Oil supply and demand

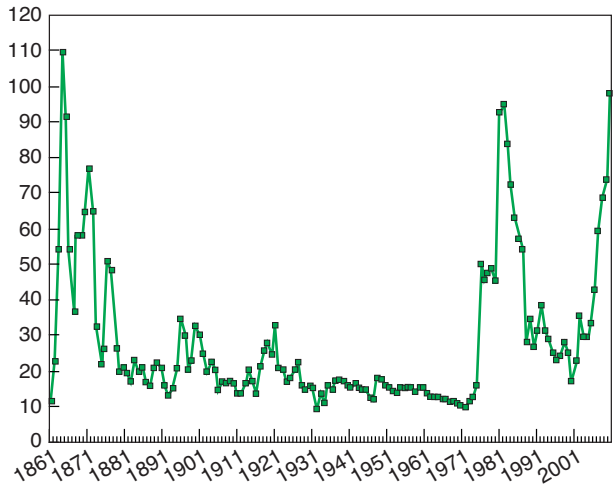
The year 2008 will probably go down in the annals of the oil industry along with the oil shocks of 1973 and 1980, the counter-shock of 1986 and the demand surge of 2004. The price spikes observed until the month of July were unusually high, followed by an unusually abrupt, steep decrease. This is the result of the short-sightedness shown by all market players, most of whom failed to anticipate the economic downturn.

Background

The oil market undoubtedly showed greater volatility (volatility being the price differential between two periods) in 2008 than in almost any other year in industry history. Of course, there were other occurrences of volatility. A quick glance at Figure 1, which tracks prices (in constant US dollar) since the birth of the oil industry in the late 19th century, brings to mind other periods of sharp readjustment.

With hindsight, the period between 1881 and 1973 seems especially stable. During this time frame, when prices were regulated by large, vertically integrated companies, the oil price managed to stay within a fairly narrow price range (US$10-30/bbl). The market became more turbulent when the price tripled during the first oil shock, then doubled in the second, in 1979.

Fig. 1 - Oil prices in US$2008/bbl over 150 years (1860-2007)



Source: BP Statistical review

Thanks to the reaction of demand, prices could be "stabilized" at US$15-30/bbl between the counter-shock of 1986 and 2003. This overview puts certain events, considered major at the time, into perspective: history would show that they were of secondary importance. Examples include the effects of the Gulf War of 1990-1991 and the low prices of 1998.

What can we say about the period 2003-2008, still too recent to be a chapter of history? It is interesting to note the visual similarities between the price hikes occurring in 2003-2008 and those dating to 1973-1980, a seven-year period when the price increased by a factor of six, from US$16 to 95/bbl. The ratio for the period between 2003 (US$33/bbl) and 2008 (about US$100/bbl), was only 3, but the ratio for 1998-2008 was also 6. Should one push the comparison further and anticipate a long slump like the one that followed the second oil shock? Probably not. The economic environment and oil market of today are radically different.

Factors determining the oil price

The formation of the crude price is very complex, as shown in Figure 2. The key factors involved are the economic conditions, the supply/demand equilibrium on the oil market, meteorological or geopolitical events and financial forecasts.

Economic growth, which is influenced by the crude price, remains the dominant element in this puzzle. It shapes the evolution of demand, used to define the supply readjustment policy of the countries belonging to the Organization of Petroleum Exporting Countries (OPEC). Since the non-OPEC supply is always at its maximum level, OPEC must adjust its production to the market in an effort to curb decreases and sometimes excessive increases.

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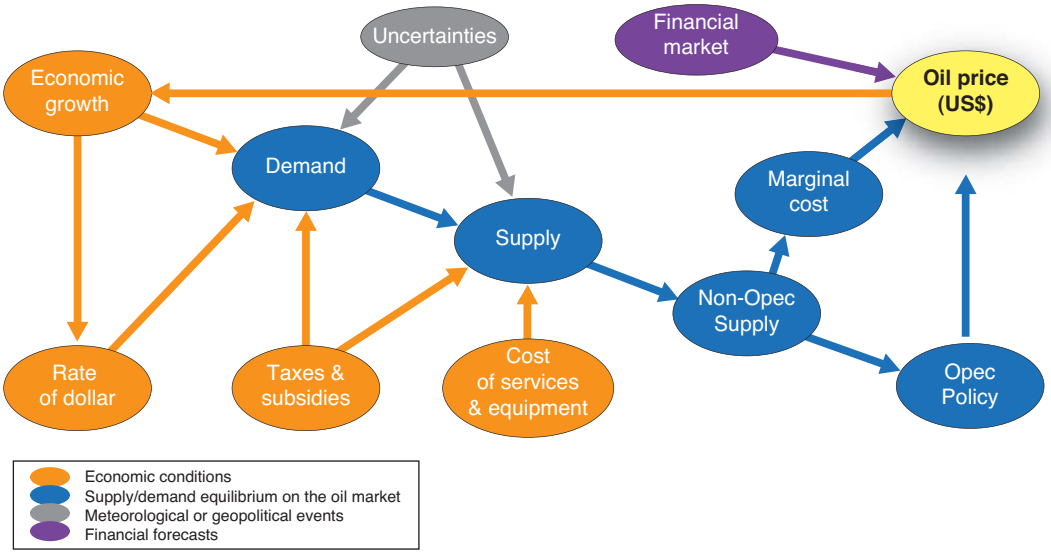
Fig. 2 - Factors determining the oil price



Source: IFP

The maximum cost of non-OPEC production is what defines the lower limit below which production costs will no longer be covered. In other words, it is defined by the highest and not the average cost.

In addition to the basic triangle consisting of "economic growth, the oil market and the crude price," other factors can impact prices, directly or indirectly. The price of the dollar is an important parameter: its value passes on the increase in the oil price expressed in other currencies to a greater or lesser extent.

The amount of tax levied on the final price or on production and any inflation in cost (services and equipment) will also modify market equilibria. Events relative to the climate (*e.g.* extreme temperatures or hurricanes) or geopolitics (especially the Middle East) ultimately yield a positive or negative premium.

Operators on financial markets evaluate all of these parameters—and their assessment will vary in thoroughness and reliability—then behave accordingly. They don't manipulate the price, but are trying to anticipate a realistic equilibrium price. The level of stocks in the United States is also an important indicator in ascertaining the state of equilibrium of the short-term market.

This mode of price formation is probably imperfect. To paraphrase Churchill on democracy, it is the worst except for all others. Nobody can determine a "fair price" better than the market, which simply reflects the perceptions of many operators in the aggregate. Obviously, excessive reactions can create a self-perpetuating spiral, but if they are not grounded in objective reality, a turnaround always occurs. The market cannot sustain a continuously rising or falling price for any length of time unless it is driven by the fundamentals.

Why the oil price went up between 2003 and July 2008...

If one had to choose the most important factors behind the uninterrupted climb in the oil price since 2003, they would be:

- economic growth,
- low OPEC production margins,
- higher production costs,
- weakness of the dollar.

Economic growth, especially in the emerging countries, tops the list. Following the slump in 2001, which brought world growth below 3%, its average for the previous decade, and a slow recovery in 2002, the economy went into overdrive (Figure 3), growing by nearly 4% in 2003 and by about 5% over a four-year period ending in 2007.

If one compares this exceptional period of growth with the past, it becomes clear that it led to inflation in the prices of all commodities. Due to the accelerated pace of this uptrend, supply could not keep up and price hikes occurred to alleviate tension on the market. This is what is known as the destruction of potential demand. Increasing the price destroys a portion of demand, which can then adjust to supply.

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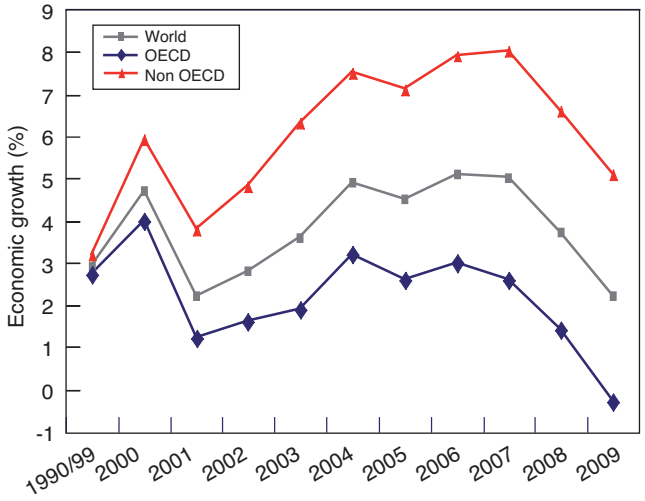
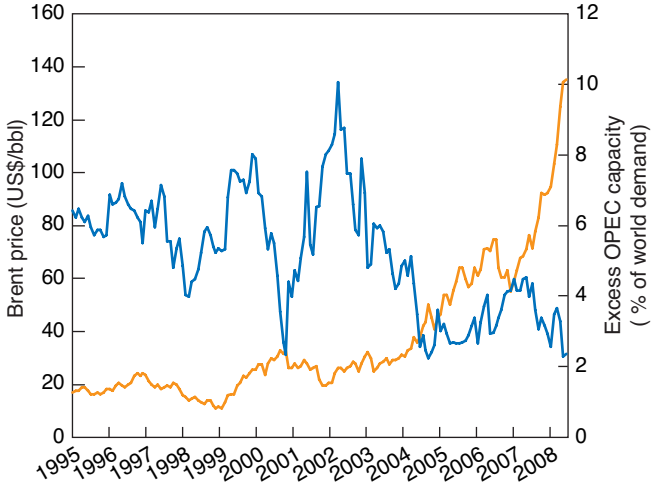
Fig. 3 - World economic growth - 1990/1999 and 2000/2009



Source: IMF - November 2008

Fig. 4 - OPEC capacity and the Brent price



Sources: Platts, Nymex

Due to the growth in oil demand, most of the world's surplus production capacity was no longer available. Capacity increased, but could not keep up with surging demand, especially in key emerging countries.

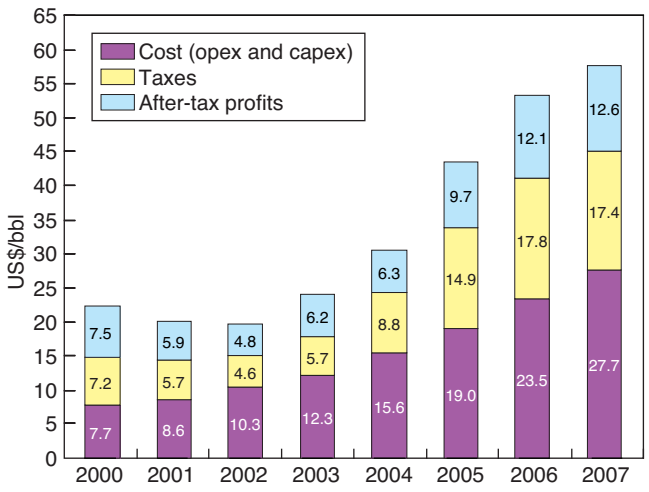
In the space of one to two years, the world oil supply went from a situation of overcapacity to a tight market. It used to be that OPEC, with its cushion of low-cost excess capacity, was the player that ensured market stability. The price per barrel seemed to be set permanently at about US$20-30. When this flexibility disappeared, the equilibrium price of oil skyrocketed (Figure 4), with a new production environment also helping to drive it up.

Increasingly, the market equilibrium depended on the development of new types of oil that cost more to produce, such as very deep offshore or Canadian tar sands. The inflationary trend in production costs can be attributed to more difficult technical conditions, but also to the rising cost of commodities, services and equipment.

By way of an illustration, let's look at Figure 5, based on data from the Shell annual report, which stresses this trend. In the upstream sector, costs increased by a factor of two between 2000 and 2004, then by a factor of 3.6 in 2007 (compared to 2000). Results did not seem to suffer: they went up significantly (x1.7 since 2000) due to the increase in the average selling price (x2.6). In any event, the rise in average cost acted as a drag on the price.

The fact that the dollar was weak against all other currencies also helped cushion the increase. Of course, this effect was not available to the United States where, in addition, motor fuel taxes are very low and therefore do not help buffer the impact of price hikes. In the other

Fig. 5 - Example of the cost structure for the upstream operations of an international company



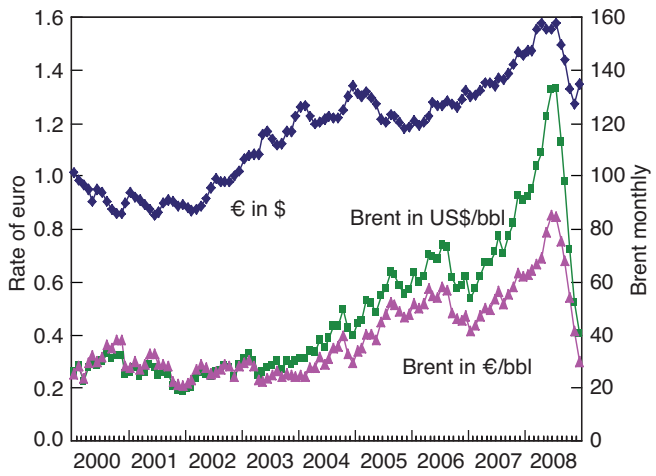
Source : IFP, based on the Shell annual report

industrialized countries, where the impact on end users is cushioned, very large increases in dollars were necessary to "destroy" part of demand.

In the Eurozone, for instance, the price expressed in €/bbl was only up by 240% (x3.4) between January 2004 and July 2008, compared to 320% (x4.2) for the price in US$/bbl (Figure 6). The difference is due to a 25% increase in the value of the euro (x1.25) during this period.

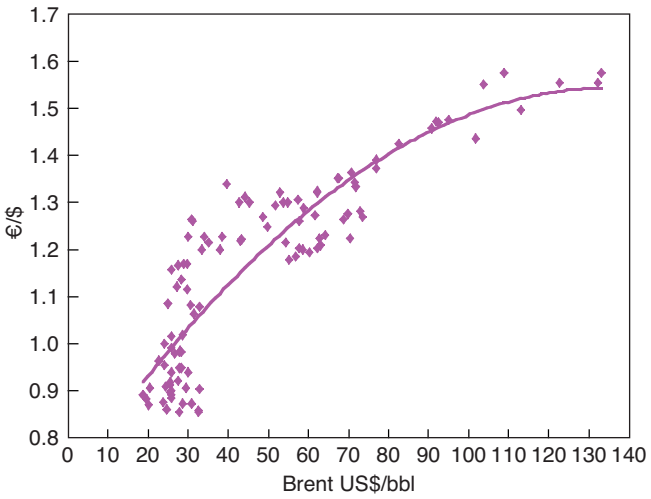
Here, one should note that there is no automatic connection existing between the price of oil and the rate of the euro. It is true that the uptrends converged to some extent when the oil price exceeded US$70/bbl (mid

Fig. 6 - Impact of the euro on the oil price



Source: IFP

Fig. 7 - Link between the Brent price and euro/dollar parity (2000/2008)



Source: IFP

2007), but that does not mean that there is a correlation in the mathematical sense. For lower Brent values, no conclusive connection can be shown (Figure 7). The differences in the benchmark rates and economic conditions between the United States and the European Union continue to be more valid determining factors for the exchange rate between the two zones.

.... and why the price has fallen since July 2008

2007 was fairly consistent with steady growth throughout the year. The Brent price started the year at about US$55/bbl and ended it at nearly US$100/bbl. With hindsight, this uptrend can be attributed after the fact to a very high rate of economic growth.

In early 2008, the trend curve got steeper and the "psychological" threshold was exceeded, again and again: the oil price hit US$100/bbl (end March), 110/bbl (mid-April), 120/bbl (May), 130/bbl (June) and 140/bbl (early July). On July 3, the Brent peaked at US$144.2/bbl (daily average).

Everyone knows what happened next. The oil price fell as steadily as it had risen, but more sharply: within four months, the Brent had lost about US$100. In early December, it stood at about US$40-45/bbl, returning to its level of early 2005 (yearly average: US$54/bbl).

This change was caused by a sudden and major turn for the worse taken by the world economy, which totally modified the outlook for the oil sector. The IMF and the International Energy Agency (IEA) have regularly revised their world growth forecasts to take these abrupt changes into account.

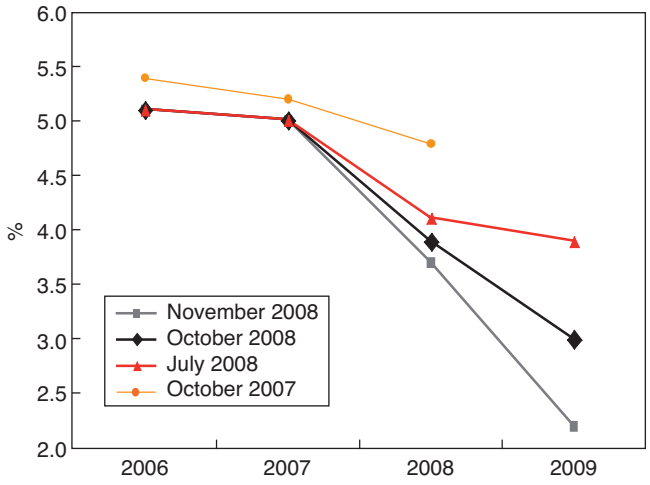
The slowdown in growth in 2008 did not make itself felt until January, with downward adjustments from July to November. It is quite surprising to remark that the financial markets were more clear-sighted. The collapse of the French stockmarket did not start in summer 2008 but in summer 2007. These were the first signs of unease in connection with the subprime crisis. After July 16, 2007, the market continued to fall steadily. Sometimes, it would level out, only to start falling again, with steep drops in January, May and September. The CAC index plummeted from about 6100 points to 3200 by early December.

Official forecasts for 2009 did not reflect the seriousness of the economic crisis until October (Figure 8). In July, the IMF was still anticipating economic growth of nearly 4%, which was revised to 2.2% in November. This general feeling of uncertainty also explains the substantial adjustments made to IEA demand forecasts (Figure 9).

Price variations in 2008, which anticipated probable market trends, simply reflected these forecasts. Early in the year, it looked as if the market would be extremely tight, but a quick reversal of the situation yielded a surplus that forced OPEC to cut production in November and then again in December.

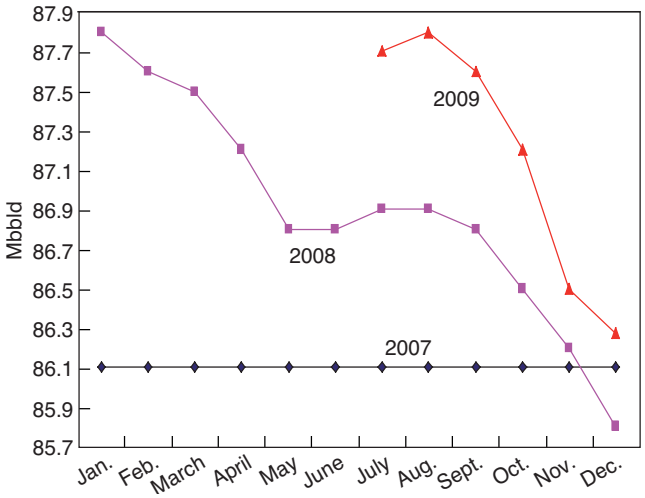
Given the large degree of uncertainty about the economic outlook, the oil market gradually entered a downward spiral, a reverse mirror image of the situation early in the year. Changes in demand on the US market offered the most tangible signs of the magnitude of the crisis: in November, consumption of petroleum products was down by 7% (–1.4 Mbbld).

Fig. 8 - Revised IMF forecasts for 2008 and 2009



Source: IMF

Fig. 9 - Monthly oil demand forecasts



Source : IEA

The short-term outlook

The biggest factor influencing the market is the economic crisis, whose magnitude is not yet clear. The OECD has indicated that Western countries might rally by 2010 while stressing that "the uncertainty surrounding these forecasts is unusually large". More and more analysts are coming to expect recovery at a more distant time horizon.

As long as the consequences of the current crisis on the economy and oil demand remain unclear, the oil price is likely to bottom out at a level that is hard to predict. It could be US$30/bbl, or even US$20/bbl, if the markets go into panic mode after hearing more bad news. But these would be temporary lows. The real question is this: what minimum price can the market sustain over a long period?

If one excludes any downward revision of the latest economic forecasts put out by the OECD and the IMF (November 2008)—which may indeed be revised downwards—one might come up with an average price of US$50-60/bbl for 2009, no doubt with strong temporary variations during the year. There are two reasons militating in favor of this relatively rational price range:

- the structure of production costs,
- OPEC's policy of supporting prices by cutting output.

According to the latest December forecasts, demand will reach about 86 Mbbld in 2009. If one includes the non-OPEC supply (50.1 Mbbld) and OPEC's production of liquid natural gas (5.6 Mbbld), the market will need OPEC to produce about 30.5 Mbbld. This value corresponds exactly to a level of production including the 1.5-Mbbld reduction decided by OPEC in October 2008 that took effect in November. This will allow the organization to significantly raise production margins, up to 4.8 Mbbld for all eleven members. This figure is by far the highest observed since 2006 (Figures 10 and 11).

The latest decision to effect a reduction of 2.2 Mbbld, made on December 17, 2008 in Oran, will not be tenable throughout the year if demand stays at its present level. Output will almost certainly have to be readjusted upwards during 2009. The decision was mainly intended to keep prices above the US$40/bbl mark. The market remains rather skeptical as to the effective implementation of this decision.

Biofuels may be adversely affected by an excessively low crude price; this is already happening in the United States. Biofuel production will certainly be lower than the previous forecast of 1.6 Mbbld (1 Mbbld for OECD countries). This indirectly works to OPEC's advantage by destroying a part of supply.

Under these circumstances, it is obvious that heavy crudes will be needed to ensure market equilibrium. That means that a minimum price—which can be estimated at about US$40/bbl, which would yield a rate of return of zero—could constitute a viable possible minimum for a few months. Let us recall that a temporary decrease does not jeopardize production at an existing unit, whose profitability is calculated over several years.

Furthermore, operators may decide to postpone new projects until market visibility improves. For one thing, they hope to see the cost of services and equipment go

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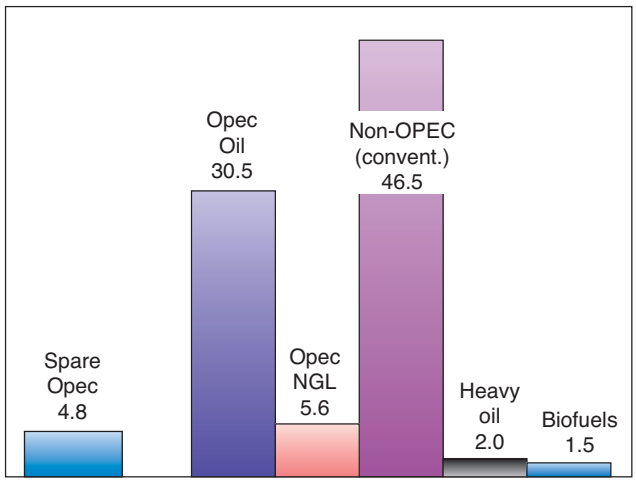
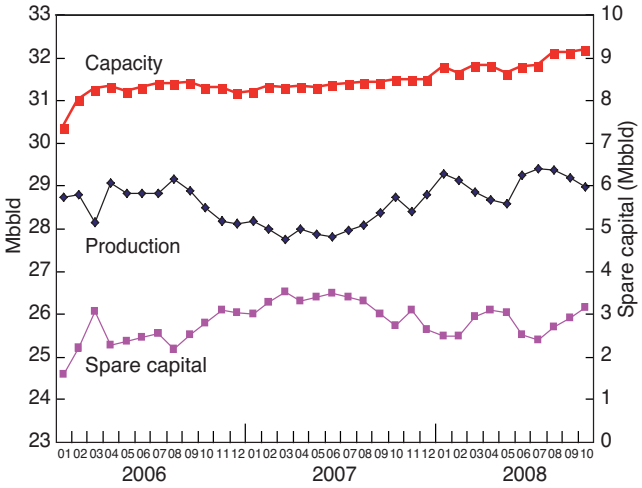
Fig.10 - Production potential in 2009



Source: IFP, based on IEA statistics

Fig. 11 - OPEC capacity, production and margins (11 members)



Source: IFP, based on IEA statistics

down. In addition, they must account for the current constraints on financing. Of course, they are running the risk of eventually finding themselves back in a situation characterized by great pressure on demand, which would drive up the "price tag" of the postponed projects. This hypothetical situation could happen when the expected recovery occurs, i.e. perhaps in 2010.

For 2009, if the OPEC supply is managed rigorously and OPEC only produces the announced quantities without exceeding quotas, the US$50-60/bbl price range becomes a credible objective. This is slightly below the lower "economic" limit of US$40. This would meet the budget requirements of certain member states without undermining the return to economic growth forecast for 2010. More ambitious targets (US$70/bbl or higher, as some OPEC members would like) would be harder to reach in the current economic environment.

Naturally, this scenario is closely linked to current forecasts. Forecasting is a chancy business: any surprise, whether good or bad, will probably change the "big picture" and affect predictions. In any event, the crisis will be the driver behind price changes. One can expect large variations as a function of the prospects for the future. A generalized decrease in key rates combined with the European, US and Chinese recovery plans should help get the world economy up and running again. The magnitude and pace of its growth remains to be seen. The most recent statements by the World Bank or the IMF are relatively pessimistic about a return to growth by year-end 2009, which had been thought possible at one point.

Inventing a sustainable long-term model

In future, the market will no doubt experience further ups and downs. For oil, like any other commodity, the time lag between capital investment and a change in demand creates cycles that go up or down. Only one thing is certain: the market must go up, due to the pressure on resources and the requirements of developing countries.

It is possible to imagine the crude price settling at a relatively stable level (about US$100/bbl or lower), provided that the growth of mobility demand, especially in the emerging countries, is kept under control. In future, being able to work on supply (e.g. second-generation biofuels) and more particularly on demand, will be essential.

The Western countries and especially the United States should mobilize to overhaul their concept and model of mobility, based in the 20th century on the premise that oil would be available and at a relatively low price. To avoid further spikes in the crude price or skyrocketing forward prices, it has become imperative to bring low-consumption vehicles (e.g. hybrids and electric vehicles) to market faster and get individuals to change their behavior (*e.g.* use mass transit instead of private cars or rent a car instead of owning one).

Our world is facing a challenge that is social and societal, economic (*e.g.* the future of the motor industry), environmental (climate change) and geopolitical (the race for natural resources). The challenge must be met within a very short time frame to avoid additional crises.

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Given the inertia of the system and the constraints on oil resources, we may not be able to avoid crises. But ever since the crude price reached nearly US$150/bbl in July 2008, the world at large has become aware of the problem. A general mobilization involving all countries, industrialized and emerging, is needed. If we are to invent a viable future for ourselves, it is absolutely vital to invest in R&D in the upstream oil sector and in new automotive technologies. Innovation will be one of the possible responses to the current crisis.

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