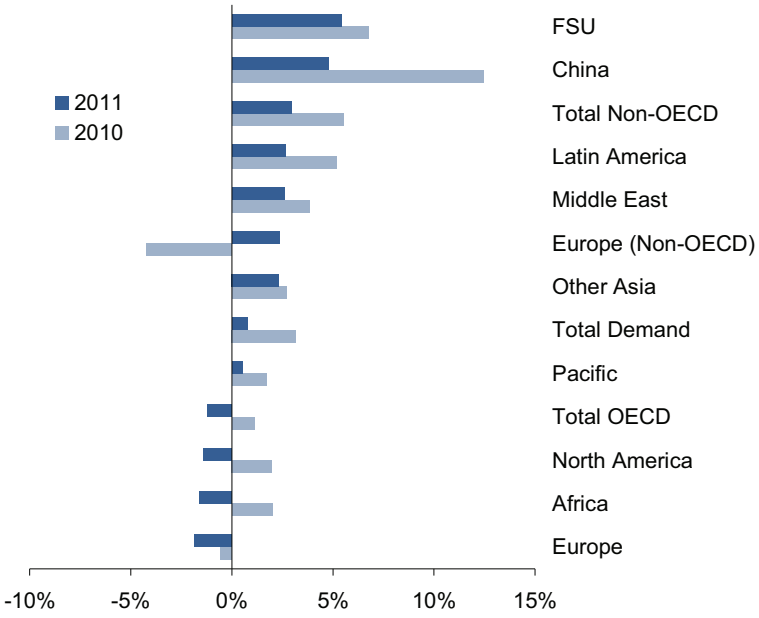
Oil demand growth 2011-2013



Source: EIA, Erste Group Research

In 2011, it was not only the retreat in the developed Western countries' oil demand that contributed to the diminished growth of globally, but also the much deteriorated growth rates in certain developing countries. While China's oil consumption jumped by 12.5% as recently as 2010, the increase in 2011 was substantially smaller, falling to 4.8%.

Change in oil consumption 2010, 2011 by region



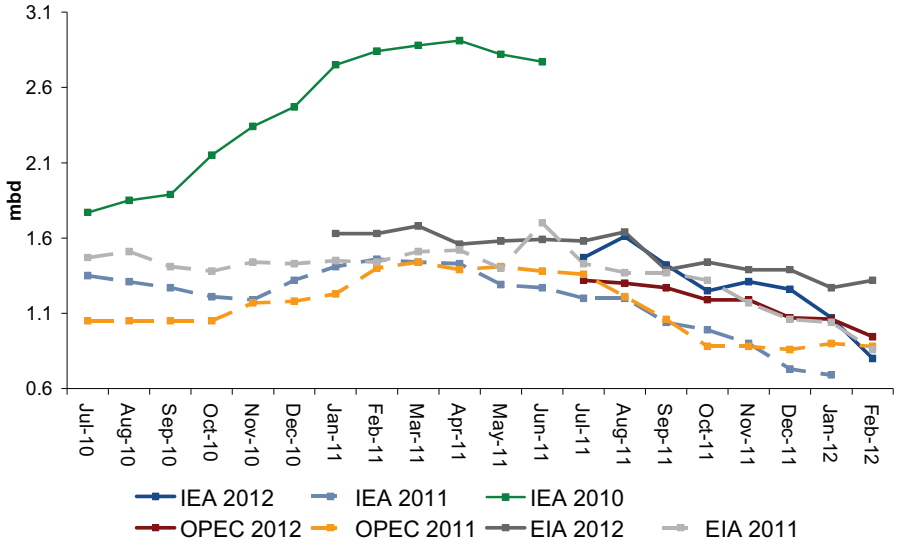
Source: IEA, Erste Group Research

Demand forecasts were revised down continuously

In times of great macroeconomic risks and uncertainty on the supply side of the oil market, the estimates of future oil demand growth in the individual regions are to be treated with caution. The chart below depicts the adjustments in the forecasts of global oil demand for 2011 and 2012 by the IEA, EIA and OPEC. Following a year of clear demand growth in 2010,

market forecasts saw a similarly strong increase for 2011 until the spring of that year. Due to the emergence of the sovereign debt crisis in Europe as well as highly elevated oil prices at that point (crisis in Libya), a severe slowdown in global economic growth was feared. Consequently, the estimates of the change in global oil demand were continuously adjusted downwards. The most recent forecasts of the final figure for 2011 as well as demand in 2012 are mostly the lowest such values the agencies published to date. **Of course further cuts cannot be ruled out, particularly with oil prices advancing.**

Change in oil demand estimates 2010, 2011 and 2012 in mn barrels/day



Sources: EIA, IEA, OPEC, Erste Group Research

Energy efficiency in Western countries will need to improve to make room for developing countries

Oil demand in Asia is projected to rise by 1mn barrels/day to 29.33mn barrels/day. 70% of this growth is expected to be generated by China and India. Overall, Asia is seen to be responsible for 90% of the additional oil consumption around the globe. We cannot detect any reasons pointing to a dramatic breach of this trend. **In general we assume that the energy efficiency in developed Western countries will need to improve significantly to make room for the less sensitive demand growth of the developing countries.**

Over the long term we continue to believe in an extensive market shakeout in China

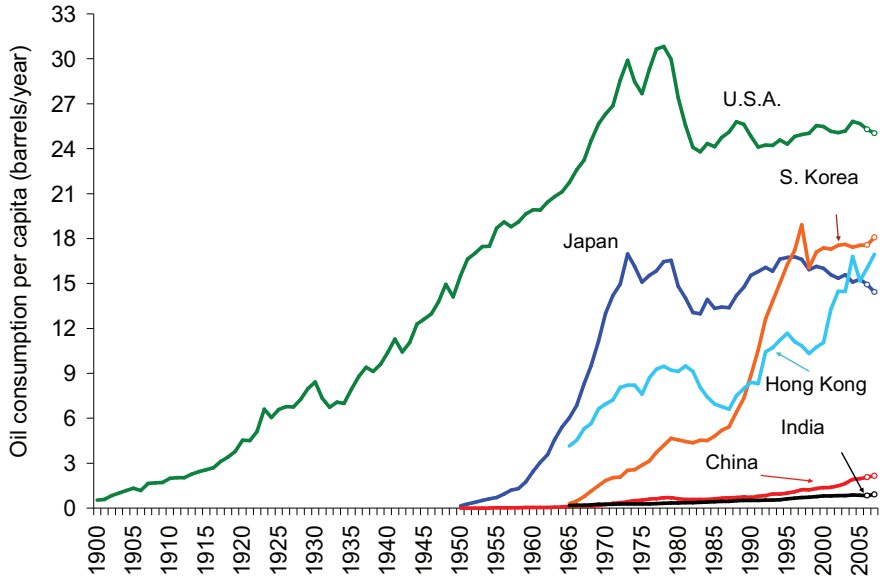
In our view, the increasingly expansive Chinese monetary policy will cause Chinese oil consumption to regain its momentum in the short term. However, over the long term we continue to believe that an extensive market shakeout will take place. The earlier China allows the necessary break to happen, the less painful it will be. Chinese leadership is facing a difficult task. Due to the exceptionally high capital intensity of the Chinese economy (gross capital expenditures stand at 40% of GDP), future growth will be dependent on the propensity to consume of the Chinese people. To lift China's domestic demand, the level of real wages would have to increase. However, the low current level of wages in China is the country's most important competitive advantage which permitted the economy to grow at enormous rates over the past decade. Thus, it is evident that the Chinese government finds itself in a dilemma.

As opposed to the now generally accepted belief in the Chinese economic miracle, we take a more skeptical stance. Merely extrapolating the past into the future can eventually be disastrous. To this point the exorbitant stimuli have been sufficient to prevent an economic collapse. Substantial existing overcapacities have increased further. The government's share in the overall economic performance is gradually rising, state-funded infrastructure projects are responsible for the majority of this growth. **In the long run, China will not be able to overturn the fundamental laws of economics and business activity.**

Enourmous discrepancy between per capita consumption in developed and emerging markets

An oil consumption per capita level of 15 to 20 barrels annually appears to be the norm for developed countries. Consumption per capita rises as a consequence of higher GDP growth resulting from cheaper labor and subsequently declines as an economy transitions into a service economy. The chart below clearly shows that an enormous discrepancy between the per capita oil consumption of the developed countries and China as well as India continues to exist.

Oil consumption per capita (barrels/year)

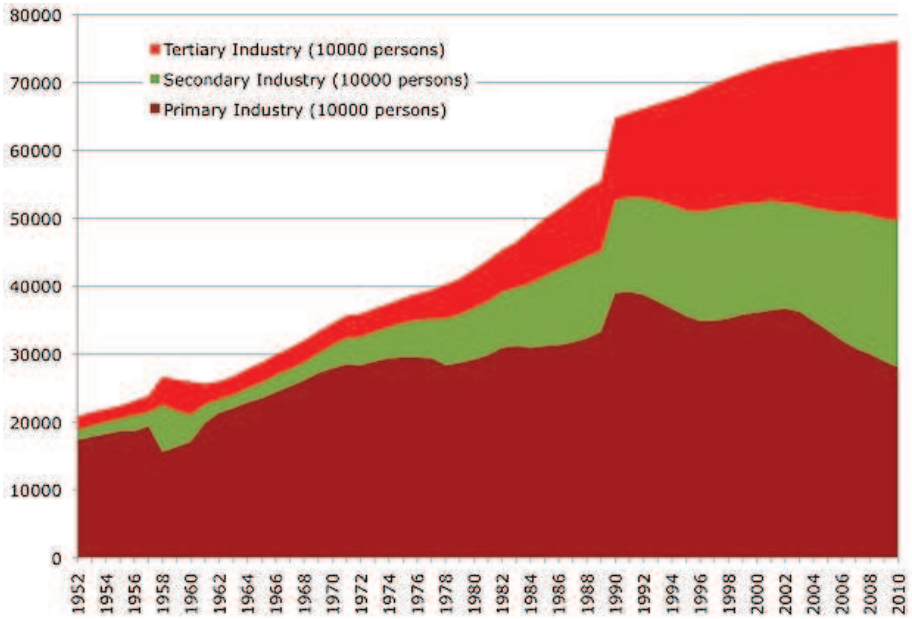


Sources: Stifel Nicolaus, Barry Bannister

The Chinese services sector now employs 263mn workers, which is more than the secondary sector (industrial sector including manufacturing, processing and construction). Since 1992 this figure has doubled which is all the more impressive considering the country's stagnating population growth[36]. The primary sector's share (agriculture) and its importance have been deteriorating over the past 20 years.

[36] http://blogs.reuters.com/felix-salmon/tag/china/

Chinese employment, by industry



Source: Felix Salmon

China will consume 17.5 mn barrels/day in 2030

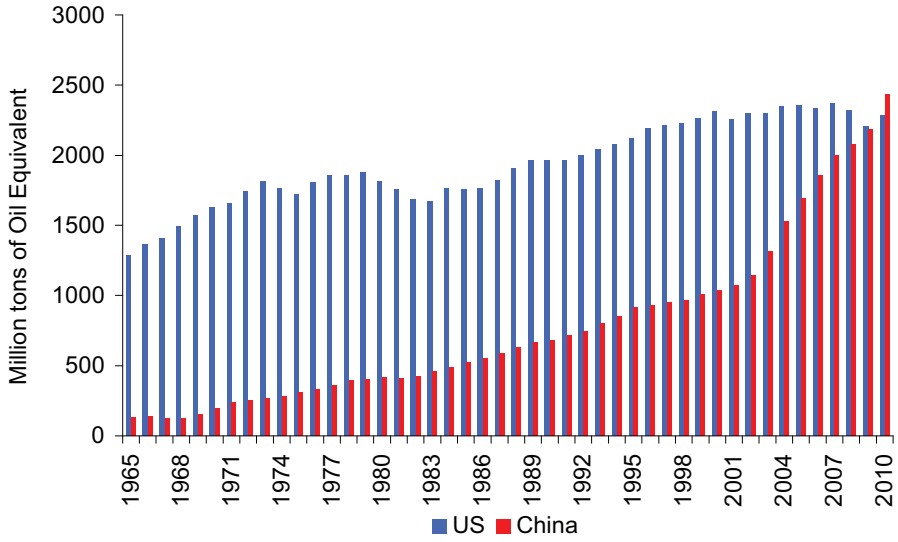
Despite our skepticism, it is likely that China will continue to account for the largest share in global oil demand growth going forward. BP reckons with an increase from currently 8mn barrels/day to 17.5mn barrels/day in 2030. The industrial and transportation sectors are expected to generate the largest chunk of this growth, and China is projected to be a driving force in the global automotive sector. In 2009, China surpassed Europe in terms of the total length of its highways (Europe has 65,000km) and intends to reach the US (100,000km) by 2020. The paradigm shift was also noticeable in 2010 when General Motors sold more motor vehicles in China than in the US.

China tries to keep its oil consumption in check

From 2020, BP projects a considerable slowdown in industrial demand as improved energy efficiency as well as changes in demographics are anticipated to reduce oil demand. Moreover, China is already attempting to keep its oil consumption in check – unsuccessfully thus far. One of such measures is a dramatic increase in taxes on oil products, which is currently being discussed.

Another sign of a paradigm shift was the fact that China surpassed the US as the world's biggest consumer of energy. According to BP, China's energy consumption grew by 11% and now takes up a share of 20.3% of energy consumed worldwide.

Total energy consumption China vs. USA



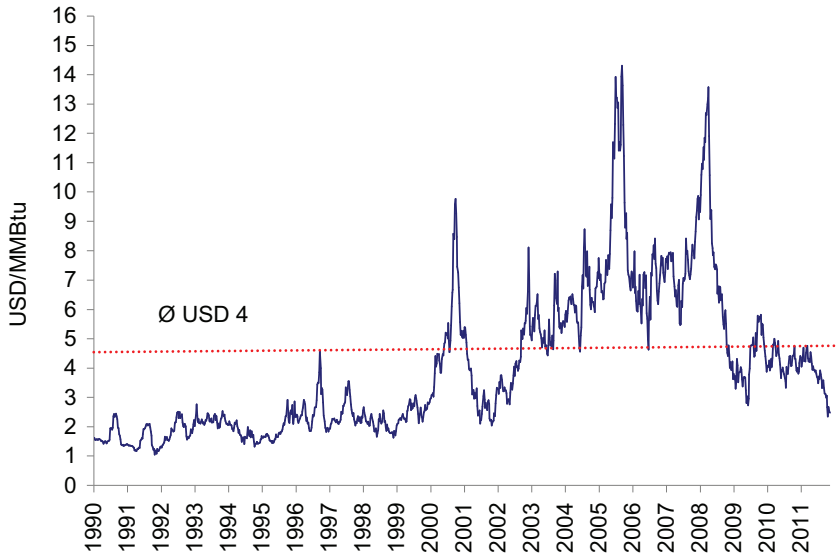
Source: BP, Erste Group Research

A golden future for Natural Gas in the US

Attractive risk/return profile

The combination of still sharply rising US production, a mild winter in the US, and high inventories caused the Henry Hub price to fall to its lowest level since 2002. **We believe, that at the current price level, the risk/return profile is very attractive.**

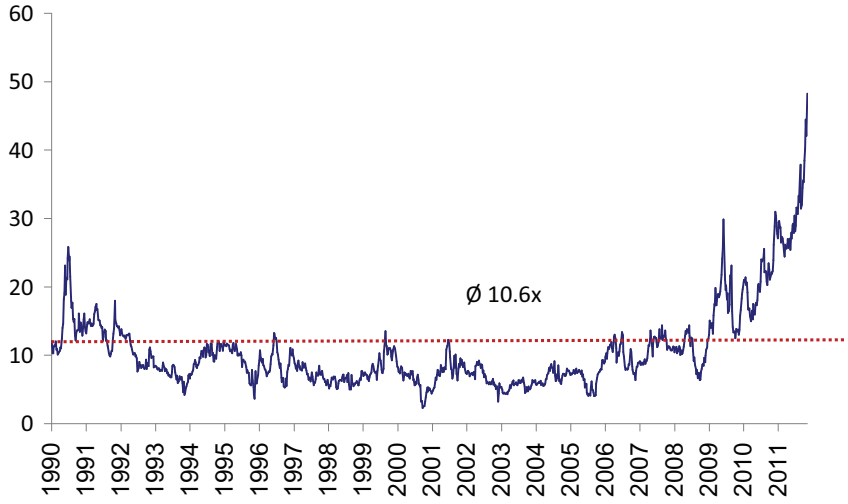
US natural gas (Henry Hub) since 1990



Sources: Erste Group Research, Datastream

In relation to oil, natural gas has fallen to the lowest level since 1970.

Oil/gas ratio



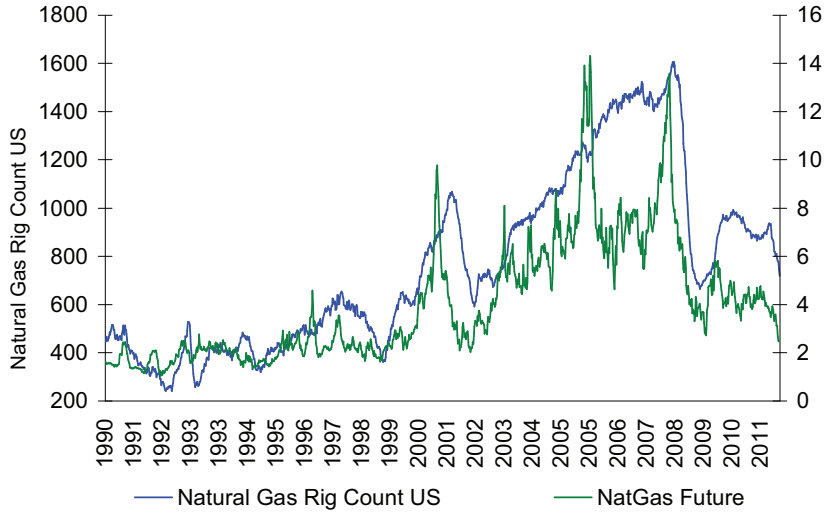
Sources: Erste Group Research, Datastream

The cure for low prices is low prices…

It seems as if the natural gas prices are about to find a bottom. We believe that, at the current level, the sector can no longer work profitably. Numerous production and investment cuts for 2012 and beyond confirm this. For example, Chesapeake Energy announced that it would cut production by 0.5 bcf/d[37]. If the prices were to remain at this level, the company would cut its output by a total of 1 bcf/d. In addition, CAPEX would be reduced from USD 3bn to USD 900mn. Exploration expenditure would be cut by 50%, which would represent a drastic u-turn from the aggressive expansion programme in the past years. And CHK, the second-biggest natural gas producer in the US, reported a decline in production of almost 10%. **We expect numerous producers to follow suit, which would lead to further cutbacks and a further decline in drilling activity.**

The rig count of natural gas has recently fallen to the lowest value since October 2009. This is particularly interesting since the rig count in the oil sector (and here mainly shale oil) has been on the rise in the past months. The current rig count has a lead time of about three to six months with regard to future production.

NatGas rig count (left scale) vs. NatGas future (right scale)



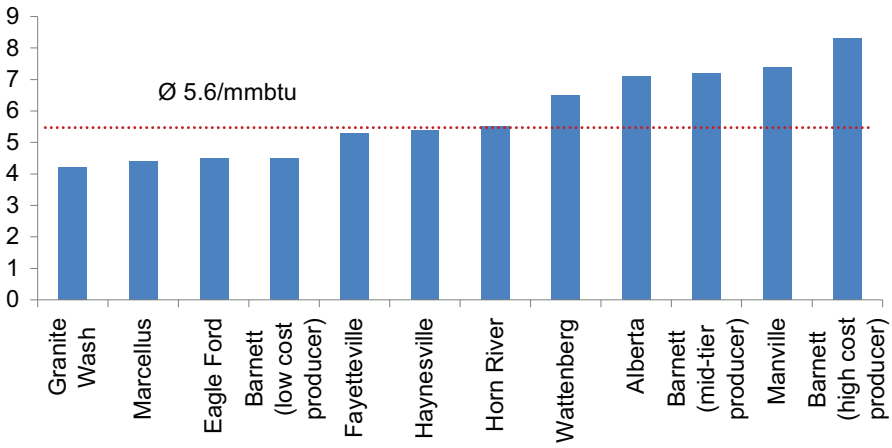
Sources: Bloomberg, Erste Group Research

Shale gas boom in the US is gradually slowing down – falling supply growth to be expected

It seems that the American shale gas euphoria is currently slowing down. The actual costs of the production of shale gas seem to exceed the costs accounted for by a substantial degree. Generous bank loans, joint ventures, and attractive hedge positions[38] often veil the actual production costs. The drastic increase in the demand for special fracking drills and skilled personnel has of course had an impact on the cost side. Therefore we expect the growth rate of shale gas supply to decline in the medium term.

[37] To put this into perspective: 0.5bn cubic feet per day equals about the consumption of 2.5mn US households.
[38] Due to the contango structure producers could fix higher prices, which offers a partial explanation for the current overproduction.

Estimated break-even price for various US natural gas fields

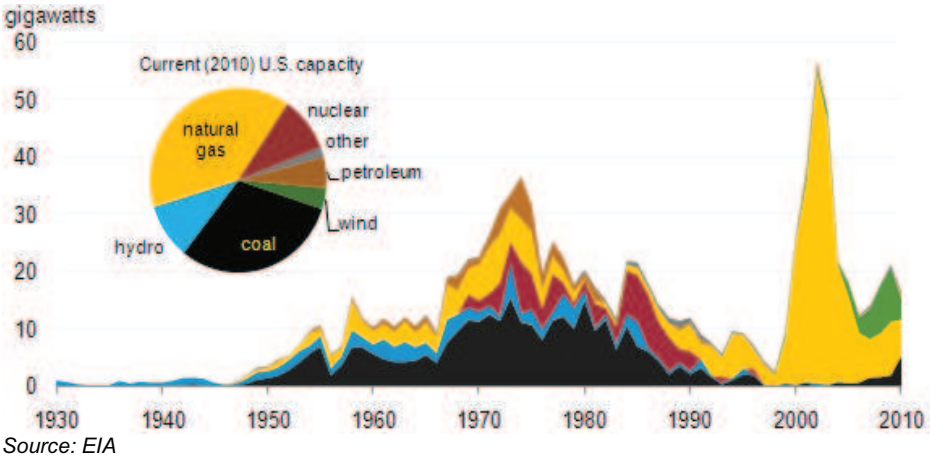


Sources: First Energy, Company Reports, Erste Group Research

Supply and demand situation suggests positive price development

We see largely positive signals in connection with the development of the gas price in the medium to long term. On the one hand, we expect the US shale gas boom to slow down, as a result of a more sober assessment on the basis of economic facts taking hold. On the other hand, the demand side should experience a positive development. **Natural gas demand is supposed to grow by 2.1% per year until 2030, according to BP.** The main source of the rapid growth of natural gas is its rising relevance in the generation of electric power. According to BP, the demand will increase by 2030, from currently 19bn cubic feet to 35bn cubic feet. Commerzbank points out that 80% of the newly created capacities in the past ten years have been gas-fired power plants.

Current capacity by initial year of operation and fuel type



Source: EIA

A Golden Age of natural gas?

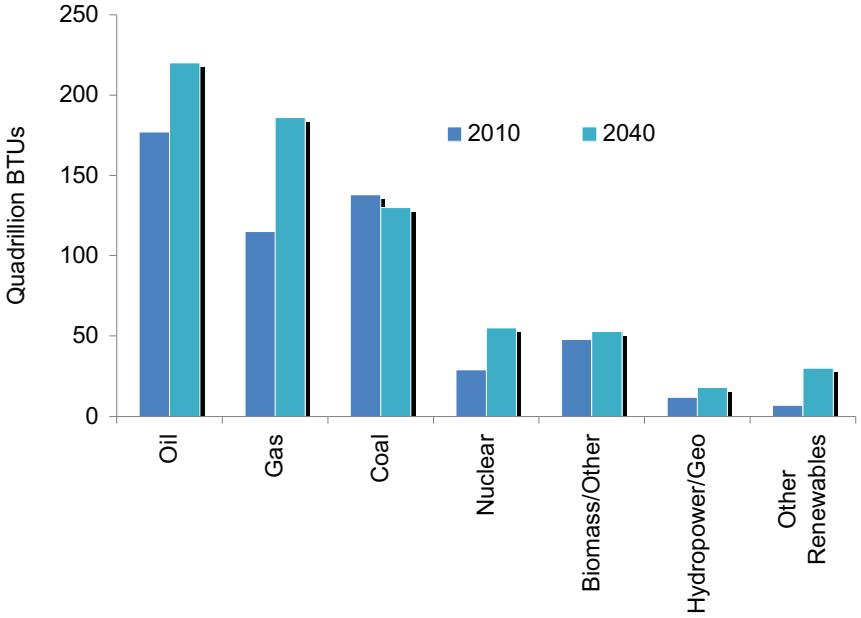
Renewable forms of energy still tend to be too irrelevant, expensive, and without any substantial governmental subsidies and are thus often unprofitable. The Obama Cabinet seems to promote natural gas, as a speech he gave at the University of Georgetown[39] confirmed. President Obama talked about shale gas reserves that could satisfy the demand for more than 100 years, and he pointed out a cross-party agreement about

[39] http://www.whitehouse.gov/the-press-office/2011/03/30/remarks-president-americas-energy-security

promoting natural gas as fuel for vehicles. The Energy Outlook by IEA also highlights the growing importance of shale gas for the US. In the World Energy Outlook the agency mentions a "Golden Age of natural gas". Shale gas is expected to account for 46% of the American gas production by 2035. On top of this BP expects the US to export at least 5 bcf/day of LNG by 2030.

At the moment IEA expects global gas demand to increase by 1.8bn cubic metres to a total of 5.1bn cubic metres by 2035. During this time, the share in the global energy mix should have grown from 21% to 25%. **In line with this development, the IEA expects the share of coal to gradually fall and gas to pass coal as energy carrier by 2030.**

Development of various energy carriers 2010 vs. 2040



Sources: Exxon, Erste Group Research

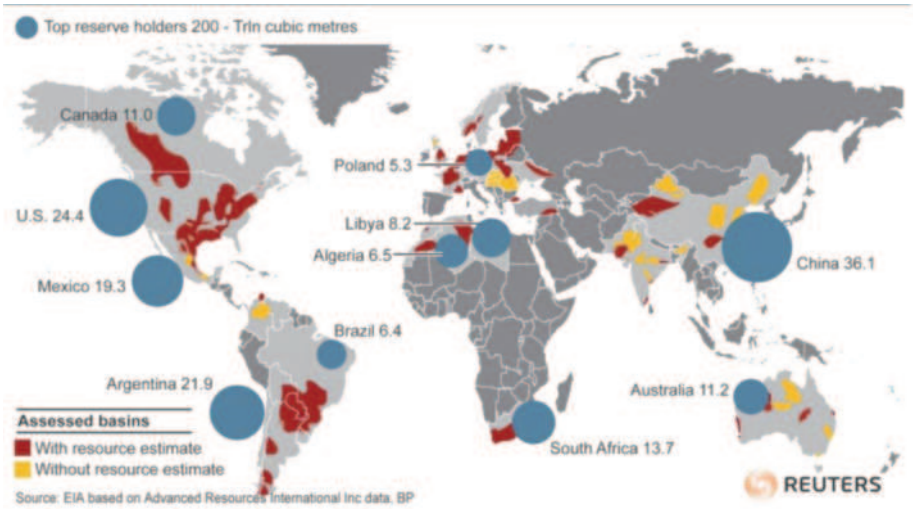
Final trend acceleration possible to USD 2, clear upward signal in the long run

US gas seems clearly undervalued. We believe that the "fair price", i.e. a level where on the one hand a rise in demand is possible, and on the other hand there is sufficient incentive for producers and explorers to introduce new products, is clearly higher. **We expect a possible final trend acceleration downwards that should bottom out at USD 2. From the risk/return point of view investments in the gas sector seem attractive.**

China pushes gas

China wants to significantly step up the share of natural gas in the energy mix as well. Plans are to cut back especially on the environmentally harmful coal firing. Currently coal covers about 80% of the energy demand, whereas gas only accounts for 1%. Beijing has realised that both CO2 and sulphur emissions have to be reduced drastically and that the focus should be shifted to gas. Unconventional gas should play an important role in this respect; it is supposed to cover 30% of Chinese gas demand. Current estimates put the shale gas reserves at 36 trillion cubic metres.

Global shale gas reserves

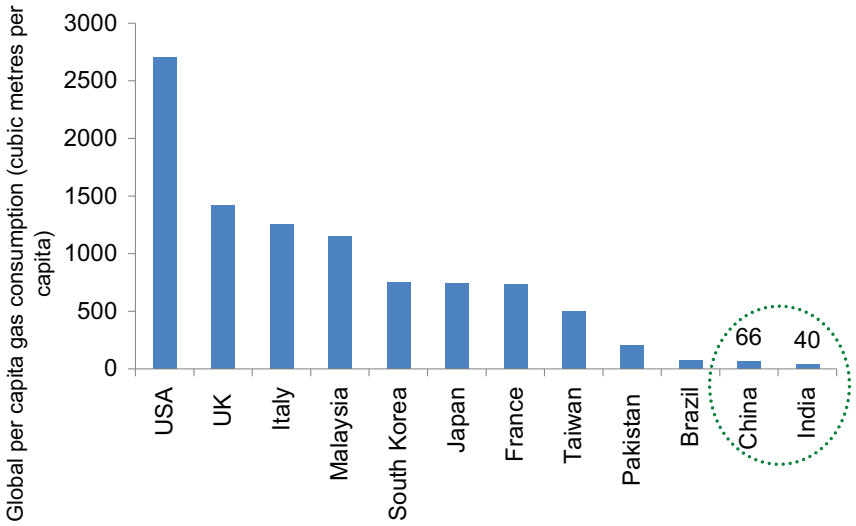


Source: Reuters

Chinese gas consumption expected to increase by 7.6% p.a. until 2030

According to the 12th five-year plan gas is supposed to account for at least 8.3% of total consumption by the year 2015. This would require more than a doubling since 2007. According to IEA, gas consumption is expected to rise by 7.6% annually until 2030 in China. The agency expects China to step up the import from 20bn cubic metres to 330bn cubic metres by 2035. This would make the country the second-largest importer worldwide behind Europe. IEA expects annual imports of 110bn cubic metres even until 2015. According to Wood Mackenzie natural gas consumption in China should rise by a factor of almost five from 9bcf/day today to 43bcf/day in 2030. **China wants to achieve this by increasing domestic production on the one hand and by expanding the pipeline capacities from central Asia and stepping up LNG imports on the other hand.**

Per capita consumption in a global comparison



Sources: Erste Group Research, Bloomberg

Turn of the tide for LNG?

Asian buyers increasingly keen on benefiting from low US prices

A few years ago, the US was still planning costly terminals for the *import* of LNG – today it looks like the US itself will soon be net *exporter* of natural gas. This is due to the rapid development of alternative sources of gas. According to Larry Jeddeloh[40] seven export licences have so far been granted for a total export volume of 10.9bn cbf/d. This almost equals 20% of the US production and could represent a decisive turning point for the global gas market. **Asian buyers are increasingly keen on benefiting from the attractive US prices and have started undermining the link between oil and gas that had been in existence for 40 years.**

US could turn into LNG exporter

GAIL India, the largest Indian natural gas group, has entered into a 20-year supply contract with Cheniere Energy. KOGAS, the world's biggest gas importer, has also recently signed a 20-year supply contract for LNG. Exports are meant to start in 2016. Overall Cheniere holds supply contracts worth 10.5 bcf/d. Invoicing will be on the basis of Henry Hub plus a fixed additional component[41]. Along with Cheniere, Lake Charles (1.9 bcf/d), Freeport (1.4 bcf/d), and Cove Point (1.0 bcf/d) in the US and Kitimat (1.5 bcf/d) in Canada might also have LNG export capacities at their hands.

This puts pressure on the Japanese Crude Cocktail (JCC), the benchmark of long-term Asian prices. While the JCC price increased by 32% last year, the Henry Hub price fell by 27%. Cheniere estimates that the export price could be close to USD 10 mmBtu. Japan was paying an average of USD 16 last year. This means that the import from the US is cheaper than the one from Australia and Qatar. Numerous countries such as Poland, Croatia, Columbia, Panama, Costa Rica, and Lebanon are currently hatching their own plans for building LNG terminals. This will lend additional support to the global LNG trade.

US exports would promote the globalisation of the LNG market

In 2010, the LNG trade recorded growth of almost 25% to a total of 300bn cubic metres. According to Commerzbank[42], LNG now accounts for 9% of global gas consumption, up from only 5.5% in 2000, and with overall gas consumption having increased by 30% over the same period of time. In the past years more countries have become LNG exporters (among others Yemen, Peru, Russia). Qatar remains number one, holding a market share of 25%. The Asian-Pacific region still makes up more than 60% of LNG imports, with 30% going to Europe.

Increasing internationalisation of LNG will lead to healthy establishment of market prices

The exorbitant price differences due to the lack of negotiability of internationally traded gas will soon be relegated to the history books. We believe that the increasing internationalisation of LNG will in the long run put an end to the indexation in Europe and Asia and facilitate a healthy establishment of market prices (gas-on-gas competition).

[40] TIS Group, Market Intelligence Report, 19 January 2012, "Natural Gas Market Outlook"
[41] Marketwatch.com "Cheniere and KOGAS sign 20-Year LNG Sale and Purchase Agreement"
[42] Rohstoffe kompakt Energie, „Umbruch am Gasmarkt" (*Upheaval on the gas market*)

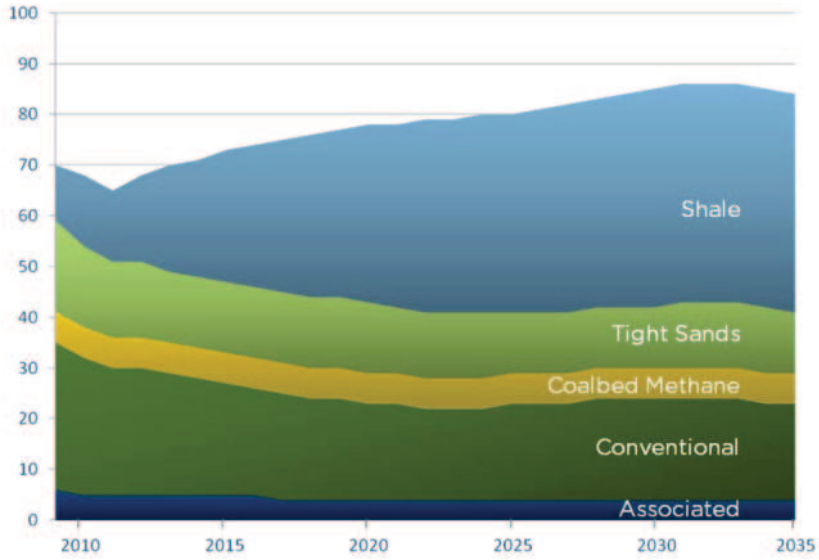
Shale Gas

Shale gas as transitory technology

As discussed in earlier reports[43], we expect shale gas to be the key for many countries towards gradual self-sufficiency in the energy sector. At the moment, the IEA estimates Europe to be sitting on unconventional gas deposits of 35 trillion cubic metres. This is six times the volume of conventional reserves.

Shale gas currently accounts for almost 35% of American natural gas production. This share is expected to rise to 43% by 2015 and to 60% by 2035. In absolute terms this translates into a production increase of 62.4 bcf/day in 2011 to 88 bcf/day in 2035.

US gas production until 2035 (in bcf/day)



Sources: IHS CERA, Fueling the Future, 2010

In a recent report, IHS CERA has analysed the extensive effects and the benefits for the overall economy of the shale gas revolution[44]:

Far-reaching consequences of the development of shale gas in the US

- Aggregate capital expenditure of USD 1,900bn is expected by the year 2035 in connection with shale gas production
- In 2010, almost 600,000 jobs were directly or indirectly created by the shale gas sector; this number is expected to increase to 1.6mn jobs by 2035
- Without shale gas, the US would depend on massive imports of LNG at substantially higher costs
- The lower gas prices will lead to a decline in electricity costs of 10%
- The American chemicals industry is one of the main beneficiaries and has now become globally competitive again, seeing as it requires natural gas as input on the one hand and benefits from lower electricity costs on the other hand

[43] Please refer to the Special Report Oil 2010 and 2011 "Shale Gas as "Game changer"
[44] "The Economic and Employment Contributions of Shale Gas in the United States", IHS CERA, December 2011

- The cost savings resulting from the lower gas prices amount to USD 926 per household and year, and disposable income is expected to increase by USD 2,000 by the year 2035
- The contribution to US GDP was USD 18.6bn in 2010 and is supposed to rise to almost USD 57bn by 2035. The aggregate expected contribution amounts to USD 933bn by 2035
- The lower energy costs should translate into an increase in industrial production of 2.9% by 2017 in the US

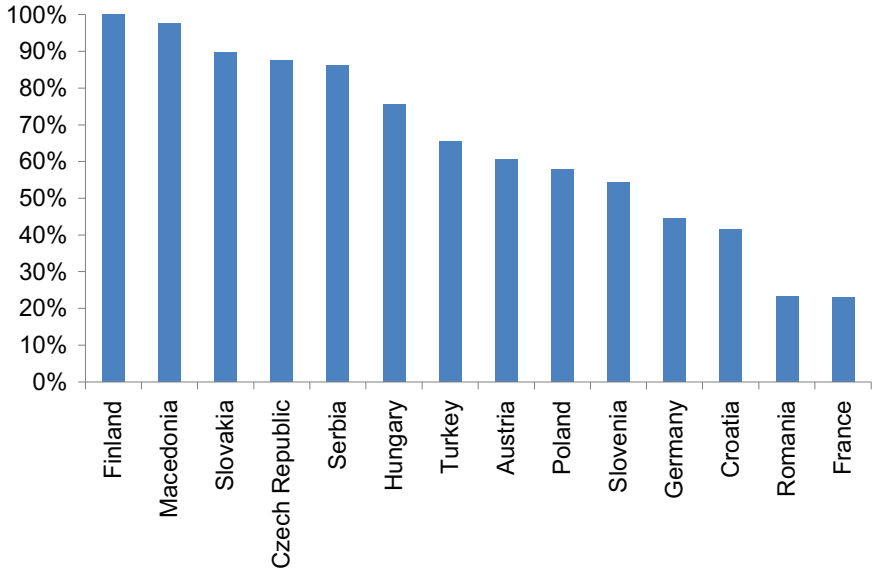
US pioneering; political support in Europe leaves a lot to be desired

The development of unconventional natural gas resources has not exactly come a long way outside of the US. Due to the current dependence on Russian gas imports the development of shale gas would be highly relevant for most of the European countries to secure their future supply. This would suggest sound political backing, which, however, has not come around so far.

Europe strongly dependent on Russian gas deliveries

With the exception of Norway, all European countries are net importers of natural gas. This means that the development of unconventional gas resources would crucially improve the future security of supply. **The following chart illustrates how enormously dependent many European countries are on Russian gas deliveries.**

Russian gas supplies in terms of total gas consumption



Sources: Gazprom (2009), IEA, BP, Erste Group Research

Environmental concerns often dramatised

Environmental concerns are currently the biggest obstacle to the further development of shale gas in Europe. For example, France and Bulgaria have already banned hydraulic fracking. There is a moratorium on unconventional gas production in North Rhine-Westphalia, and the protests in the UK have been picking up as well.

The high water consumption and the **fear of contaminated groundwater are the central arguments against unconventional gas production**. However, we believe that is simply fear mongering. Shale gas tends to be found in depths of several kilometres, whereas ground water tends to be close to the surface (up to maximum depths of 300 metres).

University study sees no direct link between fracking and environmental damages – dangers do definitely not exceed the ones associated with conventional drilling

In a 414-page study by the University of Texas[45], many concerns are invalidated. According to the study, there is no direct link between fracking and contaminated groundwater. The biggest risks are associated with sloppy drilling, leaking sewage at the surface, and broken concrete linings of the drill holes that allow drilling fluid to contaminate the groundwater. **But conventional production methods harbour the same risks[46].**
If the cementation and lining of the drill hole are done properly, there is no risk to the ground water. This is where the producers have learnt from their initial mistakes.

Fracking is represented in the media largely negative, without reference to scientific studies

Moreover, the study authors analysed the print, broadcast and online coverage of fracking in the United States. They found that the media mentioned shale gas production and especially fracking mostly in a negative context. Two thirds of national media painted a damaging picture, and in the local media, that share increased to more than 75%. **Only a fraction of the media reports based their coverage on scientific facts and studies.** Accidents and cases of contamination are highlighted, thus creating an extremely negative public perception.

Water management should help reduce water consumption

The often-criticised water consumption involved in the fracking procedure is a case of over-dramatisation as well. The comparison with industrial sites, agriculture, mining companies, or the energy sector puts the high water consumption into perspective. An average drill hole requires about 15mn litres of water. An 18-hole golf course for example needs the same amount of water in two to three weeks[47]. **On top of that the water management technologies are constantly progressing, leading to a significant decline in water consumption.**

The next generation: "Clean Fracking"

New fracking methods would make production more efficient and cleaner

The three leading oil service providers Baker Hughes ("DirectConnect"), Schlumberger ("HiWay"), and Halliburton ("RapidFrac") are currently testing the next generation of fracking technologies. The idea is to minimise environmental hazards, to increase the yield, and thus to make the production of shale gas altogether more efficient, cleaner, and less costly. On the one hand the new methods permit a better concentration of the pressure of the drilling fluid in order to reach deposits in deeper regions; on the other hand it significantly cuts down on water consumption. Currently, some 10-20% of any shale gas deposit is exploited, whereas that yield is often 80% for conventional natural gas. **Estimates suggest that superfracking technologies could help reduce drilling costs by more than 70%, from USD 2.5mn to less than USD 750,000.**

Fracking soon without any harmful chemicals

In addition, numerous methods are currently under scrutiny that do not require any chemicals or biocides. For example, the Austrian energy producer OMV stated, that they will not be using any chemicals for its planned test drilling in the substantial shale gas deposits in the Northern

[45] "Separating fact from fiction in Shale Gas development",
Dr. Charles Groat, University of Texas as Austin, Energy Institute
[46] "Neue Studie gibt Entwarnung für Fracking" (*New Study Gives All-Clear to Fracking*), Der Spiegel
[47] Advanced Resources Interrnational Inc., "Worldwide Gas Shales and Unconventional Gas: A Status Report", Vello A. Kuuskraa

Weinviertel[48] region. Instead, the company will resort exclusively to water, bauxite sand, and cornstarch, i.e. ecologically acceptable substances[49]. **According to ExxonMobil, fracking will be possible without the use of any chemicals within two years from now.**

Shale gas in Europe: Poland and Ukraine as pioneers

Poland as European pioneer in all things shale gas

The biggest and most promising European shale gas deposits are located in Poland. The EIA estimates that the Polish shale gas reserves cover more than 300 years of domestic consumption[50]. The unconventional reserves exceed the conventional ones by the factor of 32. So far 109 licences have been granted to national and international groups in Poland. Poland imported more than 10bn cubic metres of natural gas from Russia in 2011. On top of it, coal is used for 90% of electric power generation. Therefore the political support for the development of domestic shale gas production is exemplary.

Initially a "trial and error" process

However, the so far disappointing results from test drillings have somewhat dampened the hope of an imminent "sheikdom at the Vistula". ExxonMobil announced that the results of the two exploration drillings in the Baltic Sea Basin had fallen short of expectations. The gas flow was significantly below comparable sources in the Marcellus and Barnett Shale in the US, making industrial-scale extraction impossible. Last year, 3Legs Resources and BNK had already reported disappointing results. That said, we believe that a trial and error process is normal at the beginning of such a development. The initial results were disappointing in the US as well. Explorers were moving along a learning curve of seismics and geological understanding, and eventually the exploration success rate improved.

Still bottlenecks in personnel, drilling equipment, and pipelines in Europe

Europe still has to deal with infrastructural bottlenecks. Pipelines, storage facilities, and specific drilling equipment are still not widely available. As a result, the capacity of hydraulic fracking and specialised drilling equipment in the US is 80 times higher than in Europe. The sector is developing at a slow pace, but we do not believe that costs can be pushed down to levels as low as in the US.

Along with Poland, Ukraine is the new big hope of the European shale gas sector

Along with Poland, Ukraine seems to become one of the biggest players in the European shale gas sector. According to IEA Ukraine holds the fourth-largest shale gas deposit in Europe at 1.2 trillion cubic metres. Not the least because of its relatively low density of population, Ukraine seems made for the development of shale gas deposits. However, so far the Ukrainian politicians have mainly paid lip service and not taken any significant steps.

Ukraine extremely inefficient in energy consumption – enormous potential in the Lublin Basin

At the moment, Ukraine consumes about four times more gas than the European average, when related to its GDP. It has therefore one of the lowest rates of energy efficiency in the world. The potential in the Lublin Basin could turn Poland and Ukraine into a net exporter of natural gas. Estimates expect 1.4bn cubic metres on the Polish side of the Lublin Basin alone. On the Ukrainian side the deposits should be at least of equal magnitude. Geologists can see a striking similarity between the Lublin Basin

[48] The shale gas deposits would cover domestic consumption (currently about 11bn cubic metres) for about 30 years.
[49] Please refer to www.omv.at/schiefergas
[50] The Independent, "Poland's shale gas dilemma for Europe"

and the Barnett Shale in Texas, and indeed the more substantial thickness of the Silurian layers should result in significantly higher potential than in the US. In the Lublin Basin the Silurian layers seem to be ten times as thick (1,300 metres) as in average US shales.

First preliminary agreements, CAPEX of USD 10bn necessary

Within the next five years, capital expenditure of USD 10bn is required. The majority of these investments are supposed to be provided by foreign investors. A first preliminary agreement has already been signed with ExxonMobil about the development and production of shale gas. On top of this, there are agreements between Shell Exploration and a subsidiary of Naftgaz worth USD 600mn. On top of shale gas, Ukraine also sits on sizeable CBM deposits.

Conclusion Shale Gas

Shale gas could change the European energy sector on a sustainable level – clean fracking as right answer to environmental concerns

The production of shale gas in Europe would come with numerous long-term implications. In comparison with the prices the North American consumers pay, prices in Europe are often many times higher. Russia frequently threatens to suspend its deliveries, and the political dependence of countries such as Austria, the Czech Republic, Poland, or the Ukraine is enormous. Should the Polish deposits get even close to what has been expected, the country could quickly turn into a net exporter of natural gas, which would be crucial for the entire EU. **We believe that clean fracking constitutes the right answer to the current environmental concerns.**

Technical analysis

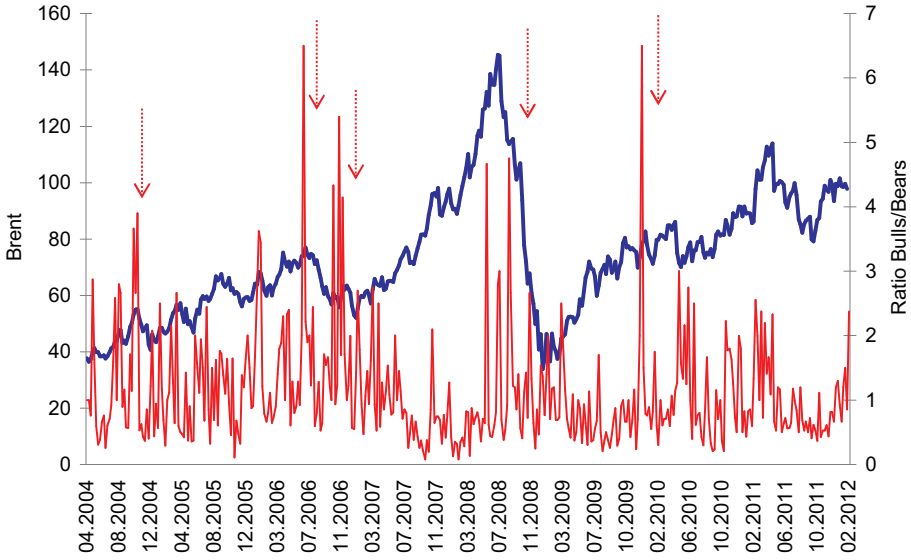
Sentiment does not (yet) signal any extreme form of optimism

Bulls/bears ratio far from euphoria levels

According to the Bloomberg sentiment index, 52% of market participants have recently declared themselves bullish, whereas 25% have been neutral and 23% bearish with regard to the future oil price. This still does not signal any excessive form of optimism, even though the sentiment has improved in the past weeks. In summer 2008, when the oil price was at its all-time-high of USD 147/barrel, the optimism was close to 70%. Therefore there seems to be further upward potential, given that the consensus is still only cautiously optimistic.

The following chart illustrates that the ratio of bulls and bears (red line) is still a long way away from euphoric levels. Spikes above 4 have often indicated corrections of the oil price in the past.

Ratio bulls/bears vs. Brent



Sources: Bloomberg, Erste Group Research

Analysts only cautiously optimistic

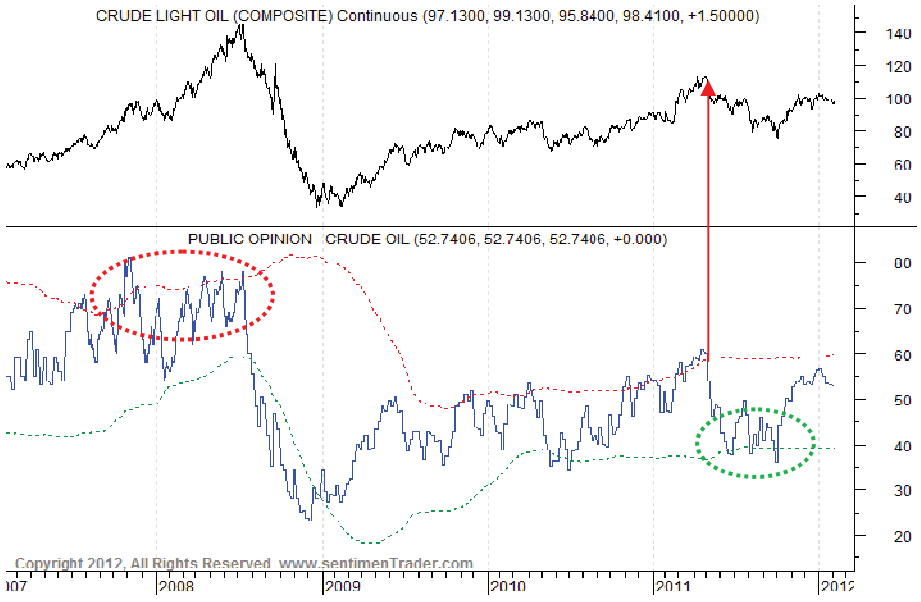
For contrarians, current analysts forecasts are a positive signal. Although the target prices are slightly optimistic at the moment, they are anything but euphoric. The median estimate of the 30 analysts polled about the price of Brent is USD 109 for 2012, USD 115 for 2013, USD 119 for 2014, and USD 115 for 2015. **These forecasts exemplify the risk aversion of many analysts.**

Screenshot Bloomberg forecasts Brent 2012-2015

Source: Bloomberg

Public Opinion indicator suggests potential for further price increases

The Public Opinion indicator confirms the marginally positive sentiment. Extreme values (1.5 standard deviations above the 1Y moving average) tend to yield reliable contraindications, i.e. bulls become too optimistic amid rising prices and vice versa. This is why substantial trend reversals are often heralded by extreme values. Currently the indicator is in the uppermost third of the bandwidth, but it has not developed any extreme values. **Therefore there should still be upward potential.**

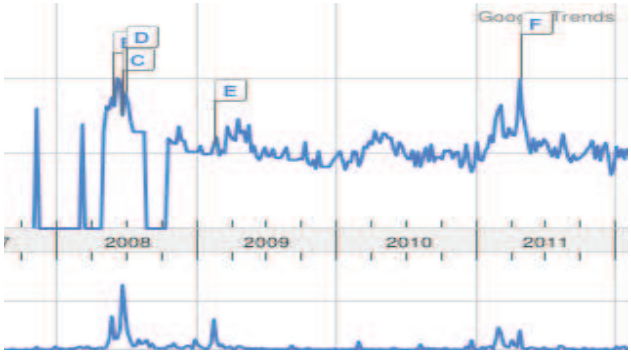


Source: Sentimentrader.com

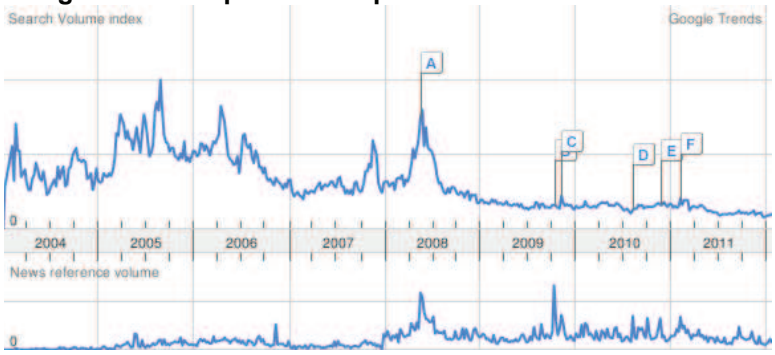
Google Trends also supports the fact that there is indeed still quite a bit of room for price increases. At the moment, the number of queries for the term "oil price" is close to the recent years' average; i.e. the sentiment is still far away from the 2008 highs. The same is true for the queries "peak oil", "oil crisis", and "oil supply".

Google Trends – queries for "oil price"

Google Trends – queries for "oil shock"



Google trends – queries for "peak oil"



Source: Google Trends

Almost all technical indicators confirm breakout

After an impulsive movement all the way up to USD 127/barrel in spring 2011, the oil price was consolidating for the rest of the year. The successively "lower lows" and "lower highs" came to an abrupt end at the beginning of 2012; now it seems as if the oil price is about to embark on a new impulsive phase. In February, we finally saw the leap above the 30/60- and 200-day line. Almost all technical indicators confirm the validity of the breakout.

Parabolic confirms new bull market

The following monthly chart also highlights the breakout. The MACD has created a buy signal and could soon cross the signal line. In addition, the oil price is located comfortably above the moving averages. The parabolic system (identifiable in the chart as stars above the candlesticks) signals a new bull market. The RSI is gradually approaching the overbought region, but it is still a long way away from its high of 80 in summer 2008. The same is true for the stochastics.

Brent chart since 2008 (monthly)

Sources: Bloomberg, Erste Group Research

Next resistance at USD 127, after that the all-time-high of USD 147

The next resistance line is at USD 127 (last year's high), and beyond that the all-time-high of 2008 at USD 147 constitutes the next hurdle. As soon as the price has entered the parabolic phase, the sentiment should set new extreme values, resulting in first divergences; this is when tight stops should be set. However, it seems to be too early for that.

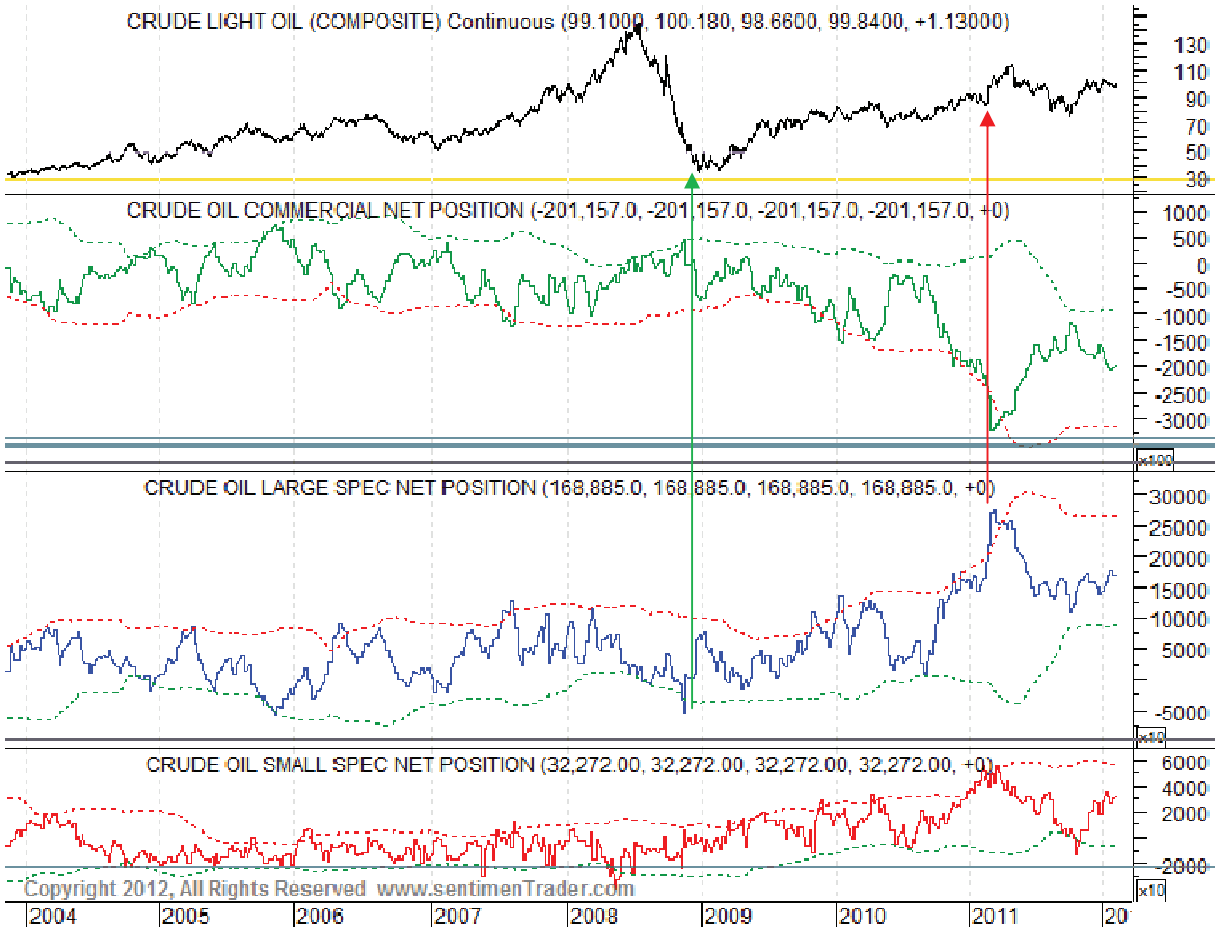
Commitment of Traders Report signals further upward potential

CoT report also bullish

The weekly report by the CFTC illustrates the positions of commercial traders ("Commercials"), large speculators ("Large specs"), and small speculators ("Small specs"). The Commercials are often called "smart money" and tend to act on a contrarian basis. The Commercials provide the market with the most valuable signals in case of extreme values. The Large specs are mostly hedge funds and institutional investors and tend to invest cyclically. Extreme values can most often be interpreted as reliable contra indicator. The Small specs are also usually trend followers and represent the "dumb money".

The chart illustrates the fact that currently both Small and Large specs still hold relatively neutral positions. It is only when the positioning exceeds the second standard deviation (broken line) that a trend reversal or at least a larger correction is imminent. **This means that there should still be significant potential for price increases, given that the extent of speculations has not reached an excessive level yet.**

CoT Report oil since 2004



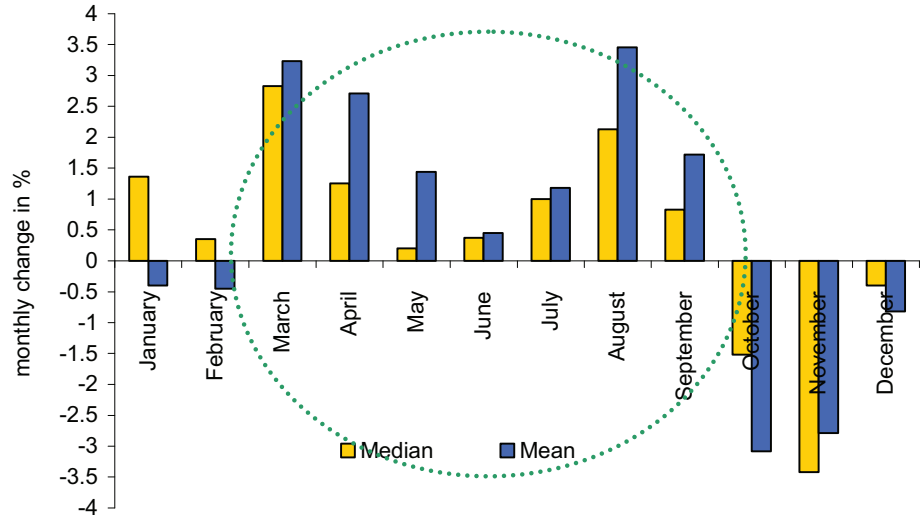
Source: www.sentimentrader.com

Seasonality signals further price increase as well

The seasonally best phase begins in March

The oil price is subject to a profound degree of seasonality, much like most commodities do. Oil tends to go through a price low in February or towards the end of March at the latest. From a seasonal point of view, it is therefore a good time to invest. The annual highs tend to be reached in August or September. This is due to the hurricane season in the Gulf of Mexico as well as the replenishing of stock prior to the heating season, and not the least the effect of the self-fulfilling prophecy. In the past 23 out of 28 years the oil price increased between February and May. **Therefore we expect rising prices on the back of seasonality.**

Monthly returns since 1980



Sources: Datastream, Erste Group Research

Natural gas taking time to find a bottom

The following monthly chart shows the 12Y development of natural gas. Both in 2005 and in 2008, the upward trend was abruptly cut short at USD 14/mmBtu. Since 2010 the price has been in a downward trend, with USD 2 now seemingly lending strong support. The MACD has created a massive divergence. The short-term chart has already yielded numerous buy signals, and now it seems that the long-term chart will follow suit in due course. Therefore we expect the price to continue building a bottom. **A quick, impulsive upward trend is not (yet) likely.**

Monthly chart natural gas spot price (Henry Hub)

Sources: Bloomberg, Erste Group Research

Ratio analysis

Ratio charts indicate relative valuation

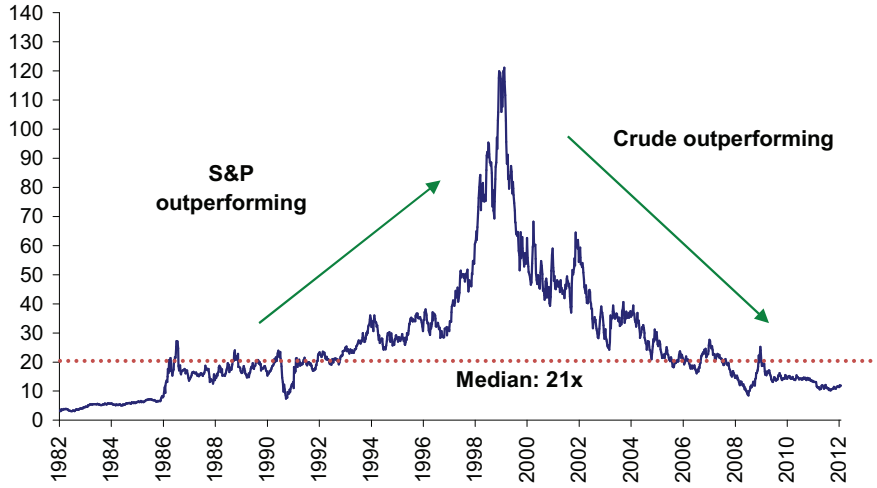
Ratio analysis is a simple yet extremely useful part of the technical analysis. By simply dividing one value by another one, one obtains a ratio, which can be depicted as ratio line in the charts. If the line increases, the numerator is gaining vis-à-vis the denominator. This means that a rising line indicates relative strength. The analysis of long-term relations between oil and other assets is meant to help the investor look at the current market situation from a new and long-term perspective. **The simple mathematical operation of the division, representing a direct, long-term comparison of the variables involved, shows whether an asset is fairly valued, overvalued, or undervalued.**

S&P500 /oil (currently 11.9x)

Oil vs. S&P expensive

In comparison with the broad US equity market, oil is currently expensive. The long-term median of 21x means that one unit of the S&P 500 index would buy 21 barrels of oil. At the moment, this ratio is at only 11.9x. It would seem the period of clear outperformance is over and the ratio is bottoming out.

S&P / crude Ratio



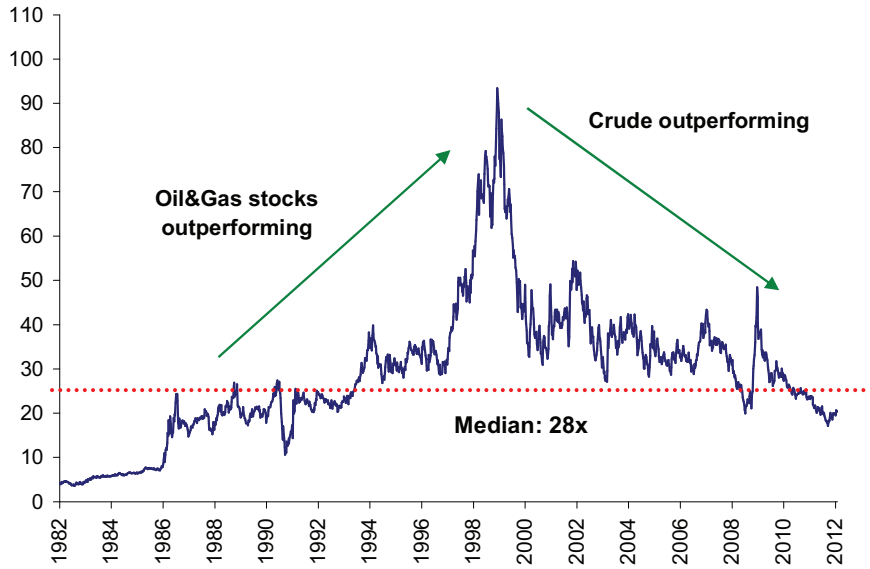
Sources: Datastream, Erste Group Research

Integrated oil & gas index / oil (currently 20x)

Oil also expensive relative to oil shares at the moment

In relation to the oil & gas sector index, oil currently commands an expensive valuation as well. But it seems that the outperformance is slowly coming to an end the ratio is finding a bottom in the region of an old support line. In comparison to the service and equipment sector, the supplier sector seems to be clearly gaining relative strength. Therefore, we prefer this sector to the producing oil companies

Integrated oil & gas / crude ratio



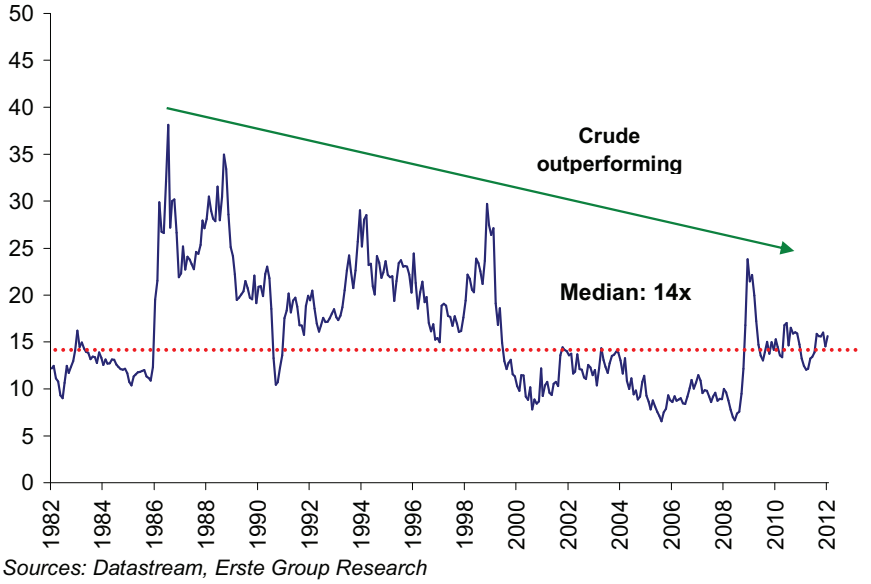
Sources: Datastream, Erste Group Research

Gold / oil (currently: 15x)

Gold should outperform oil

One ounce of gold currently buys 15 barrels of oil, which is slightly more than the long-term median of 14. From this perspective, gold is fairly valued relative to oil. But it seems the almost 25 years of outperformance of oil are drawing to an end and gold is gaining in relative strength.

Gold / oil ratio

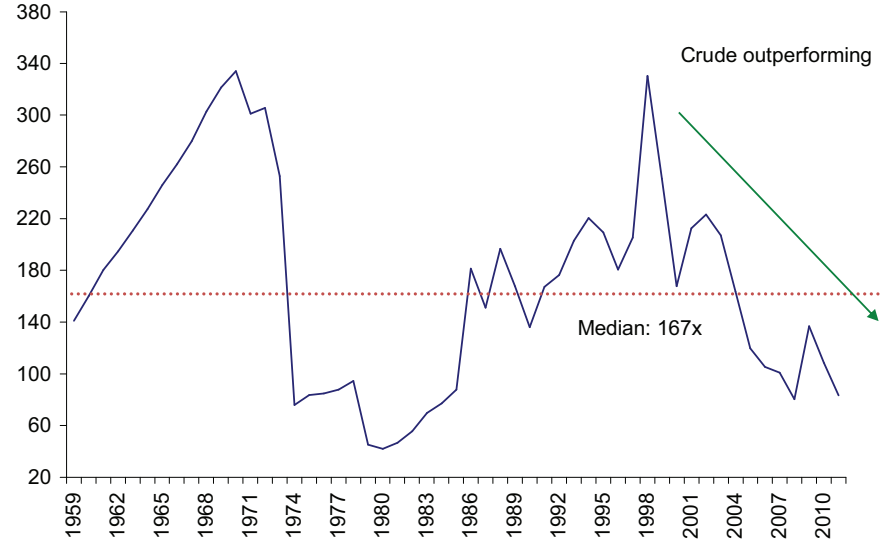


Sources: Datastream, Erste Group Research

M2 money supply / oil (currently: 83x)

The comparison of the M2 money supply of the US and the oil price reveals the fact that the ratio has been in sharp decline since 1999, which means that the oil price has been growing at a faster pace than M2. The historical low of the ratio was at 41x in 1980. This means that there is still room for this ratio to halve before extreme values would have been reached. However, in relation to the median of 167, oil is expensive relative to the money supply.

M2/Crude Ratio



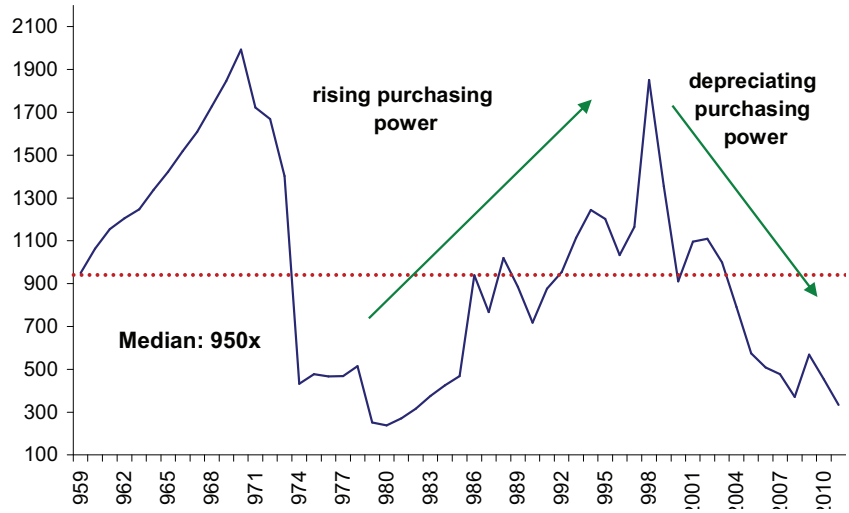
Sources: Datastream, Erste Group Research

Average annual income per capita / oil (currently 333 x)

Strongly falling purchase power measured in oil

The oil price is currently extremely high in relation to the disposable income per capita; or put differently, the purchase power of the US population is at its lowest level since the 1980s. The long-term median since 1959 has been 950x, but currently one the annual income will only buy you 333 barrels of oil. **This is further proof of the rapidly falling purchase power of the US dollar.**

Disposable Income per Capita / Crude Oil Ratio



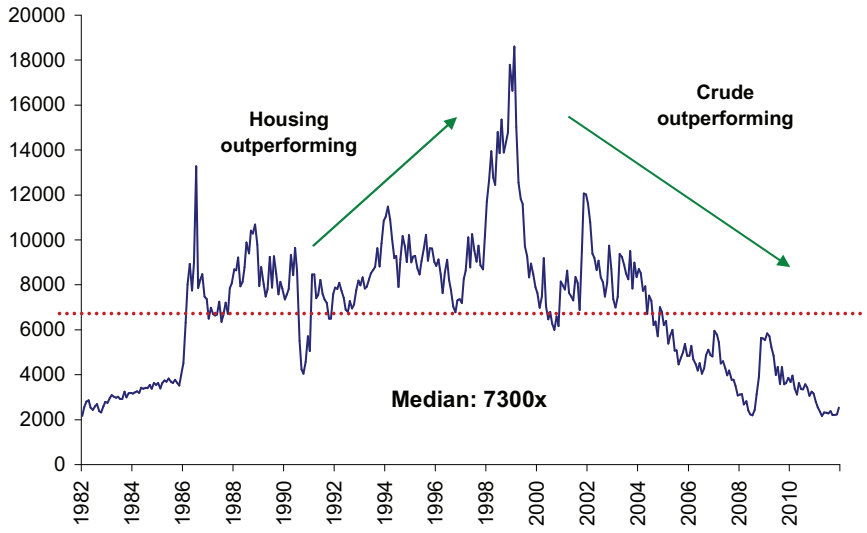
Sources: Datastream, Erste Group Research

Real estate / oil (currently: 2,500x)

US real estate cheap in relation to oil

At the moment an average single-family house buys 2,500 barrels of oil. The long-term median is 7,300, which means that property is currently too cheap in relation to oil. It seems that there is a support line at the current level. Therefore we expect US real estate to outperform oil in the future.

Average One Family House / Crude Ratio



Sources: Datastream, Erste Group Research

CONCLUSION

The foundation for new all-time-highs seems to be in place

High liquidity, low interest rates, and QE should create a positive environment for oil

The currently high levels of liquidity, global monetary expansion, and the low interest rates (and thus low opportunity costs) should continue to provide a positive environment for investments in commodities. However, the artificially created prosperity should not be confused with real, healthy growth. Therefore, the development of the oil price from here on out should also strongly hinge on whether and when the third Quantitative Easing programme will be implemented. The extremely high correlation of equity markets and the oil price can hardly be explained by the traditional supply/demand patterns. In fact, the monetary policy seems to become the most important determinant. **The fact that the Federal Reserve will now maintain its zero-interest policy until 2014 should lend support to the entire commodity sector, but particularly to oil and gold.**

Low reserve capacity makes the oil price very vulnerable to political tensions

The still low reserve capacity makes the oil price vulnerable to geopolitical tensions. With the exception of Saudi Arabia, no country holds any significant reserve capacities. But since Saudi Arabia has never exceeded the psychological barrier of 10mn barrels/day on a sustainable basis, we harbor doubts as to whether the country can actually produce 12.5mn barrels/day. Risks are that it may only turn out in a real emergency whether the alleged reserve capacity actually exists to the extent proclaimed. **At any rate, the decision of IEA to tap the strategic reserves during the Libya crisis is a clear indicator of the strained supply situation.**

In the case of a blockade of the Strait of Hormuz USD 150-200 is likely

The latently smouldering Iran crisis seems to be close to escalation. The most recent manoeuvres, ostentatious threats, sanctions, embargoes and the currently happening shadow war have heated up the situation further. On top of this, the situation in the Iran seems tense, with the cut in subsidies and the onset of hyperinflation exacerbating the crisis. It seems we may soon see the last straw that breaks the camel's back. **Even though Iran could probably only maintain a blockade for a very limited amount of time, the consequences would still be dramatic. The oil price would definitely set new all-time-highs and could reach levels of up to USD 200.**

The Arab Spring could only be stopped by billions in handouts – the revolution may be suspended, not called off

We believe that the risks on the supply side will continue to intensify in 2012. Although at the moment the focus is pretty much on Iran, Nigeria, Iraq (which has been destabilized in the wake of the withdrawal of troops), Yemen, Syria, and Sudan should not be left out of the equation either. Although the political situation in Saudi Arabia, Oman, Bahrain, and UAE is still stable, we would not rule out a domino effect. The latent social tensions, caused by high unemployment, political repression, the strong increase in food prices, and the widening income gap, should not be underestimated. **Therefore, we believe that the smouldering political risks have not been fully priced into the oil price yet.**

Rising break-even oil price

The significant increase in the BEOP also suggests higher prices. Numerous governments in the Middle East and Northern Africa reacted to the burgeoning Arab Spring by launching social aid programmes and handing out billions' worth of gifts and subsidies in an all-round fashion. As a result there is a big incentive to maintain the oil price at least above USD 100. In the long term, the oil price is no longer following the laws of supply and demand, but

will develop according to the monopolistic principles of a few large producing countries in the Middle East.

High time preference causes lack of long-term investments

OPEC has stated that its target oil price is USD 100 – one cannot overrate this news

Therefore, a high oil price is a top priority for many OPEC countries. **The OPEC has recently stated that its target oil price was USD 100, which is clearly above the former target of USD 75. One cannot overrate this news.** On top of it, this also means that the investment incentive for the construction of new production capacities is often minimal. **The long-term effects of the subsidies are devastating.** The high preference for the present over the future displayed by the regimes causes a lack of long-term investment in refineries, new oilfields, and infrastructure. In addition, the recipients of subsidies tend to expand consumption and thus cause the dilemma to deteriorate.

Sharply rising oil consumption in the exporting countries could trigger shortages in the long run

Worryingly, the share of domestic consumption in total Saudi Arabian production has been on a continuous rise. At the moment, some 29% of Saudi Arabian production is consumed domestically. At the beginning of the 1990s, that percentage was 13%. If the development were to continue at the same speed, less than 50% of Saudi Arabian oil production would be available for exports ten years from now. **This would on the one hand cause the budget to blow up, on the other hand Saudi Arabia is the only significant swing producer and thus essential to global oil supply. In the absence of any major discoveries or massive capacity expansions, the rising domestic consumption in Saudi Arabia could cause shortages in the long run.**

High oil prices will soon affect economy

The oil price should be rising or remain high until the economy "feels the pain". In the US, the average petrol price increased to a new all-time-high in January. The high petrol price acts like an additional tax for US consumers. An increase of 10 cents per gallon equals an additional burden of USD 14bn per year for US households. Therefore we expect the high petrol prices in the US to affect the economy in due course. **In Europe, too, the increase in the oil price could soon manifest on the national accounts, with the Brent price recently setting a new all-time-high in euro.**

Shale oil shows innovation power in the sector; production profitable from USD 60/barrel onwards

In the US we have seen a dramatic trend reversal: oil production, on the decline since 1970, has increased drastically since its low in 2008. The reason: shale oil. While the old oilfields in Alaska and Texas are apparently way past their prime, unconventional production methods have caused the State of North Dakota, which used to be of no relevance in terms of oil production, to skyrocket to the top league of oil producers in the US. **According to statements made by the biggest producers, the production of shale oil is profitable from an oil price of about USD 60 onwards.** Given the current level of about USD 100/barrel (WTI) the boom of the new oilfields is understandable.

US natural gas has a attractive risk/reward profile

US gas seems clearly undervalued. We believe that the "fair price", i.e. a level where on the one hand a rise in demand is possible, and on the other hand there is sufficient incentive for producers and explorers to introduce new products, is clearly higher. **We expect a possible final trend acceleration downwards that should bottom out at USD 2. From the risk/return point of view, investments in the gas sector seem attractive.**

Clean fracking will make shale gas production more efficient, cleaner and cheaper

We are still optimistic in terms of the development of shale gas in Europe. The current scaremongering with regard to the environmental risks seems exaggerated. Many studies prove that the dangers are definitely not any bigger than those associated with conventional drilling. The next generation – **"clean fracking" – will reduce the environmental risks further, increase the yield, and thus make the production of shale gas more efficient, cheaper, and cleaner.**

***"The reports of my death are greatly exaggerated",* Mark Twain**

The belief in a quick substitution of fossil energy carriers by alternative forms of energy seems illusory and naïve, given the current investment volumes and lip service. At the moment there seems to be no intention to initiate sustainable changes. Presently, decision makers do not appear to have the intention to initiate sustainable changes. **But we still believe that – much like Julian Simon forecasted– high oil prices cause shifts in efficiency and technology.** Or as Mark Twain said, *"The reports of my death are greatly exaggerated"*. Therefore we assume that (as highlighted in the chapter on the skyscraper-index) an extrapolation to infinitely high oil and gas prices may end in a (c)rude awakening.

Forecast: Average oil price of USD 123 per barrel (Brent) between now and March 2013

To sum up, we see the risks for the oil price heavily skewed to the upside. At the moment the market is well supplied, but the smouldering crisis in the Persian Gulf could easily push oil prices to new all-time-highs should it escalate. From a technical point of view (especially seasonality) and on the basis of tactical considerations, we expect the upward trend to continue at least until mid-year, at which point we could see demand destruction setting in. **We believe that new all-time-highs can be reached and forecast an average oil price (Brent) of USD 123 per barrel between now and March 2013.**

Contacts

Group Research

Head of Group Research
Friedrich Mostböck, CEFA +43 (0)5 0100 - 11902
Macro/Fixed Income Research
Head: Gudrun Egger, CEFA (Euroland) +43 (0)5 0100 - 11909
Adrian Beck (AT, SW)) +43 (0)5 0100 – 11957
Mildred Hager (US, JP, Euroland) +43 (0)5 0100 - 17331
Alihan Karadagoglu (Corporates) +43 (0)5 0100 - 19633
Peter Kaufmann (Corporates) +43 (0)5 0100 - 11183
Carmen Riefler-Kowarsch (Covered Bonds) +43 (0)5 0100 - 19632
Elena Statelov, CIIA (Corporates) +43 (0)5 0100 - 19641
Macro/Fixed Income Research CEE
Co-Head CEE: Juraj Kotian (Macro/FI) +43 (0)5 0100 - 17357
Co-Head CEE: Birgit Niessner (CEE) +43 (0)5 0100 - 18781
CEE Equity Research
Co-Head: Günther Artner, CFA +43 (0)5 0100 - 11523
Co-Head: Henning Eßkuchen +43 (0)5 0100 - 19634
Günter Hohberger (Banks) +43 (0)5 0100 - 17354
Franz Hörl, CFA (Steel, Construction) +43 (0)5 0100 - 18506
Daniel Lion, CIIA (IT) +43 (0)5 0100 - 17420
Christoph Schultes, CIIA (Insurance, Utility) +43 (0)5 0100 - 16314
Thomas Unger, CFA (Oil&Gas) +43 (0)5 0100 - 17344
Vera Sutedja, CFA (Telecom) +43 (0)5 0100 - 11905
Vladimira Urbankova, MBA (Pharma) +43 (0)5 0100 - 17343
Martina Valenta, MBA (Real Estate) +43 (0)5 0100 - 11913
Gerald Walek, CFA (Machinery) +43 (0)5 0100 - 16360
International Equities
Hans Engel (Market strategist) +43 (0)5 0100 - 19835
Stephan Lingnau (Europe) +43 (0)5 0100 - 16574
Ronald Stöferle (Asia) +43 (0)5 0100 - 11723
Editor Research CEE
Brett Aarons +420 956 711 014
Research Croatia/Serbia
Head: Mladen Dodig (Equity) +381 11 22 09 178
Head: Alen Kovac (Fixed income) +385 62 37 1383
Anto Augustinovic (Equity) +385 62 37 2833
Ivana Rogic (Fixed income) +385 62 37 2419
Davor Spoljar; CFA (Equity) +385 62 37 2825
Research Czech Republic
Head: David Navratil (Fixed income) +420 224 995 439
Petr Bittner (Fixed income) +420 224 995 172
Head: Petr Bartek (Equity) +420 224 995 227
Vaclav Kminek (Media) +420 224 995 289
Jana Krajcova (Fixed income) +420 224 995 232
Martin Krajhanzl (Equity) +420 224 995 434
Martin Lobotka (Fixed income) +420 224 995 192
Lubos Mokras (Fixed income) +420 224 995 456
Josef Novotný (Equity) +420 224 995 213
Research Hungary
Head: József Miró (Equity) +361 235-5131
Orsolya Nyeste (Fixed income) +361 373-2026
Zoltan Arokszallasi (Fixed income) +361 373-2830
Research Poland
Head: Piotr Lopaciuk (Equity) +48 22 330 6252
Tomasz Kasowicz (Equity) +48 22 330 6251
Marek Czachor (Equity) +48 22 330 6254
Michal Hulboj (Equity) +48 22 330 6253
Research Romania
Head: Lucian Claudiu Anghel +40 37226 1021
Head Equity: Mihai Caruntu (Equity) +40 21 311 2754
Dorina Cobiscan (Fixed Income) +40 37226 1028
Dumitru Dulgheru (Fixed income) +40 37226 1029
Eugen Sinca (Fixed income) +40 37226 1026
Raluca Ungureanu (Equity) +40 21 311 2754
Research Slovakia
Head: Juraj Barta, CFA (Fixed income) +421 2 4862 4166
Sona Muzikarova (Fixed income) +421 2 4862 4762
Maria Valachyova (Fixed income) +421 2 4862 4185
Research Ukraine
Head: Maryan Zablotskyy (Fixed income) +38 044 593 - 9188
Ivan Ulitko (Equity) +38 044 593 – 0003
Igor Zholonkivskyi (Equity) +38 044 593 - 1784
Research Turkey
Head: Erkin Sahinoz (Fixed Income) +90 212 371 2540
Sevda Sarp (Equity) +90 212 371 2537
Evrim Dairecioglu (Equity) +90 212 371 2535
Ozlem Derici (Fixed Income) +90 212 371 2536
Mehmet Emin Zumrut (Equity) +90 212 371 2539
M. Görkem Goker (Equity) +90 212 371 2534
Sezai Saklaroglu (Equity) +90 212 371 2533

Group Institutional & Retail Sales

Institutional Equity Sales Vienna
Head: Brigitte Zeitlberger-Schmid +43 (0)5 0100 - 83123
Cash Equity Sales
Hind Al Jassani +43 (0)5 0100 - 83111
Werner Fuerst +43 (0)5 0100 - 83121
Josef Kerekes +43 (0)5 0100 - 83125
Cormac Lyden +43 (0)5 0100 - 83127
Stefan Raidl +43 (0)5 0100 - 83113
Simone Rentschler +43 (0)5 0100 - 83124
Derivative Sales
Christian Luig +43 (0)5 0100 - 83181
Brigitta Weilinger +43 (0)5 0100 - 83182
Sabine Kircher +43 (0)5 0100 - 83161
Christian Klikovich +43 (0)5 0100 - 83162
Armin Pfingstl +43 (0)5 0100 - 83171
Roman Rafeiner +43 (0)5 0100 - 83172
Institutional Equity Sales London
Head: Michal Rizek +44 20 7623 - 4154
Jiri Feres +44 20 7623 - 4154
Tatyana Dachyshyn +44 20 7623 - 4154
Declan Wooloughan +44 20 7623 - 4154
Institutional Equity Sales Croatia
Damir Eror (Equity) +38 562 37 28 13
Zeljka Kajkut (Equity) +38 562 37 28 11
Institutional Sales Czech Republic
Head: Michal Rizek +420 224 995-537
Ondrej Cech (Fixed income) +420 224 995-577
Radim Kramule +420 224 995-537
Jiri Smehlik (Equity) +420 224 995-510
Pavel Zdichynec (Fixed income) +420 224 995-590
Institutional Sales Hungary
Gregor Glatzer (Equity) +361 235-5144
Attila Preisz (Equity) +361 235-5162
Norbert Siklosi (Fixed income) +361 235-5842
Institutional Equity Sales Poland
Head: Marin Hresic +48 22 330 6206
Pawel Czuprynski (Equity) +4822 330 62 12
Lukasz Mitan (Equity) +4822 330 62 13
Jacek Krysinski (Equity) +4822 330 62 18
Grzegorz Stepien (Equity) +48 22 330 6211
Institutional Equity Sales Turkey
Simin Öz Gerards (Head) +9 0212 371 2525
Mine Yoruk +9 0212 371 2526
Institutional Equity Sales Slovakia
Head: Dusan Svitek +48 62 56 20
Andrea Slesarova (Client sales) +48 62 56 27
Saving Banks & Sales Retail
Head: Thomas Schaufler +43 (0)5 0100 - 84225
Equity Retail Sales
Head: Kurt Gerhold +43 (0)5 0100 - 84232
Fixed Income & Certificate Sales
Head: Uwe Kolar +43 (0)5 0100 - 83214
Treasury Domestic Sales
Head: Markus Kaller +43 (0)5 0100 - 84239
Corporate Sales AT
Mag. Martina Kranzl +43 (0)5 0100 – 84147
Karin Rattay +43 (0)5 0100 – 84112
Mag. Markus Pistracher +43 (0)5 0100 - 84152
Günther Gneiss +43 (0)5 0100 - 84145
Jürgen Flassak, MA +43 (0)5 0100 - 84141
Antonius Burger-Scheidlin, MBA +43 (0)5 0100 - 84624
Fixed Income Institutional Desk
Head G7: Thomas Almen +43 (0)5 0100 - 84323
Head Germany: Ingo Lusch +43 (0)5 0100 - 84111
Fixed Income International & High End Sales Vienna
Jaromir Malak/ Zach Carvell +43 (0)5 100 - 84254
U. Inhofner/ P. Zagan/ C. Mitu +43 (0)5 100 - 84254
Fixed Income International Sales London
Antony Brown +44 20 7623 4159

Disclaimer

Published by Erste Group Bank AG, Neutorgasse 17, 1010 Vienna, Austria.
Phone +43 (0)5 0100 - ext.

Erste Group Homepage: www.erstegroup.com On Bloomberg please type: EBS AV and then F8 GO