

## The oil context and trends in 2009

In 2009, the market experienced panic, hope and confidence (still feeble) in succession. In a new context of relative abundance and depressed demand, the price of oil stood up well, averaging \$60/bbl and ending the year in the \$70-80/bbl range. This equilibrium price was justified by production costs and forecasts of a potentially tight market. It is feared that the hoped-for rally in 2010 and especially 2011 will eventually bring pressure to bear on the oil price again. These fears are fueled by expectations of a limited supply and growing demand. Will markets be “reasonable” and integrate medium-term fundamentals into price quotations?

### A crisis on a large scale

After a stockmarket mini-quake in the summer of 2007, a financial tsunami hit in September 2008 with the emblematic failure of Lehman Brothers on the 15<sup>th</sup> of the same month. “Emergency relief” was in place by November, strengthened by a decisive G20 summit in early April 2009 that restored confidence with the announcement that 5,000 billion dollars would be injected into the world economy.

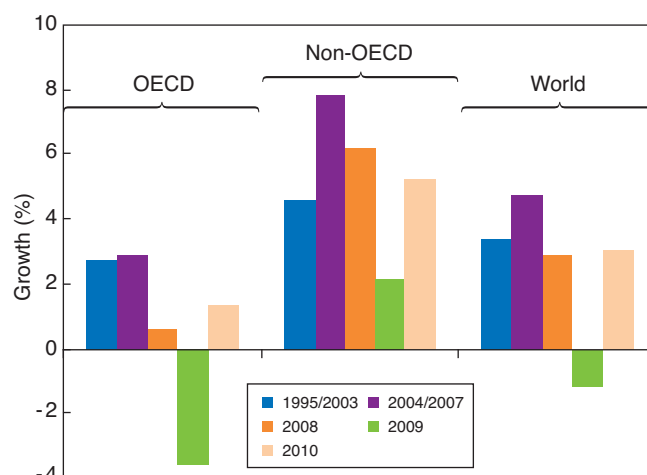
This unprecedented financial shock put an abrupt end to four years of outstanding world growth. Averaging nearly 5% between 2004 and 2007, it was mainly driven by the emerging countries (+8%). 2008 revealed the first effects of the crisis: the OECD countries grew by only 0.6% compared to almost 3% in the past. In 2009, the world economy declined heavily: the OECD countries went into recession while the non-OECD countries grew at a sluggish rate (Figure 1).

The oil sector could not avoid the consequences of a crisis affecting demand, production, prices, investments and corporate bottom lines. Looking beyond the crisis, many forecasts continue to be dominated by the idea of possible tensions in a world in transition marked by the rise of the emerging countries.

### The crisis and the oil price

In an attempt to understand the oil price trends in 2009, one must take a look at the stockmarkets. Starting in September 2008, the markets reacted in relatively similar ways for fairly legitimate reasons (Figure 2). Gradual

Fig. 1 - World economic growth by geographical region



Source: IFP, based on IMF

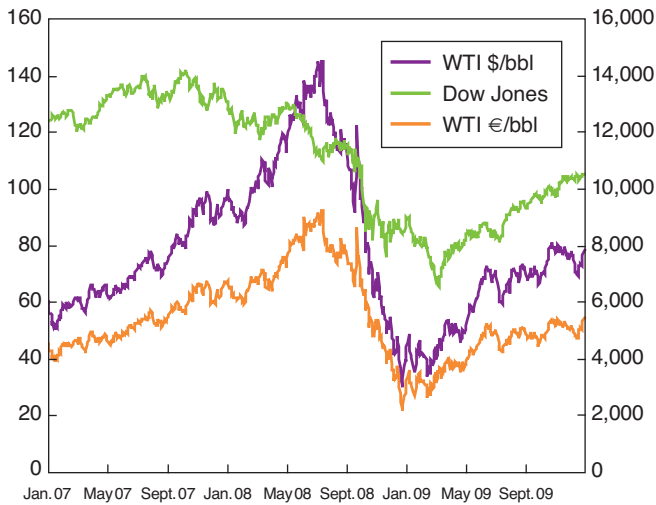
return to optimism has indeed greatly influenced trends of the two markets.

Things happened differently in the past. In 2007, the first concerns about the economy sent the Dow Jones into a downswing that lasted until March 2009. In contrast, oil climbed steadily from 2004 to the summer of 2008, when it reached new highs.

From November on, one can observe a connection with the financial slump. Investors massively lost confidence in the stockmarket and commodities and temporarily panicked, moving to get their money out. These transactions drove the oil price down to about \$40/bbl, where it stayed from December to mid-March.

## The oil context and trends in 2009

Fig. 2 - The Dow Jones and WTI prices



Source: IFP

The G20 meeting on April 2 restored hope that cash injections by public authorities could help the economy emerge from crisis. From this date on, “speculative” buying resumed: the Dow Jones and WTI prices rose by more than 50% and found equilibrium close to \$70-80/bbl in the fourth quarter.

As for the dollar, it went up and down as perceptions of the economy changed. It went up when markets felt uneasy, but no longer served as a refuge value when the outlook looked brighter. This prompted the euro to rise gradually from \$1.3 early in the year to about \$1.5. This mechanism, according to which interest in the dollar falls during “boom” periods, largely explains the relatively convergent euro/oil trends.

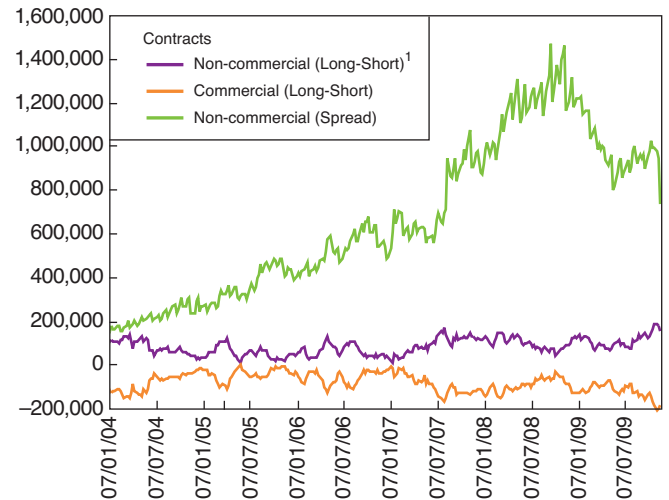
Overall, the market has responded quite well to economic signals. An initial panic set in considering a systemic risk that might cause a collapse in the financial system. The oil price bottomed out at \$40/bbl, too low to sustain long-term investment. Obviously, this price level was not tenable. With the first indications that the economy had started to grow again, the price naturally returned to levels that were compatible with the fundamentals.

### Questions about prices

Beyond the purely rational perspective, many technical and moral questions have also been raised regarding these price trends.

The result of the sharp market fluctuations were historic financial gains. Attractive interest rates in the United States, mainly intended to jump-start the economy, encouraged speculative “cash and carry” transactions. These issues are the subject of broad political debate.

Fig. 3 - Hedge and speculative positions on the WTI Nymex (2004/2009)



(1) Long-Short: salors/buyers positions, Spread: others than hedge position

Source: IFP, based on CFTC

From a more technical standpoint, these erratic fluctuations raise questions about the role played by speculation and the impact of volatility within the oil industry.

Speculation is inherent to financial markets. Here, it is taken to mean the anticipation of price increases or decreases as a function of forecasts based on market conditions. Speculators can win if the price goes up or down, irrespective of the absolute price level. The price quotations resulting from speculation can be erroneous, leading to corrections upwards or downwards that can be severe, as in the case of speculative “bubbles”.

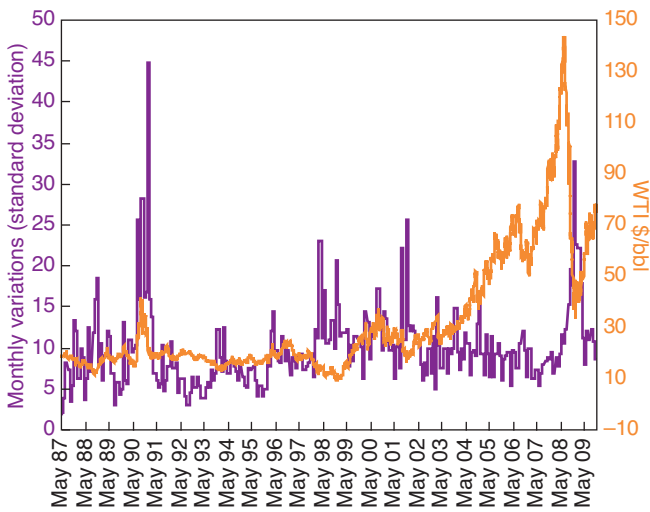
Obviously, speculation does not impose an artificial price, but an equilibrium price justified by the fundamentals. Speculation exists because of the potential for gain and not the other way around. The rise of oil contracts on the Nymex since 2004 is largely due to predictions that prices were following an upwards curve (Figure 3).

The market in 2009 was typical of this *modus operandi* shifting from panic to hope, which makes it easier to understand the trends observed. The price set at year-end 2009 was based on various elements including expectations that growth – hence oil demand – would rally, the minimum costs to cover in order to ensure investments, the price defense mounted by OPEC and the anticipation of a tight supply.

Of course, any trader that saw these movements coming, storing oil for some early in the year, turned a comfortable profit. One of the challenges of these positions is linked to a potential rollover market, if prudential measures within companies are not implemented.

## The oil context and trends in 2009

Fig. 4 - Fluctuations in the oil price (1988/2009)



Source: IFP

These issues are under study at the US Commodities Futures Training Commission (CFTC), whose mission is to “foster efficient, transparent and fair marketplaces” with a clear intention of reinforcing prudential measures. Two key measures are under consideration. The first bears on the limitation of risks taken by operators and the second on augmenting market transparency. The primary target is not speculation but the risk associated with speculation, i.e. the real reason for the sub-prime mortgage crisis that struck the financial markets.

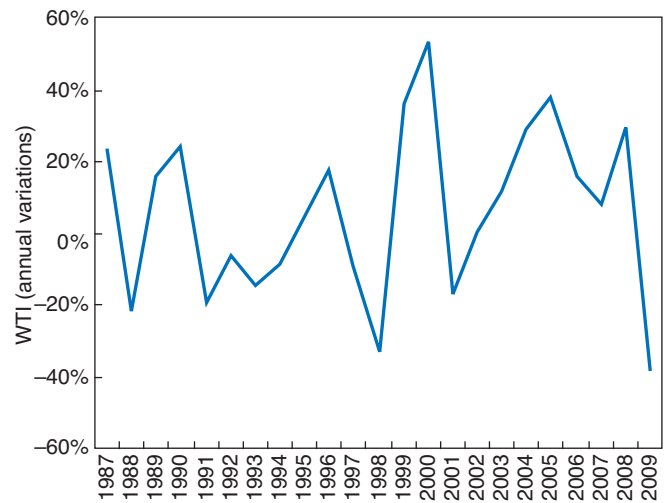
Market volatility also gives cause for concern. Again, speculation is not the only reason for price volatility, but also the uncertainty surrounding the forecasts. In a perfect, crisis-free world of regular growth and linear demand, with an adequate, predictable supply available at constant cost, prices could be more or less stable. But this scenario, which would by definition exclude speculation on future price trends, is far removed from the real world.

In a context marked by uncertainty, the oil market – like any other commodity market – is volatile by nature (Figure 4). For the last twenty years, monthly variations of +/-10% have been the norm, with extreme peaks and hollows occurring during periods of crisis (e.g. the Gulf Crisis of 1990 and the economic or financial crises of 1998, 2001 and 2008/2009).

One must distinguish between the concept of price increase and that of volatility. For instance, the period between 2003 and 2008 saw a steep upswing in the oil price, but it was steady, without pronounced fluctuations.

What is under challenge is the typical pattern of the past, which alternated increases and decreases of about

Fig. 5 - Annual oil price variations (WTI)



Source: IFP, based on BP

+/-20% per year (Figure 5). It took a crisis to slow down the steady upward price climb of the last few years.

Overall, what has really changed is not so much the volatility of the market as the reference value, which approximated \$25-30/bbl in the 1990s and now stands at about \$70-100/bbl. In other words, the absolute variations are much more larger. In fact, reducing “volatility” means hoping that prices will fall to lower levels. This is probably incompatible with the new reference prices based on higher production costs.

### Outlook for the medium-term: a decline in excess production capacity

All operators have integrated the idea of an inevitably high oil price into their thinking. On the financial markets, this translates into “contango” futures prices (the anticipated value of the future spot price is higher than the spot price today).

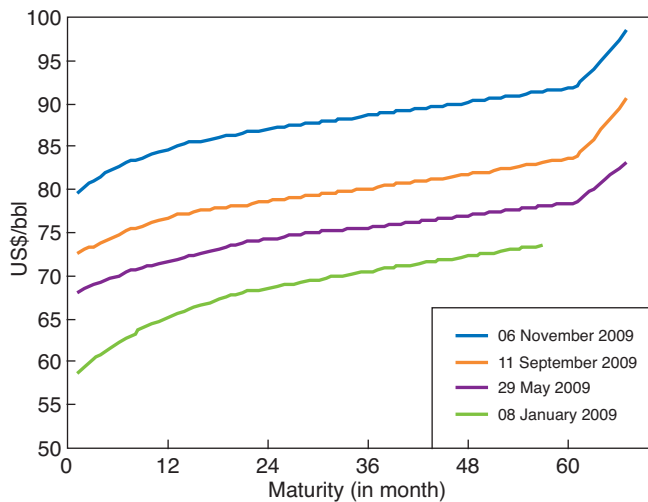
One could observe this throughout the year 2009. For instance, the price quoted for December 2010 rose from \$65/bbl early in the year to about \$85/bbl in November, with a premium of about \$8 compared to the spot price quotations (Figure 6).

These upswings occurred after the IMF revised its world forecasts for 2010 upwards. After announcing 2% growth in March, the IMF now predicts a rate of 3% (5.1% for the emerging countries and 1.3% for the developed economies). The forecast for the period 2011/2014 should exceed 4% (over 6% and 2.5%, respectively).

According to this scenario, non-OECD demand should rise by about 3% a year (more than 1 Mbbl/d) and

## The oil context and trends in 2009

Fig. 6 - The WTI futures price in 2009



Source: IFP, based on Nymex

stagnate in OECD countries. World demand (including for biofuels) is expected to rise from 84.8 Mbbld in 2009 to more than 90 Mbbld in 2015. At the same time, the non-OPEC supply is expected to stagnate while OPEC capacity is supposed to expand slightly. This combination of factors will progressively reduce the margins for maneuver available to the market (Figure 7).

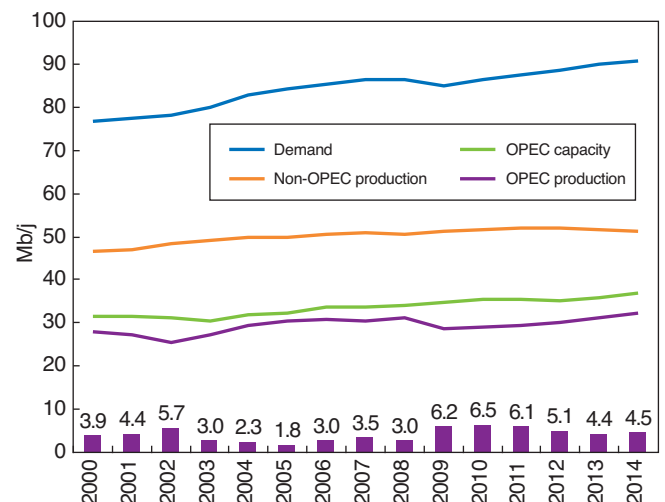
In 2009, the excess spare capacity was generated by a severe decrease in demand, which was down by 1.3 Mbbld year-on-year and by 2 Mbbld compared to the trend forecast. In order to support oil prices, OPEC had to adjust production at its meeting on December 17, 2008. This was the largest that it had ever made, taking 4.2 Mbbld off the market. Compliance with quotas was only partial: over-quota production totaled 1 Mbbld early in 2009 and 1.3 Mbbld starting in May.

Spare capacity exceeded 6 Mbbld (3.3 Mbbld in Saudi Arabia and 0.6 Mbbld in Nigeria and the Emirates) and is expected to fall to 5 Mbbld by 2011 and to about 4 Mbbld from 2013. This includes an (uncertain) increase of about 0.6 Mbbld in the Iraqi production.

The oil potential of Iraq is beyond doubt. Three key fields (Rumaila, Majnoon and West Qurna) that fond takers in late 2009 represent a potential of 5 Mbbld, which is double the current output. However, the current context is likely to delay planned development projects and thus weigh on the future equilibrium of the market.

The current premium on the crude price for futures quotations is the result of this anticipation of potential future tensions. This situation should continue to weigh on the spot price unless the fundamentals see a reversal (e.g. demand goes down). In other words, barring the

Fig. 7 - Supply/Demand equilibrium 2000/2014



Source: IFP, based on IEA

isolated adjustment, the idea of a lasting decline in the oil price has little credibility within the framework of current economic forecasts.

Forecasts for the longer term – four years or more – currently see a tight market with -futures- prices in the \$90-100/bbl range. Repeated assessments to determine whether oil production might peak in the very near future have influenced these expectations. A comparison between future requirements and available or potential resources lends this scenario credibility.

### Eventually, it is possible that production will stabilize...

It is possible to estimate the future oil consumption trend based on per capita income and the population (Figure 8). For OECD countries, the average consumption ratio varies substantially according to region, with an especially high ratio in the United States. This being said, it has remained relatively flat for several years within the OECD as a whole, averaging about 38 bbl per thousand inhabitants. Postulating a slight increase in the population, consumption would reach 50 Mbbld by 2030 in one trend scenario (Table 1).

For non-OECD countries, the simultaneous growth of the population and per capita income would yield oil consumption of 56 Mbbld in 2030 versus 39 Mbbld today. This forecast is based on unit consumption of more than eight barrels per thousand inhabitants for unit GDP of about \$4,500, which corresponds to the situation existing in Turkey in 1987. Of course, the trend would have been higher if it had been close to the curve presented by South Korea, where consumption in the industrial

## The oil context and trends in 2009

Table 1

Oil consumption based on income and the population (in 2030)

Forecasts 2030	GDP per capita \$2005	Bbld per thousand inhabitants	Population in millions	Consump. Mbbld
OECD	42,700	38	1,308	49.7
Non-OECD	4,500	8	7,000	58.1
World	10,500	13	8,309	107.8

Source: IFP

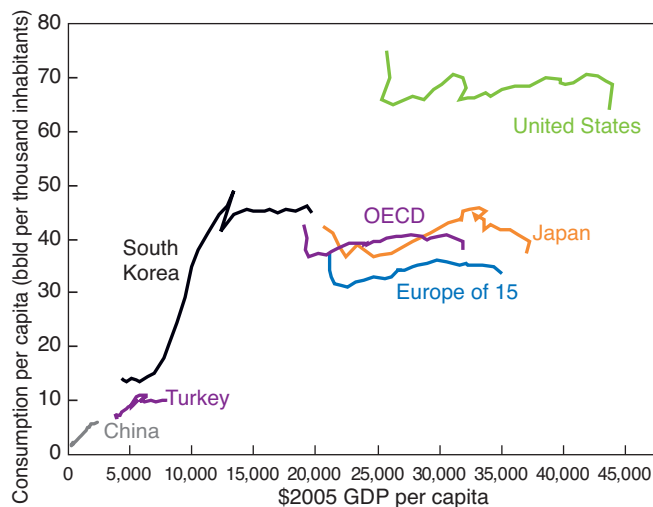
sector and electricity production had been higher. This prospect seems improbable for non-OECD countries, given the new oil context.

By this simplified calculation, world consumption would stand at about 108 Mbbld in 2030, close to the forecasts issued by the IEA (107.9 Mbbld) and the US Department of Energy (106.6 Mbbld). This would represent an increase of about 20 Mbbld compared to current consumption (86 Mbbld).

The demand curve will no doubt be influenced by the changes expected in the transport sector, responsible for most of the future increase.

In its WEO 2009 report, the IEA reviews pathways that could be considered to influence demand. It examines options that could reduce CO<sub>2</sub> emissions to 450 ppm, as opposed to 1,000 ppm in the baseline scenario. In the transport sector (e.g. road vehicles and aircraft), the measures retained fall into two categories: the first aim to boost motor vehicle efficiency and the second to develop fuels to replace oil-based fuels.

Fig. 8 - Income and consumption per capita



Source: IFP, based on IMF and DOE

The baseline scenario is not very ambitious, based on the assumption that conventional vehicles will still account for the majority of sales in 2030. On the other hand, the so-called "450 ppm" scenario postulates the deployment of higher-performance vehicles, e.g. hybrids, for estimated all-sector aggregate gains of 7 Mbbld by 2030 (Table 2). Advances in the development of substitutes for oil-based motor fuels (e.g. second and third generation biofuels, natural gas and electric vehicles) would save an additional 4 Mbbld, approximately.

Table 2

Transport sector demand for all energies and for oil 2007/2030

Mbbld (equivalents)	2007	2030		Variations	
		Ref.	450 ppm	Ref./2007	450/Ref.
Transport demand (all energies)					
	47.9	69.5	62.5	21.6	-7.0
Including: Biofuels	0.7	2.8	5.8	2.1	3.0
Including: Gas, electric power, etc.	2.1	3.0	4.3	0.9	1.3
Demand for liquids					
Transport	45.1	63.7	52.4	18.6	-11.3
Oil, other sectors	40.3	40.9	36.3	0.5	-4.5
Oil, all sectors	85.5	104.6	88.7	19.1	-15.8
Supply of liquids					
Oil liquids <sup>1</sup>	81.4	99.5	83.7	18.1	-15.8
Other liquids (CTL, GTL, unconventional from outside Canada and Venezuela, processing gains)	2.1	5.7	5.7	3.6	0.0
Total	83.5	105.2	89.4	21.7	-15.8

(1) Included: Natural gas liquids, Canadian tar sands and Venezuelan extra-heavy crude  
Source: IFP, based on IEA

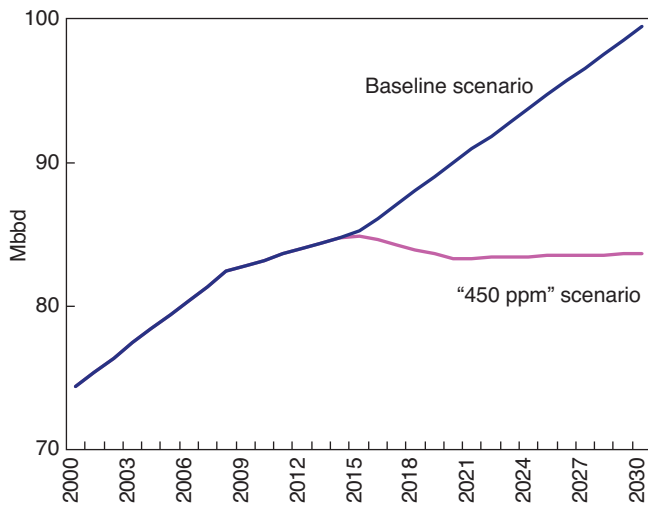
All in all, taking these measures would reduce oil demand by 5 Mbbld by 2020 and by 11 Mbbld by 2030, compared to the baseline scenario. If one also includes measures implemented in other sectors (industrial, electricity, etc.), the total would reach 7 Mbbld by 2020 and 16 Mbbld by 2030.

On the supply side, the development of certain resources – extra-heavy crudes and tar sands from outside Venezuela and Canada, GTL and CTL fuels, and biofuels – could also limit our reliance on conventional oil. By 2030, these resources may represent slightly less than 6 Mbbld. The level could be lower, considering the project developments planned in Brazil and Iraq, in particular.

If we retain the more ambitious scenario that sets out to influence supply and demand trends, residual

## The oil context and trends in 2009

Fig. 9 - Production of conventional oil



Source: IFP, based on IEA

production would stabilize near 84 Mbbld for the oil supply<sup>1</sup> versus about 100 Mbbld in the baseline scenario (Figure 9).

### ... but pressure on resources is growing

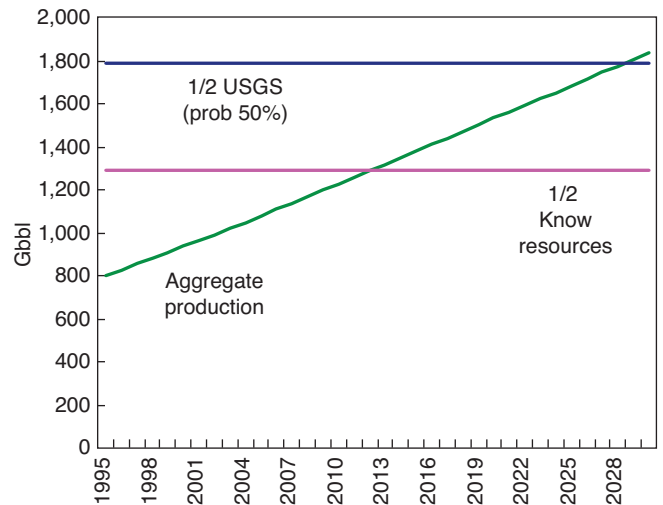
This change, radical though it may be, actually has little effect in solving the problem of resource. The aggregate gain between 2007 and 2030 only represents 50 billion barrels (Gbbbl), i.e. less than two years of consumption at the present rate or 3% of the aggregate production of oil since it first began to be exploited. This aggregate will reach 1,840 Gbbbl by 2030 compared to 1,170 Gbbbl in 2008.

These numbers should be compared with the 2,600 Gbbbl of known producible volumes (aggregate production + current reserves + contingent resources; see the Panorama article "Update on hydrocarbon resources - 1 - Petroleum liquids"). To these, one might add between 520 (IFP) and 1,000 Gbbbl (USGS) of undiscovered potential resources. Hence, in the most optimistic scenario, half of known producible conventional volumes will be consumed by about 2012 and potential resources by 2030 (Figure 10).

This indicates that the it will become increasingly difficult to develop production to ensure future equilibrium between supply and demand. Once half of the existing resources have been consumed, production can only go down. This idea is consistent with the observation reiterated by the IEA that, for mature oil fields, the rate of decline is accelerating.

(1) Included: Natural gas liquids, Canadian tar sands and Venezuelan extra-heavy crude

Fig. 10 - Aggregate production and exploitable resources



Source: IFP

Barring major advances by heavy oils or by biofuels and synfuels (e.g. GTL, CTL and BTL), the most credible assumption is that supply will be increasingly subject to constraints, even in a scenario in which virtuous efforts are made on the demand side.

### Oil prices: high and under pressure

Studies of the oil market indicate that the supply/demand equilibrium will probably be under pressure in the medium-term, based on the current IMF economic scenario, but also in the longer run.

This context helps shed light on oil price trends in 2009. Speculation should not be the only argument put forward to explain why prices climbed past \$70/bbl in July and have stayed there since then.

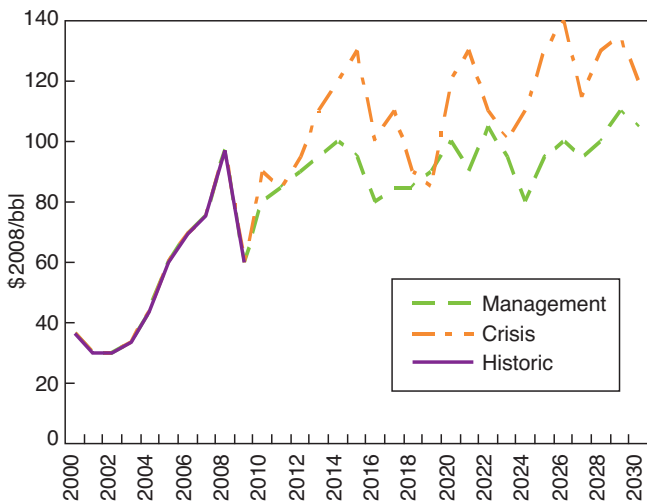
Prices will have to be in the \$60-80/bbl range to ensure long-term investments in new and more cost-intensive types of oil. The market consistently confirmed this hypothesis throughout 2009 in spite of the relative overabundance of supply.

In the short-term, however, isolated price drops cannot be ruled out. For instance, the disclosure of Dubai's debt on November 26 and of the level of debt in several European countries in December created short-lived mini-panics on the markets. At the same time, the Managing Director of the IMF draw attention to the uncertainty concerning the weight of "uncertain assets" in world finance. A shock to the financial sector would certainly weigh on the price of oil.

Therefore, significant downward corrections are possible, given the continuing uncertainty associated with the

## The oil context and trends in 2009

Fig. 11 - Possible scenarios for oil price trends



Source: IFP

economic context. Even so, this will not change the mainstream uptrend and medium- and long-term prices can be expected to exceed \$80/bbl.

Growth of the world population, particularly in emerging countries, and a significant increase in per capita income are the key trends that will influence oil demand. This

being so, there is likely to be substantial pressure on supply, even if one were to suppose an improvement of transport sector efficiency or a sustained development of alternative fuels.

Depending on future economic growth and transport sector policy initiatives, two scenarios are in fact possible. The first is a "management" scenario marked by resolute demand management policies in a context of moderate economic growth. The second is a crisis scenario in which cyclical prices regularly exceed the \$100/bbl mark, destroying demand in periods of short supply.

At any rate, future trends are certain to have a strong influence on energy policies, especially in the transport sector. It will be imperative to incorporate new technologies into these policies to replace hydrocarbons and achieve better vehicle performance, as well as new models to "rethink mobility". This type of reflection is underway in France and Europe at large.

Price trends (level and volatility) will largely depend on whether resolute measures are taken to influence demand or not. More proactive management or price management are thus two possible ways forward.

*Guy Maisonnier - guy.maisonnier@ifp.fr  
Final draft submitted in December 2009*