

The Oil and Oil Services Industry

International Context 2008

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PREFACE

Oil companies rarely do their own major work within the framework of their investments or in the operation of their facilities. They most often act as project coordinators, thereby opening up a vast market for equipment, services and engineering, involving many companies of widely-varying sizes, which constitute the oil services industry.

This document provides a panorama of the international oil context in three distinct parts, for 2007, for the first three quarters of 2008, and aspects of trends for 2009.

- The first part is devoted to a rapid description of the oil context and the economic environment in which it is evolving.
- The second part examines the evolution of world investment in exploration-production (E&P) activities, distinguishing the investments made by oil and oil product/service companies throughout the E&P chain from the more targeted ones of three specific sectors: seismic, drilling and the construction of offshore production equipment. These markets are observed exclusively for oil product/service companies.
- The last part is devoted to investments in the refining sector, focusing on the changes in the fundamentals, particularly the equilibrium between refining capacities and medium-term oil demand. This latter analysis involves both oil and oil product/service companies.

THE INTERNATIONAL CONTEXT

1 Economic growth and oil context

1.1 General economic trends

Economic growth in 2007 remains firm, close to the 2006 values. The world GDP rose by 5.0% in 2007, a decrease of 0.1 point compared with 2006. The cycle of rapid growth that began in 2002 continued in 2007. This growth remains unequally distributed and is mainly in the emerging countries, particularly China and India.

Table 1: Growth in volume of the GDP (variations in %)

	2006	2007	2008(e)	2009(f)
World	5.1	5.0	3.7	2.2
United States	2.8	2.0	1.4	-0.7
European Union	3.3	3.1	1.5	-0.2
China	11.6	11.9	9.7	8.5

Source: IMF; (e) estimation, (f) forecast

2008 will see a break in the cycle of growth. It should slow down significantly in the second part of the year as a result of the financial crisis that is extending to all areas of the world. According to IMF forecasts (November 2008), world growth should be 3.7%, a decrease of 1.3 points in one year. A further downward revision cannot be ruled out according to the IMF. After a relatively morose year in 2007 (with a growth rate of 2.0%), the US economy is falling deeper into crisis with growth of 1.4% or 0.6 less than the preceding year. The other industrialized countries are also likely to see a significant slowdown of their economies. The IMF is forecasting growth of 1.4% versus 2.6% in 2007 for all industrialized countries.

The emerging and developing countries should also feel the effects of the general economic situation. A clear drop of 1.4 points in the economies of these countries is expected with growth of 6.6% in 2008 versus 8.0% in 2007.

In **2009**, the world economy will probably be in recession. A decrease in growth is expected. According to IMF forecasts, it will be 2.2%, a drop of 1.5 points with respect to the preceding period. The growth of the industrialized countries will be negative, at -0.8%. The forecasts for the United States and the Euro zone are -0.8% and -0.7% respectively in 2009. China and India with 8.5% and 6.3% respectively remain the driving forces of world growth despite a clear slowdown.

The situation remained very uncertain at the time of the writing of this report. The financial crisis continues to get worse and its spread to the real economy is extending further every day. Despite the aggressive measures implemented by governments to restore investor confidence, no visible sign of a turnaround has appeared. According to IMF analysts, the turnaround will not start until the end of 2009 and will then increase in 2010.

1.2 Short-term changes in oil supply and demand

The growth in world oil **demand** has been slowing down progressively each year since 2004. In 2007, demand increased by +1.0 Mb/d, the smallest increase since 2002. In 2008, the increase in demand should be only +0.7 Mb/d. The forecasts were significantly decreased. One year ago the IEA was predicting growth of +1.5 Mb/d and +2.2 Mb/d for 2007 and 2008 respectively.

The slowdown in demand in 2007 and especially in 2008 is very significant in North America and in Europe. Demand fell by 0.7 Mb/d in North America in 2008 and was stable in Europe. These two zones accounted for 46% of world demand in 2008. China, the Middle East and Latin America are maintaining pressure on demand.

Table 2: World demand, supply and oil stock variations (in Mb/d)

	2005	2006	2007	2008 (f)	2009 (f)
World demand	84.0	85.1	86.1	86.8	87.6
Variation [n - (n-1)]	+1.7	+1.1	+1.0	+0.7	+0.8
World supply	84.7	85.5	85.6	86.9*	-
Variation [n - (n-1)]	+1.5	+0.8	+0.1	-	-
Stock variations	+0.7	+0.4	-0.5	-	-

*Source: Oil Market Report (IEA); (f): forecast
average of the first two quarters

For 2009, growth close to that of 2008 is forecast (+0.8 Mb/d) with a decrease in North America (-0.4 Mb/d) and in Europe (-0.1 Mb/d). As in 2008, demand should be steady in the same countries, especially China, where demand will increase by 0.5 Mb/d in 2009.

In 2007 there was also a slowdown in the increase in the world **supply** of oil, from 85.5 Mb/d in 2006 to 85.6 Mb/d in 2007, or an additional 0.1 Mb/d. In 2007 the world supply was thus lower than the demand and drawing on oil stocks was necessary. In 2008 a significant increase in oil supplies of 1.3 Mb/d is forecast.

1.3 Oil context

Since the end of the 1990's, the oil context has been characterized by continual price increases, with record after record being broken, almost reaching the symbolic threshold of US\$150/b before finally attaining US\$141.9 at the beginning of July this year (Brent, Rotterdam quote as weekly average). After this date, the drop in prices was brutal: a drop of practically \$100/b over the course of several months. The trend is still downward and the price many soon fall below \$50/b.

The rise in crude prices **until mid-2008** is explained firstly by the on-going real tension between supply and demand.

- Firstly, the need for energy, and especially hydrocarbons, continued to rise at a steady rate over many years because of the dynamic economic growth that allowed people in the emerging countries to buy energy-consuming goods and the administered prices (taxes, subsidies) that cushioned the variations in crude prices.
- Also, supply is having trouble keeping up for both geological and political reasons: in the countries that are open to the international companies, the increase in production capacities requires the exploitation of reservoirs for which sophisticated technology is needed; in the places where the subsoils are most promising, the tendency towards nationalism in oil and gas policies is slowing down or limiting investments.

In this context of economic growth and tensions on the market for crude, new price rises would most likely be necessary in the medium-term to reconcile production and consumption.

In the short term, various events exacerbated price volatility and will probably continue to have their effects – regardless of the economic situation.

- Recurring incidents in refining: in 2007 and 2008 there were many technical problems in refineries, particularly in the United States.
- Climatic uncertainties: since the trauma caused by Rita and Katrina in 2005, cyclone activity is very closely monitored from July to September and risk premiums rise or fall as the hurricanes approach or move away. On another level, winter temperatures represent a major source of uncertainty.
- OPEC policy: the strategy of OPEC, or rather the struggles among the strategies *within* OPEC, is the main source of structural uncertainty on the oil market. Should the taps be opened or shut in order to regulate crude prices? The organization succeeded in restoring its spare capacities in 2007 and in 2008 and thus diminished the risk premium – recreating a safety cushion – but at the cost of a restricting quota

policy that did not succeed in influencing crude prices. The real issue is the strategy of investment in new capacities of the producer countries.

- Economic growth and the "sub-prime" crisis: the credit crisis in the United States revealed a certain fragility in the economic growth. The main downward risk a few months ago was the continuation and worsening of the financial crisis. Now it is here.

Since mid-2008, the economic situation has been in upheaval. The financial crisis is getting worse; over the course of a few months it has spread to the other areas of the world and is directly affecting the real economy. Macroeconomic forecasts have been adjusted downward: first, the IMF which had forecast world growth of 2.2% for 2009 reduced it to 0.8%, then the OECD confirmed a decrease in economic activity in the United States, in the euro zone and in Japan of 0.9%, 0.5% and 0.1% respectively.

The IEA is also regularly adjusting the oil demand forecasts downward. Last week the agency reduced the expected demand for 2009 by 700,000 b/d and revised that for 2008 downward by 300,000 b/d. It is very likely that there will be more new revisions.

The decrease in oil demand in the United States and in Europe was the consequence of high prices for oil products and the economic situation which began to show signs of weakness, particularly in the United States. The collapsing demand led to a drop in the price of crude that was aggravated by the onset of the financial crisis and its impact on the economic indicators. This new situation is a growing threat to short-term demand.

In this context the supply-demand tensions will tend to diminish in the short-term because of surplus supply and weakened demand. Investments, essential for a future upturn in demand, may suffer from this. While the credit crisis threatens the maintaining of investments, reduction in revenues of exporting countries – major investors – also risks significantly slowing down the realization of their industrial projects. The emerging countries, the main force in demand and investment, seem likewise to be affected by the crisis. Furthermore, the oil companies, with prices below \$60/barrel, will be tempted to reduce their investments or to postpone them. At least until the current downward spiral stops. It is more reasonable to think that the price of oil will vary between \$60/b and \$80/b in the months to come, at least that's what the IMF, IEA and the DOE seem to believe: the IMF readjusted its prices to \$68/b for 2009, the IEA to \$80/b and the DOE estimates it between \$60 and 65/b.

Beyond the short term, the collapse of oil prices should stop. This will depend initially and rapidly on the impact of OPEC's production reducing policies. Then, and depending on the

economic situation, demand should start to rise again, in the emerging countries initially. The question is: how long the crisis will last?

2 Exploration-production

2.1 Investments in exploration-production (E&P)

In **2007**, world investments in exploration-production continued to grow, reaching \$330 billion or growth of 18% for the year. This was slower than in the past but higher than the forecast made the preceding year. The estimation for 2007 based on provisional budgets was an increase in investment of 13%; the final figures show an increase of 18%.

As during previous periods, in 2007 the environment remained favorable to the development of E&P activity with sustained oil demand, tensions on oil capacities and high oil prices – the price of a barrel of Brent reached more than \$65 on average for the year compared with \$55 in 2005. In addition to these factors there were elements that increase the level of investments without contributing to the increase in industrial activity: the increase in the prices of raw materials, inflation in the cost of services, inadequate availability of equipment, the lack of qualified personnel and the resulting salary inflation, led to a significant increase in project costs.

Unlike the supply-demand tensions, cost factors contribute to a slowing down of the activity, leading to bottlenecks in the industrial process. These phenomena, which are often poorly or little anticipated, lead to a deterioration of the cost effectiveness of projects and a certain wariness of operators, leading to a growing search for economies of scale and, in correlation, an increase in the size and complexity of projects, leading in turn to delays in the decision-making process.

In terms of investments, the main increases were in Latin America, Russia and China, whose spending rose by 24% and 38% respectively to reach \$51 billion and \$62 billion. The North Sea had the weakest growth.

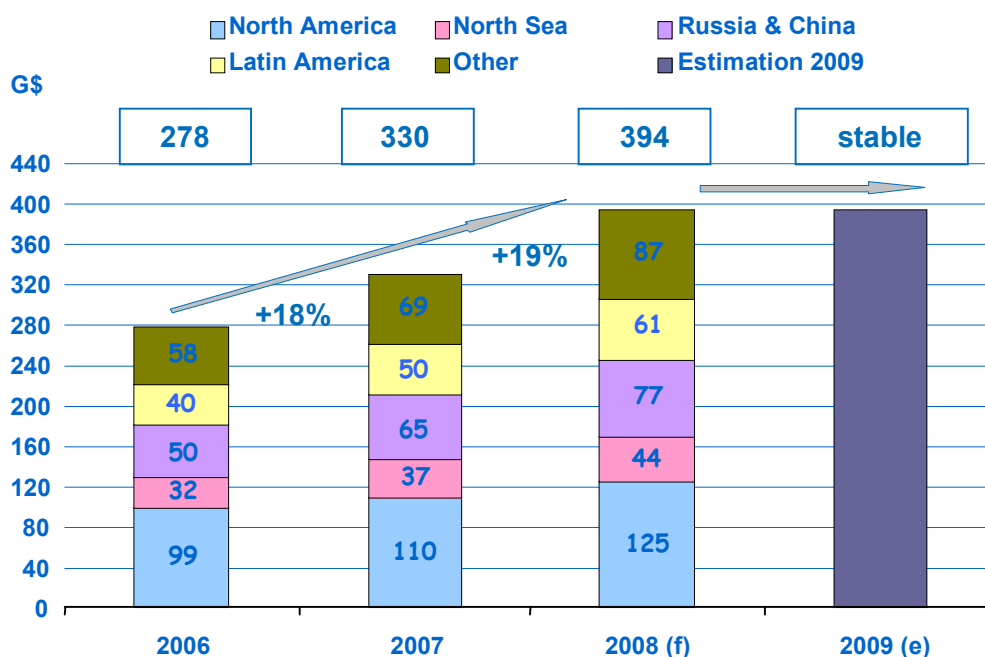
In **North America**, the slowdown in spending was very marked. After a spectacular increase in 2006, the growth was only 11% in 2007, reaching \$110 billion. This trend is explained by a stopping of certain investments in Canada, with a decrease of 16%. In the United States, investments stand at \$85 billion. That means a 23% increase which is less than preceding year. The slowdown observed in the United States can be explained by the strong responsiveness of this market to the continuous increase in the costs of services and particularly daily rental rates. In Canada, some of the largest companies decided to reduce their spending in 2007 (Apache Corp, Canadian Natural Resources Ltd, ConocoPhillips, EnCana Corp, ExxonMobil, Husky Energy Inc, Nexen Inc, Petro-Canada, Talisman Energy).

The volumes actually invested even diminished with respect to budget provisions. The inflation in costs, the difficulties in finding labor and the clear will of the Province of Alberta to raise taxes covering the development of the tar sand resources led to the postponement of many projects.

The slowdown in investments in North America led to a decrease of this region's share in total world investment. While it is the clear leader, its share nonetheless fell by more than 2 points in one year from 35% to 33%.

In the **North Sea**, the growth in investments continued in 2007 but at a slower rate than in the past. With 15% annual growth, they reached \$38 billion, or \$5 billion more than in 2006. This increase is due to Norway which continued its E&P activities and for which its investments increased by 23% in 2007 (in \$).

Figure 1: Worldwide Investment in E&P



Note¹

Russia and China had higher than average growth. With a 30% increase, the expense reach \$65 billion in 2007, encouraged in Russia by the will to both invest to develop production, - the goal being to exceed 10 Mb/d – and to diversify reserves. The large companies such as Gazprom, Gazprom Neft (ex-Sibneft), Lukoil, Rosneft, Surgutneftgaz

¹ Evaluation done by IFP from publications of Citigroup, Lehmann Brothers, Oil & Gas Journal, Spears & Associates, BP, annual reports of companies, others.

and TNK have ambitious investment plans in which the growth over the course of three years (2005-2007) has more than doubled. The largest increase was in China however, with a 40% increase in the amount of investments in 2007 to reach \$29 billion, considering the four main Chinese companies (CNOOC, CNPC, Petrochina and Sinopec). This is much higher than the figure of \$24 billion which had been forecast one year earlier.

The share lost by North America in world investments was taken over by Russia and China, which now account for one fifth of world investment in E&P.

After Russia and China, **Latin America** had the second best performance in terms of investments in E&P with a 25% increase for a total amount of \$50 billion for fiscal 2007. Brazil, through its national company Petrobras, is still a driving force in this region, with growth of 34% in its spending for E&P activities. Mexico has an ambitious development program for the period 2007-2012 with the aim of preventing the production of oil from falling to 2.5 Mb/d in 2012 (3.5 Mb/d in 2007 or a decrease of 5.5% in one year). In Colombia, the national company Ecopetrol is increasing investments in E&P activities: production spending increased by 40% and exploration spending more than doubled in 2007. Venezuela also significantly increased its investments in E&P. According to the annual report of PDVSA, they have increased by 74%.

In **2008**, the growth in investments should continue at the same rhythm as in 2007 and reach \$394 billion. Despite the world economic slowdown that is extending to the entire planet, energy demand that is stagnant, particularly in America and in Europe, and a price for oil that fell sharply as of the second half of the year, E&P investments should not suffer the effects of these trends or at least not in the coming few months. If the decrease in oil prices continues in the months to come, the effects on the activity will start to be felt with a time lag of six months for drilling activities and approximately one year for production.

Furthermore, certain factors that can encourage investments have not totally disappeared:

- An oil price of more than \$50/b still allows for the carrying out of a large number of projects, even though a price below \$70/b can disturb certain oil investments;
- The prices of raw materials, services and equipment rental rates remain high despite a recent decrease;
- The persistent tensions with regard to qualified labor;
- The difficulties in access to resources for international companies and their imperative need to maintain – or increase – their rate of renewal of reserves.

In **North America**, investment is rising again, the forecast is for an amount of \$125 billion or an increase of 14% in 2008. Although the pace is slower than in the previous year, the United States continue to grow and should reach \$97 billion at the end of 2008, an increase of 15% for the year. Canada has been experiencing a recovery. After a decrease in 2007, investments rose by 11% in 2008, which is still low compared with other parts of the world. By comparison, only the North Sea saw lesser growth.

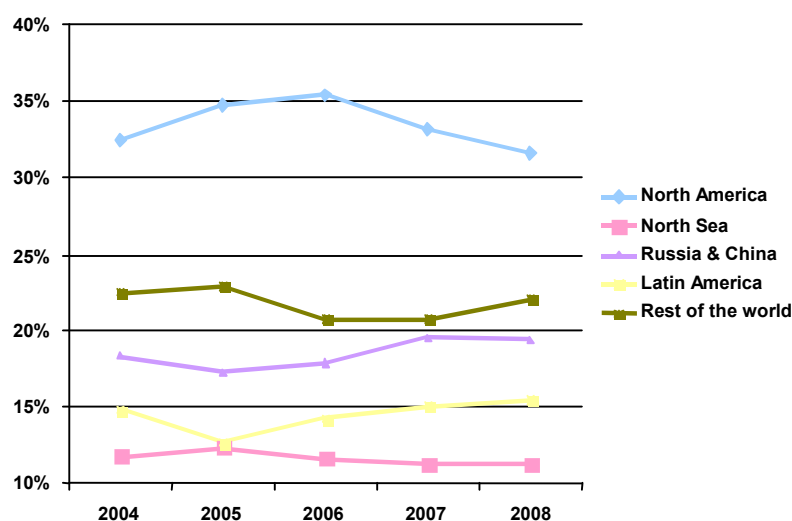
The forward-looking budgets for oil activities were established based on a price of gas higher than that of the preceding years and taking into account increasing costs for raw materials, equipment and qualified labor. Furthermore, offshore E&P activities are more and more oriented to deeper areas.

There could be some easing starting in 2008 due to several factors such as greater availability of drilling equipment, identification of new targets that are now undergoing seismic analysis and the acquisition of additional areas for exploration.

Canada has had the same cost problems, particularly for labor. The sluggishness of the E&P activity could deteriorate further in the future due to the new structure of royalties now applied by the Province of Alberta (NRF – New Royalty Framework). The changes imposed that will take effect on January 1, 2009 could have a serious impact on the oil and gas industry and on the tar sand projects. The significant increase in royalties under the new reform will lead to a decrease in cash flow for the companies and thus in investments in Canadian E&P.

The share of North America in total world investment has continued to erode in 2008 at almost the same rhythm as the preceding year. With minus 1.6%, North America now accounts for only slightly more than 31% of world investments or a loss of close to 4 points since 2006.

Figure 2: Worldwide investments in E&P –Breakdown by regions in % of total



IFP/ Economic Studies Department/2008

In the **North Sea**, investments rose 19% compared with the preceding year and stand at \$44 billion. This trend is due to Norway where a 19% increase in investment is forecast for 2008, rising from 109.3 GNOK in 2007 to 130.2 GNOK this year. As in the preceding years, Great Britain is not planning to increase its investments in the North Sea.

Production has been in decline for several years, on both the British and Norwegian continental shelf: -5% and -8% per year since 2002 respectively according to IEA data. In these conditions, the increase in investments is linked to several factors, some specific to this region such as the desire to slow down the decline in production, and others also seen in other regions of the world such as the increase in costs for equipment, particularly the rental of platforms (the regional fleet has had a use rate of 100% since 2006) and the lack of qualified labor.

In 2008, **Russia and China** had investment growth that was lower with respect to the preceding period but nonetheless had an 18% increase to reach \$77 billion. This trend is mostly due to certain national companies that established provisional budgets with large

increases, such as Gazprom (68%) Gazpromneft (61%) and Rosneft (41%) in Russia, CNOOC (40%) and Sinopec (19%) in China.

In **Latin America**, an increase in investment of more than 20% is forecast for the third consecutive year. With 23% growth expected, the budget should reach \$61 billion in 2008. The inexorable rise to power of Petrobras is the main factor in this growth. Its E&P investments have practically tripled since 2005. According to the forecasts, the amounts committed for oil development represent close to \$16 billion in 2008, an annual increase of 24%.

Colombia continues to invest massively in E&P activities which budget for 2008 is said to reach approximately 75% of the total investments planned by the national company Ecopetrol (Petrobras for example devotes between 60 and 70%). An ambitious investment plan is underway, aiming to increase production to reach 1 Mb/d around 2015 and to consolidate its position as an oil exporting country (in 2007 Colombia produced 0.56 Mb/d). This plan involves the participation of foreign capital alongside Ecopetrol. Like Petrobras, the national Colombian company is extending its field of action beyond its borders by investing directly in Peru, in Brazil in collaboration with Petrobras and in the American sector of the Gulf of Mexico with Shell.

Mexico is also contributing to upstream oil development in the region through its development program looking ahead to 2012. For 2008, growth in its E&P investments of close to 20% is forecast, with the objective of stopping the decline in production.

E&P investments also increased significantly in Venezuela: after exceptional growth in 2007, PDVSA expects lesser growth, of 16%, for 2008.

Unlike the national companies mentioned above, the Spanish-Argentinean company Repsol/YPF is planning to decrease its investments in this region. This is a strategic decision by the company which now wants to reduce its exposure in Latin America. The region has become uncertain and less cost effective according to Repsol/YPF. The reasons mentioned include the decline of its aging fields, modifications of contracts by governments that want a larger share of the proceeds and growing uncertainty about regulations due to the rise of nationalism. By withdrawing from certain activities, Repsol/YPF wants to concentrate, in the years to come, on a few large projects, some of which are in Latin America: the Carioca oil field in Brazil, the Shenzi and Genghis Khan fields in the Gulf of Mexico and Block 39 in Peru.

Like Argentina and Venezuela, Bolivia has seen a rise in nationalist aspirations regarding national energy resources. Investments in E&P have been paralyzed since the

nationalization of the gas industry and the increases in the rates of taxation of foreign companies. Along with this there are the current political and social tensions that generate a highly risky climate for investment. Despite this tense climate, certain companies such as Total and Gazprom are not hesitating to form partnerships with YPF (51% of the shares) for exploration and development of natural gas: a \$4.5-billion investment program could be launched in the months ahead.

Looking at the breakdown in investments among **large companies**, particularly between the international oil companies and national oil companies, commonly referred to as IOC and NOC², we see that the latter are enjoying more rapid growth than the former: while the IOC progressed by only 16% in the course of the year, the NOC have had growth of 24%, i.e. 8 points more. A few large national companies such as Gazprom, CNOOC, Saudi Aramco, Sonatrach and Petrobras remain very active. Among the most active IOC in terms of investments we find two European companies, the French Total and the Italian ENI, with annual increases of more than 20%. On the other hand, Repsol-YPF has decreased its investments in upstream activities.

In 2009, we consider that the volume of investments in E&P is not likely to increase. There are many uncertainties.

- The substantial drop in oil prices since the middle of 2008 is not a factor favorable to maintain investment at levels similar to those of past years. The price of crude remains high however and it is not certain at the moment that it is the main factor in the slowing of investments. If crude prices continue to fall in the weeks and months to come, a more lasting correlation between investments and crude prices could be established.
- However, a significant drop in demand could seriously affect growth in investments. Oil demand forecasts have been periodically adjusted downward over the past few months, particularly in the OECD countries, due first to the price of crude which reached a record level in July and then the general slowing of the economy as a result of the financial and economic crisis in the United States which progressively spread to all regions of the planet.
- The costs of oil services and equipment could decrease due to the fall of prices for certain industrial raw materials and for certain services (initially for services with the least technological content). Lower costs would have less impact on investments. This decrease in costs can contribute, at an equivalent level of activity, to reducing their volume. But the decrease in these costs should remain marginal in 2009.

² IOC: International Oil Companies, NOC: National Oil Companies. The analysis was done on a sample of 10 IOC and 12 NOC

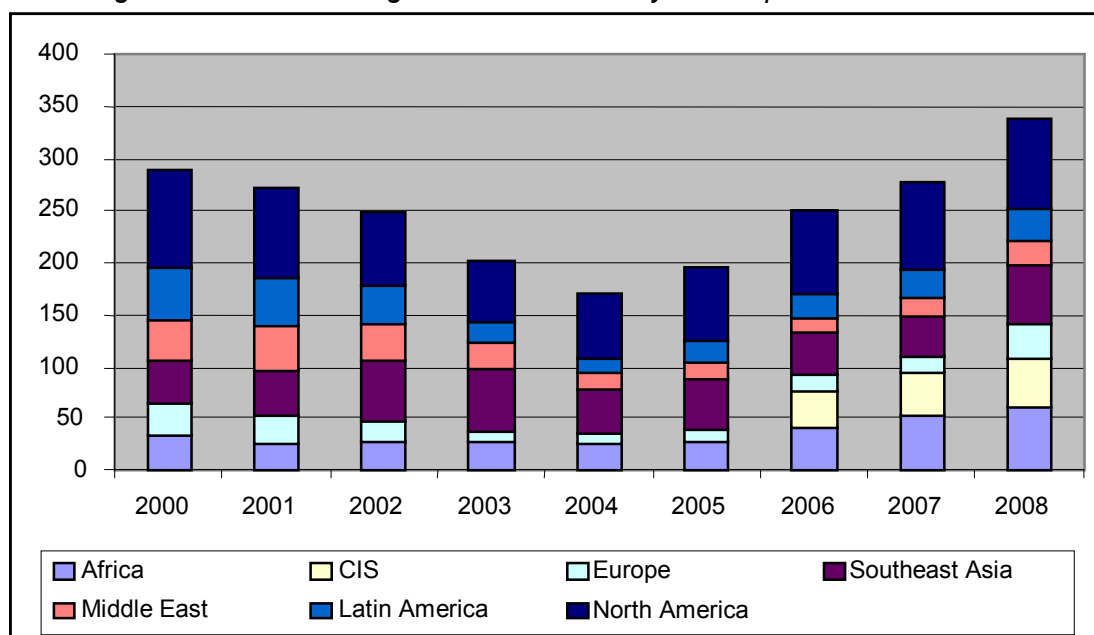
In this context of economic slowdown and growing uncertainties of unknown duration, the companies – which were optimistic a few months ago – will be tempted to reduce their forecasted budgets for 2009. Attempting an estimation of investment seems risky at the moment, although we can say that an impact on the level of investment is seeming more and more likely. Stabilization of investment in 2009 now seems like an almost optimistic scenario.

2.2 Geophysics Sector

2.2.1 World activity

At the end of 2007, close to 300 seismic teams were at work around the world. We must go back to the year 2000 to find such activity. Seismic activity grew by 14% in 2007. The first nine months of 2008 suggested continued growth of the activity on the order of 19%. There was no visible sign of slowing of seismic activity for the period from January to September 2008.

Figure 3: Annual average for seismic activity for the period 2000 to 2008



Source: IHS Energy, partial evaluation of active seismic teams for India, China and Russia.

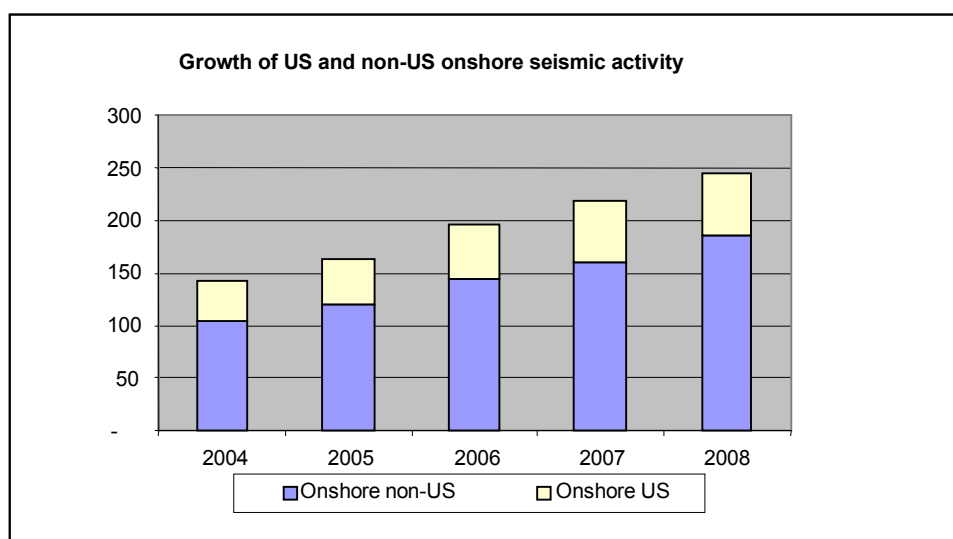
- **Seismic activity on land and at sea**

The total number of active seismic teams doubled from 2004 to 2008. The average growth of the activity per year was 11% in North America and 18% for the rest of the world.

In 2008, land seismic work accounted for 73% of the seismic teams active throughout the world.

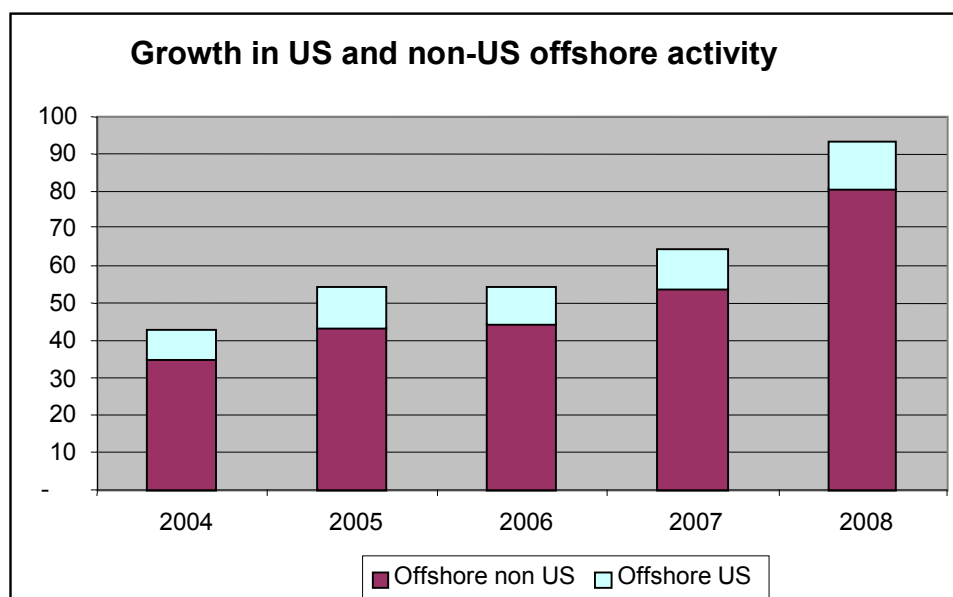
In 2004, this share was 78%. Over the period from 2004 to 2008, the indicator of terrestrial activity rose by 14% on average, less quickly than the indicator for offshore seismic activity for which the average growth was 24%.

Figure 4: Evolution of onshore seismic activity for the period 2004 to 2008



Source: IHS Energy, IFP

Figure 5: Development of offshore seismic activity for the period 2004 to 2008



Source: IHS Energy, IFP

In 2005, the growth in world offshore seismic activity was 25%. But due to a lack of available seismic survey ships, the growth stopped in 2006. It was only in 2007, with the arrival on the market of new boats, that offshore seismic activity saw strong growth of +20%.

The first nine months of 2008 saw increased activity in the offshore seismic sector with record growth of 45% in the number of teams in operation.

The growth in offshore seismic activity benefited contractors, who enlarged their acquisition fleets and who have 3D multi-streamer seismic acquisition systems and offer acquisitions

and processing with large and multiple azimuths. These technologies provide a better understanding of geological structures and improve depth imagery. They yield better results in the exploration of deep and complex formations, particularly on the edges of salt domes or below sub-salt formations.

- ***Seismic activity: 2D, 3D and 4D***

The share of 3D seismic acquisition continues to grow from year to year. It rose from 53% in 2004 to 59% in 2008. The number of 3D acquisitions doubled between 2004 and 2008, while the number of 2D acquisitions increased by 60%.

4D seismic activity is still limited to a few dozen campaigns per year. This technology is used for monitoring the production of fields but not for the exploration phase. Despite the technical progress made in terms of repeatability of seismic campaigns and their processing, 4D campaigns remain highly targeted and require much more technical expertise of operators. More than half of the 4D campaigns are carried out in the North Sea. The main operators are StatoilHydro, BP, Shell and Total.

- ***Seismic activity by geographical area***

In 2007, the number of active seismic teams was 284 on average, an increase of 14% compared with 2006. The acquisitions (Figure 6) occurred mostly in the USA (25%), in Africa (19%), in Southeast Asia (14%) and in the CIS (14%). Among the geographic zones with the highest growth with respect to 2006 we note in particular Europe, with +40%, then Africa and Latin America with respectively +36% and +25%. In Southeast Asia there was a 3% drop in activity.

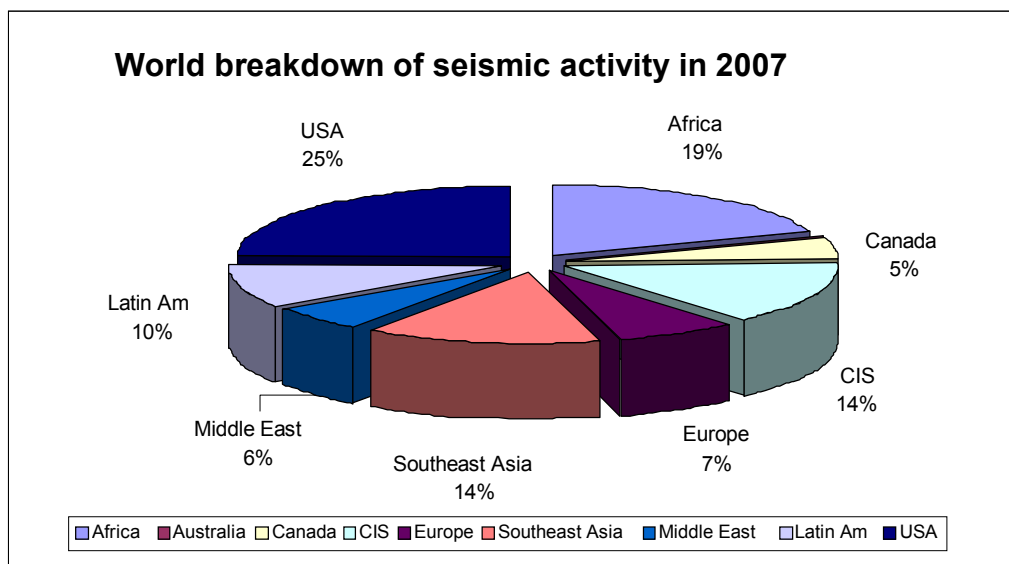
Canada had a drop in activity of about -30%. This situation led contractors to diversify their geographical activity, for example **Tesla Exploration**, a Canadian company specializing in land and sea operations, which purchased the English company IMC Geophysicis, which works in Europe and in Africa.

In the first 9 months of 2008, there was a 19% increase in seismic activity. There were increases in all of the geographic zones. Offshore seismic surveys were the main beneficiaries of this growth with an increase in the number of teams in operation of 45%.

Europe is continuing its strong growth of 2007 with +50%. Southeast Asia, which stagnated in 2007, has bounced back with +45% growth and the Middle East, which is continuing to

intensify its exploration, should have an increase in its activity of +42%. Canada is catching up from its lag in 2007 with +10% growth in 2008.

Figure 6: World breakdown of seismic activity in 2007



Source: IHS Energy, IFP

The lowest growth was in the United States which had only a 5% increase for the first 9 months of 2008. Land-based activity was unchanged, **only the offshore activity in the Gulf of Mexico, which rose by 30%**, partly offset this situation.

The American MMS (Mineral Management Service) opened new offshore blocks in the Gulf of Mexico to exploration, allowing for new seismic campaigns. At the beginning of 2008, TGS-NOPEC thus began an enormous \$40 million 3D multi-client campaign in the Gulf of Mexico. Likewise, CGG Veritas signed a \$250 million contract for several years for the acquisition of wide azimuth land and marine seismic data in this zone.

In this context of strong activity, PGS and CGG Veritas indicated rates of use of their acquisition fleets that remain very high for the third quarter of 2008.

Remarks

The seismic activity data cited is based on figures published by IHS Energy. The seismic activity of the CIS is only partially taken into account. At the beginning of 2008, for a total of 300 seismic teams working in the world, 40 were in the CIS.

Evaluation of the number of seismic teams in the Far East is also difficult, particularly for China and India.

The **Bureau of Geological Prospecting of China** (BGP), a direct subsidiary of the China National Petroleum Corporation (CNPC), announced that it has 60 to 90 teams in China and 40 teams abroad, but the number of seismic teams actually working is closer to 50, including 25 abroad. BGP's activity is mostly on land, but the company also has a few 2D and 3D acquisition ships with 6 streamers, and a multi-component sea bottom seismic cable system (OBC 4C). BGP has been geographically diversifying its operations for several years now and its clients include large international oil companies. The company is working in more and more varied and more and more sophisticated seismic sectors, in both seismic processing and acquisition (3D VSP, 4D seismic, etc.).

The other Chinese actors of the sector include **China Oilfield Services Limited** (COSL). This company, a subsidiary of the China National Oil Company (CNOOC), announced revenues of \$1200 million. It works mainly in four sectors:

- Offshore drilling in Southeast Asia (with 15 rigs), \$1,200 million
- Well services (directional drilling, cementing, work over), \$500 million
- Sea logistics and transport (70 boats), \$200 million

but also in offshore seismic with 7 acquisition boats including one 6-streamer boat, \$200 million

2.2.2 The Geophysics market (acquisition, processing and equipment)

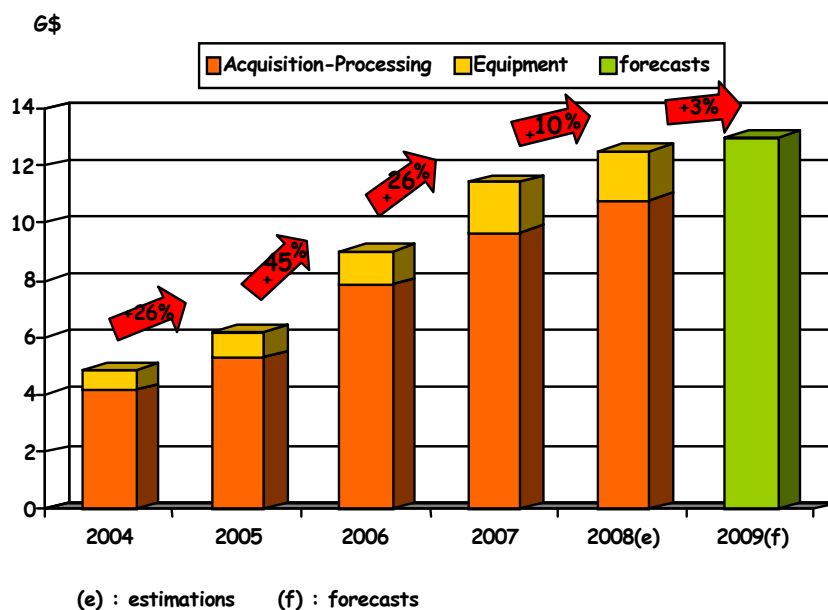
The revenues of the world geophysics market rose by 25% in 2007, reaching \$11.5 billion, including 86% for seismic acquisition and processing activities and 14% for equipment (acquisition laboratory, seismic sources and sensors, etc.).

For 2008, the revenues for the first two quarters indicate a continuation of the growth at a lower level, on the order of 10%. The two main market segments are evolving differently however:

- **The seismic acquisition and processing sector is continuing as in preceding years but with lower growth of 11%**, versus 25% and 45% in 2007 and 2006.
- **The seismic equipment sector, which is upstream from oil exploration is stagnant with zero growth**

For 2009, the overall growth of the geophysics market should be relatively low and stagnate with 3% growth. The companies of the sector will not be affected in the same ways as a function of geographical diversity and the specialties of their activities. The market for high technology services should do better.

Figure 7: Evolution of revenues of the geophysics market



Source: IFP

• Acquisition and Processing Revenues

The market for acquisition and processing was estimated at **\$9.7 billion in 2007**. The years 2000 to 2003 saw a decline in the activity and revenues of the sector and surplus capacity in means of acquisition and seismic teams. With the upturn of the market confirmed in 2005, the means of seismic acquisition were saturated, victims of many years of under-investment. This led to a sharp increase in the prices of services which, along with the increase in the volume of the activity, contributed to increasing the 2006 revenues (+45%) of the acquisition and processing segment. In order to meet demand, geophysics contractors had to replace and increase their means of production and buy new equipment. In 2006 and 2007, the geophysics contractors announced the launching of many new acquisition boats that started operation in 2007 and 2008.

For 2008, the revenue data for the first two quarters and the level of activity of the seismic teams through to September 2008 suggest that the acquisition and processing market will have **10% growth**.

For 2009, the acquisition market should continue to grow, but more slowly. In September 2008 Spears & Associates forecast growth of 6% for the entire geophysics market.

In the long-term, the oil companies need to continue their exploration efforts to reconstitute their reserves and to maintain their production.

In the medium-term, the fall of oil prices could have the effect of postponing some exploration campaigns.

- **Equipment revenues**

The equipment sector had revenues of \$1.7 billion in 2007 and represents close to 14% of the geophysics market. **The equipment sector had a very good performance in 2007 with 38% growth.** This is the fifth year with two-digit growth.

The equipment sector grew by 42% in 2006, 22% in 2005 and 50% in 2004.

For 2008, the revenue outlook for the first two quarters indicates that the market could reach \$2 billion.

After several years of increased oil exploration, the equipment sector, like the acquisition/processing sector, is enjoying sustained demand for new generation seismic acquisition equipment.

Among the promising markets we can cite, among others, the new seismic laboratories with larger and larger channel recording capacities, the offshore multi-streamer seismic recording systems, and multi-component ocean bottom cable systems (OBC).

For 2009, stabilization of volumes and prices is very likely. Sercel, the market leader, remains optimistic however. The small actors of the market will likely be more affected by this decline than the larger figures whose positioning is more in the supply of high-tech products.

- **The actors**

For acquisition and processing

More than half of the geophysics market is held by two companies, **CGG Veritas and Western Geco**. In all, 80% of the world market for geophysics services is held by six companies.

With the merger of CGG and Veritas DGC in 2007, **the market leader is now CGG Veritas** with 28% of the geophysics market (acquisition/processing and equipment) followed by **Western Geco**, the marine seismic subsidiary of Schlumberger which accounts for 26% of the market.

The other actors of the geophysics sector account for market shares that are two to four times lower. The number three on the market, **PGS** is mostly involved in offshore seismic acquisition and processing and holds 13% of the market. The company innovated this year by presenting a new generation of streamer, *the dual streamer* which opens up new possibilities in terms of data quality and acquisition in difficult sea areas.

Next in terms of market share for the acquisition/processing segment are **Fugro** with 6% and TGS Nopec with 4%. **Fugro's** activity is 30% offshore seismic acquisition and processing,

with the remainder of its activity divided between civil engineering geotechnics and robotic offshore inspection assignments that are outside of the sphere under consideration here.

In terms of equipment

Just three companies account for 90% of the market. **Sercel**, a subsidiary of CGG Veritas, **alone represents 54% of the market**, far ahead of the number two and three companies in the sector. **ION** and **Oyo Geospace** represent respectively 28% and 8% of the market for equipment.

ION is specialized in seismic recording systems (seismic acquisition laboratory), and its revenues for 2008 were down by 10% for the first two quarters of the year. With regard to **Oyo Geospace**, the expected variation in revenues for 2008 is almost zero.

Only the market leader, **Sercel**, has an increase in revenues, of about 8%. The company attributes this success in part to the increase in sales of its onshore laboratory 428 XL.

Table 3: Market shares of acquisition, processing and equipment suppliers

Total geophysical activity	% market 2007	Acquisition Processing	% market 2007	Geophysical equipment	% market 2007
CGG Veritas	28%	Western Geco	30%	Sercel	54%
Western Geco	26%	CGG Veritas	24%	ION	28%
PGS	13%	PGS	15.5%	OYO Geospace	8%
BGP	5% to 8%	BGP	5% to 8%		
ION	6%	Fugro	7%		
Fugro	6%	TGS Nopec	4.5%		
TGS Nopec	4%	Dawson Geophys.	2.5%		

Source: IFP

2.3 Drilling sector

2.3.1 World activity 2006-2007: slowdown in growth

The number of wells drilled in the world was 105,000 in 2007, a decrease of 3.5% compared with the number of drillings in 2006. This decline in activity was however essentially due to the sharp decline on the gas market in North America which led to a reduction of the number of wells drilled in the United States and Canada.

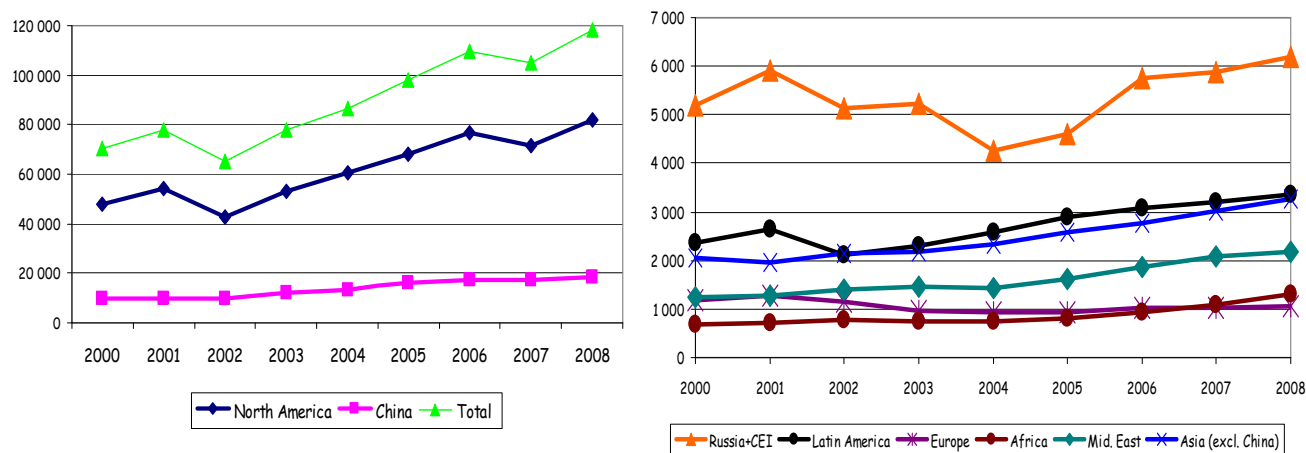
All of the other geographic zones in the world had growth in 2007, except for Western Europe which had a drop in activity of -1.2%.

The regions of the world that had the strongest growth were Africa, the Middle East and Asia with respectively +18%, +11% and +9%.

For 2008, an upturn in drilling in North America seems to be taking place in the second half of the year.

For 2009, this upturn could be compromised however, given the drop in oil and gas prices due to decreased demand.

Figure 8: Total number of wells drilled worldwide



Source IHS Energy, Spears & Associates, AEUB

With regard to drilling activity as a whole, most wells in the world are drilled on land, offshore drillings represent only 3,5% of the total. This proportion is almost constant on the world level.

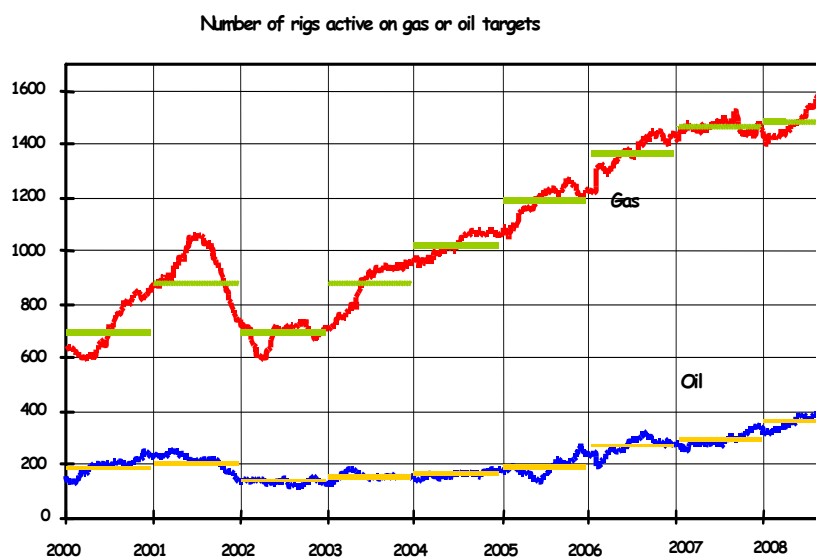
- **Onshore drilling activity**

Onshore drilling is traditionally in North America (71%) and China (16%), see Figure 8. **The decrease in world onshore activity in 2007 (-4%) was due to Canada and the United States with respectively -13% and -7%.**

The main cause of this decline is the sharp drop on the North American gas market and the climatic conditions in Canada that were particularly unfavorable for drilling in 2007.

The number of drilling units in activity in the United States on gas targets stagnated in 2007 (Figure 9) with an annual average of 1460 active rigs. The clear upturn in business only began in mid-2008. In light of this rebound, the rates of growth of onshore activity for Canada and the United States should be respectively on the order of 20% and 15% in 2008.

Figure 9: Drilling activity in the United States



Source : Baker Hughes Rig Count

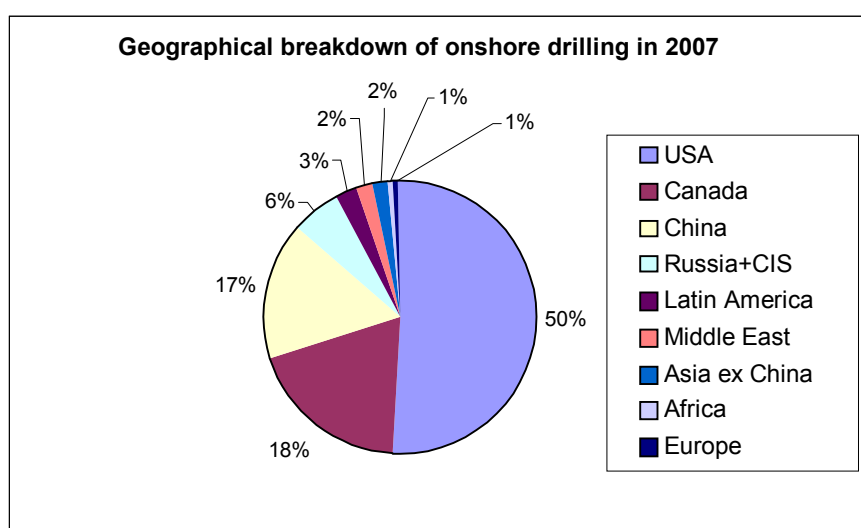
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The rates for the rental of onshore drilling units in North America, after reaching a peak of \$21,000/d in the second half of 2006, then fell by 2% in 2007 and 2008 to stabilize around \$20,400/b.

The cost of well equipment, which includes the casing and tubing, continued to follow the exponential growth in the price of steel. According to PipeLogix, which monitors the cost of the completion of wells, this rose by +80% in 2008.

After the United States and Canada, the number three figure in onshore drilling is China whose activity continues to increase at a rhythm of 2% per year.

Figure 10: Geographical breakdown of onshore drilling activity in 2007



Sources: IHS Energy, Spears & Associates, AEUB

In the rest of the world, the growth in onshore drilling activity was 9% in 2007 and should reach 7% in 2008. The areas with the highest growth were Africa and Asia (not including China) with 17% and 12% growth respectively.

Onshore drilling activity in the Middle East increased enormously in 2005 and 2006 with 19% and 12% growth due to a vast program of exploration and development of fields in Saudi Arabia, but then only by 4% in 2007.

- **Offshore drilling activity**

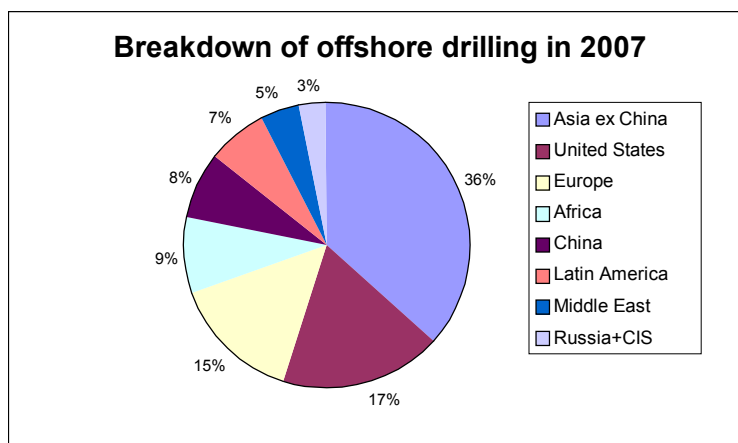
Offshore drilling activity is geographically more diversified than onshore drilling. **The most active geographic zone is the Asia-Pacific zone** which represents, without China, 36% of the number of offshore drillings. In this geographic zone, the most active countries are **Australia, Indonesia and Malaysia**. The other geographical areas with strong offshore drilling activity are the United States, 17%, Europe, 15%, Africa, 9%, China, 8% and Latin America, 7%.

In 2007, offshore drilling activity slowed considerably with growth of only 1%, although it had been 8% in 2006.

It was mainly **Latin America, Africa and China** that sustained offshore activity in 2007 with growth rates of +20%, +18% and 12% respectively.

These countries compensated for the drop in offshore activity of 15% in the United States and the 2.5% drop in Europe.

Figure 11: Geographic breakdown of offshore drilling activity in 2007



In the United States, the decline in offshore drilling that began in 2006 and ended with a -4% drop, was further amplified in 2007 with -15%. The first six months of 2008 indicate a continuation of the drop in offshore drilling in the United States of 9%. Operators are abandoning the exploration of the mature shallow offshore zones, to seek larger fields in the deep offshore that require complex and costly but fewer drillings.

In Europe, the United Kingdom, Norway and the Netherlands, which account for half of the wells drilled in Europe, are seeing a decline in the development of the fields in the North Sea.

In Latin America, Brazil has had growth of 16% in its offshore drilling activity. This boom in offshore exploration in Brazil led to the discovery of several giant fields at the beginning of 2008 in the Santos Basin. Brazil now accounts for 60% of the offshore activity of Latin America.

In Central America, offshore drilling activity in Mexico and in Trinidad and Tobago grew by 17%. Mexico is trying to deal with the decline of its national production, and Trinidad and Tobago is busy developing its enormous gas reserves discovered a few years ago.

In Africa, Egypt, which is not used to offshore drilling, had growth of 40%. The Egyptian parliament's ratification of exploration licenses helped relaunch drilling in the Mediterranean and in the Gulf of Suez.

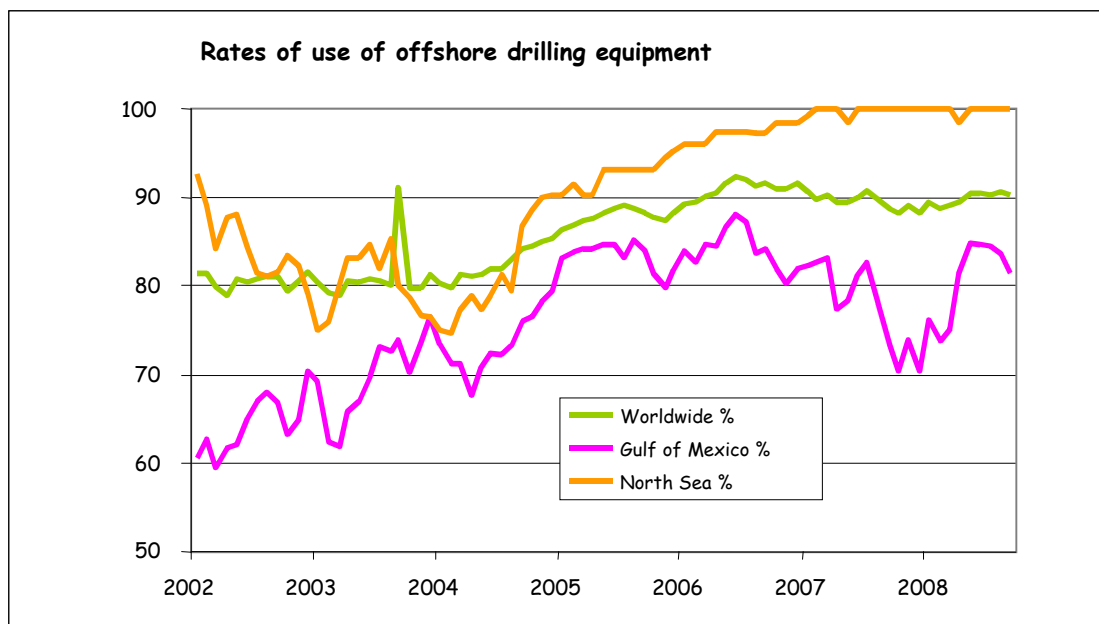
For 2008, the growth outlook for offshore drilling continues to be based mainly in Africa and in Latin America, with resumption of offshore drilling in the Middle East.

Rate of use and rental of platforms

Since mid-2006, the average rate of use of drilling platforms in the world has stabilized at a high level of 90%. But, since 2008, as a function of the geographic zones and the types of

platforms, we have seen disparities in rates of use, particularly for jack-ups and semi-submersibles.

Figure 12: Rates of use of offshore drilling equipment



Source: Offshore Rig Locator, IFP

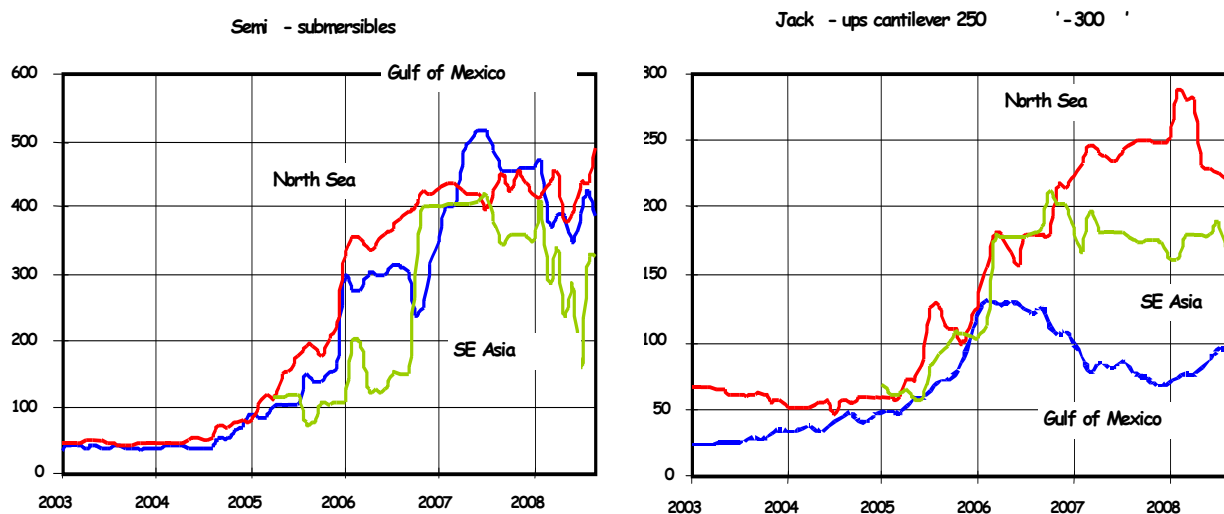
Since 2007, **the North Sea** has maintained a rate of use of offshore drilling platforms close to 100%. With respect to 2004, the daily rental prices in the North Sea have been multiplied by 5 for the jack ups and by 8 for the semi-submersibles.

In the Gulf of Mexico, the rates of use of the platforms since 2005 have varied between 80% and 85%, except for the period from mid-2007 to mid-2008, corresponding to the decrease in activity of the sector, where they fell to 70%.

The refocusing of the offshore activity of the Gulf of Mexico to very deep areas penalized jack-ups and favored the use of semi-submersibles. Since 2006, the rate of rental of jack ups in the Gulf of Mexico fell from an average of \$125,000/d to \$86,000/d in July 2007. Conversely, the rate for the rental of semi-subs rose from \$300,000/d in 2006, to more than \$500,000/d at the end of 2007. With the decrease in offshore drilling activity of 9% in the United States, since mid-2007 we have seen a drop in rental rates of 20% for semi-subs and near stability or even a slight increase in rental rates for jack-ups.

In Southeast Asia, the rates for rental of semi-submersibles have quadrupled since the end of 2005. They reached a record level of \$400,000/d in 2007 and have since fallen back 2008 by 25%. The rates for rental of jack-ups after tripling over the course of two years since 2005, were stable in 2007 and 2008 to \$175,000/d.

Figure 13: Rate for rental of offshore drilling platforms (in thousands of US \$ /d)



Source : Offshore Rig Locator

IFP/Economic Studies Department/2008

2.3.2 Revenues of the drilling activity

Since 2004, the sustained price levels for oil and gas led to increases on the oil product/service market, especially for drilling. **The market more than doubled in four years, reaching the record level of \$50 billion in 2007.** However, the two market segments evolved differently in 2007:

- **Offshore, the market continued its strong growth in terms of revenues**
- **Onshore, the market fell, impacted by the reduced activity in North America**

As two-thirds of the revenues of the world market for drilling come from the offshore, the growth of the drilling market, all segments taken together, was 22% in 2007

The onshore market was estimated at \$16 billion in 2007, it fell by 3% with respect to 2006, which was a record year. Since 2004, the onshore market has increased by 70%.

It is mostly located in North America where it depends strongly on the demand for gas which has been low since the beginning of 2007. The strong drilling activity in Africa and Asia slowed the drop in the onshore market in 2007

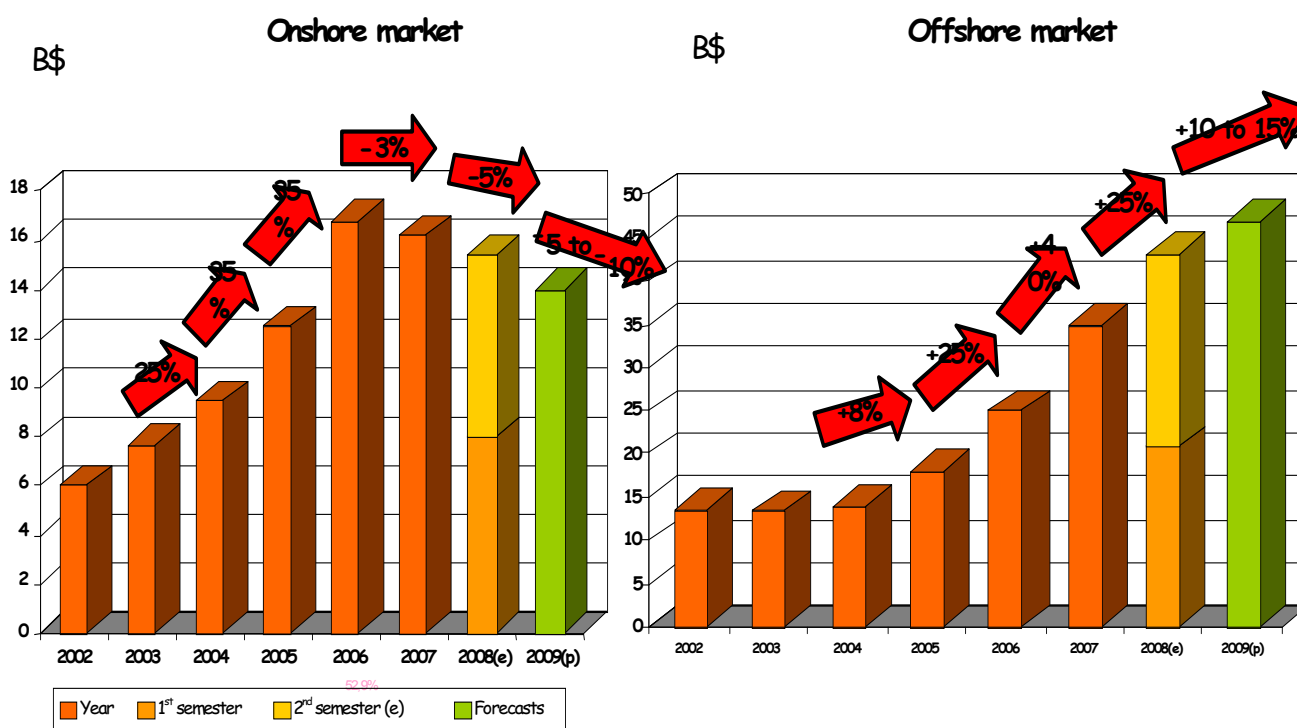
The offshore market had record growth of 40% in 2007. The offshore drilling market was \$35 billion, an increase of 150% over the course of four years.

This rise, twice as fast as that of the onshore market, illustrates the rush to exploration and development of deeper and deeper offshore fields. But this rise of the market is mainly due to

a price effect along with the very weak parity of the dollar. As a reminder, in 2007, the number of offshore drillings rose by only 1%.

For 2008, the recovery of onshore drilling activity in North America, in the second half of 2008, should correct the weakness of the market seen in 2007. This recovery will only be temporary however, because oil and gas prices have fallen sharply since September 2008. **The onshore market should continue to stabilize in 2008 or even fall by 5%, and the growth of the offshore market should slow down by about 25%.**

Figure 14: Onshore and offshore drilling market, 2008 estimation and 2009 forecasts



Source IFP

For 2009, given the economic situation, **Spears & Associates** adjusted their estimations downward and forecast:

- **A decrease for North America of 7% of the number of active rigs. This reduction could even be as much as 15% in the second half of 2009.** The drilling activity for gas should be more strongly affected than that of oil wells which should increase slightly.
- **Modest growth of 5% for the rest of the world, which should be relatively spared by the reduction in the drilling activity.**

The need for the oil companies to renew their hydrocarbon reserves in the long-term will be the main driving force in maintaining the market.

The main actors of the drilling market

Most of the actors in offshore drilling saw their revenues rise in 2007 as in 2006. The situation is much more contrasted for onshore drilling actors, particularly for those who operate mainly on the depressed market of North America. For both onshore and offshore there were many mergers and acquisitions in 2007 and 2008.

In 2007, the world leader in onshore drilling was still Nabors Industries, which has maintained its 20% market share.

In August 2008, the number 6 of the sector, the Canadian **Precision Drilling** acquired the American **Grey Wolf** group, which was then number five. With 13% of the market shares, the new company has 371 onshore drilling facilities and has moved into **second place**.

Patterson UTI Energy and **Ensign Resources** have been bumped into third and fourth place with 11% and 10% of the onshore market. They lost market share of -2% and -1% respectively. **Ensign Resources** has weak international activity which is not sufficient to compensate for the decrease in its activity in North America. **Patterson UTI's** activity is mostly based in North America.

Table 4: The main companies in the onshore drilling sector

Company	Market share, onshore drilling 2007
Nabors Industries	20 %
Precision Drilling	13 %
Patterson UTI Energy	11 %
Ensign Resources	10 %
Helmerich & Payne	9 %
Unit Corp	4 %
KCA/Deutag Drilling	3 %
SAIPEM SPA	2.5%
Parker Drilling	1.6 %

Source IFP

Offshore, Transocean reinforced its position as leader on the offshore drilling market by acquiring the number two company, Global Santa Fe, in November 2007. With this merger, the new group represents 28% of the world market and has won an additional 3% market share in the rapidly growing offshore market. The two companies are complementary; GlobalSantaFe specializes in the shallow offshore while Transocean is the leader for the deep offshore. This will allow the new group to diversify its clients, as the shallow offshore is

sought by national companies and independents whereas the clients for the very deep offshore are mostly the large international companies.

The number two in offshore drilling, **Diamond Offshore**, which specializes in deep sea drilling, continues to benefit from the high prices for rental of its platforms. The company has 46 rigs, including 30 semi-submersibles, a drill ship and 15 jack-ups.

The **Pride International** company focused on its offshore activity by selling its onshore drilling activity in Latin America to an investment company in August 2007. The company had suffered from the difficult market conditions in Venezuela, and also from the strikes in Argentina that affected its results. Its market share in onshore drilling continued to fall and went from 5% in 2005 to 1% in 2007.

The Chinese company, **China Oilfield Services**, a subsidiary of the public oil group CNOOC confirmed its ambition to become an international actor in offshore drilling by seeking to acquire the Norwegian drilling company **Awilco Offshore** which owns 7 giant and mobile drilling rigs in the North Sea and the Southeast Asia.

Table 5: The main companies in the offshore drilling sector

Company	Market share, offshore drilling 2007
Transocean + Global Santa Fe	28 %
Noble Drilling	8 %
Diamond Offshore	7 %
ENSCO International	6 %
Pride International	5.5 %
Seadrill	5 %
Nabors Industries	4 %
Rowan Companies	3.5 %
KCA/Deutag Drilling	2%

Source IFP

2.4 Offshore production equipment construction sector

2.4.1 Offshore construction activity: strong activity in 2006 and 2007

This chapter looks at offshore construction activity for fixed platforms, floating platforms and sub-sea installations.

In 2007, with a total of 280 units in construction, offshore construction activity remained at a high level despite a drop of 12% for the year. 2006 had been a record year

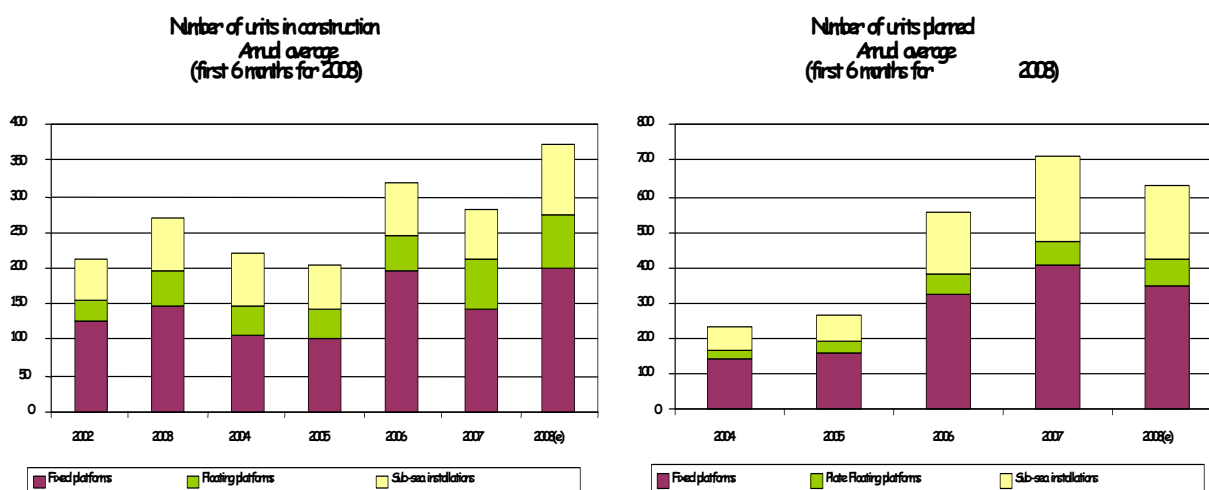
with 56% growth and more than 300 offshore units in construction. Of the 280 units counted in 2007, half are for the construction of fixed platforms, and the remaining two quarters are floating platforms and sub-sea installations.

The first six months of 2008 suggest an increase in offshore construction for the year of +30%. A record number of 375 units built should be reached at the end of 2008. The three types of offshore construction should be reinforced in 2008 with:

- +40% for fixed platforms and sub-sea installations
- +10% for semi-sub floating platforms

Beyond 2008, the offshore construction projects planned are down by 10%. There are 700 units planned, or a drop of 10% for fixed platforms and sub-sea installations, only semi-submersible construction projects are continuing to grow (10%).

Figure 15: Offshore construction



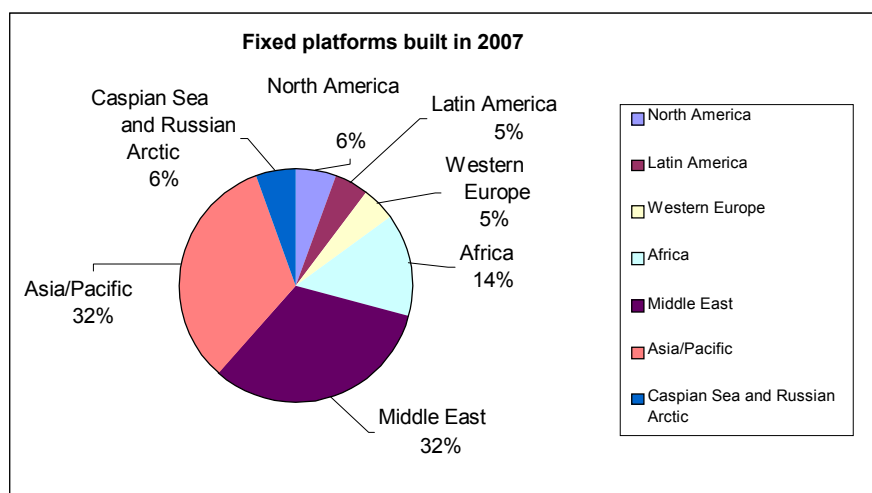
Source: ODS Petrodata

• Fixed platforms

The number of fixed platforms built decreased by 25% in 2007, after having practically doubled between 2005 and 2006. The first six months of 2008 indicate an upturn of 30% in the number of fixed platforms in construction. The 2006 record of 190 units should be exceeded to reach 200 units.

With regard to construction projects for fixed platforms planned in 2008, the number remains high, at 382, but represents a decline of 11%.

Figure 16: Geographical breakdown of fixed platforms built in 2007



Source: ODS Petrodata

In 2007, one third of the construction of fixed platforms was located in the Asia-Pacific zone, chiefly in Southeast Asia and another third in the Middle East. Africa accounted for 14% of the fixed platforms, with most of the construction in West Africa and a small share in North Africa. In North America, the Gulf of Mexico accounted for the largest share of construction with 6% of fixed platforms in the world, or as many as Latin America or the Caspian Sea or Western Europe.

In 2007, all of the geographic zones with the exception of the Middle East saw declines in the construction of fixed platforms. This was the case for North America, Latin America and Europe, which had drops in activity of between 70% and 80%.

The Middle East had 30% growth on the other hand, with the implementation of a large number of projects scheduled in 2006.

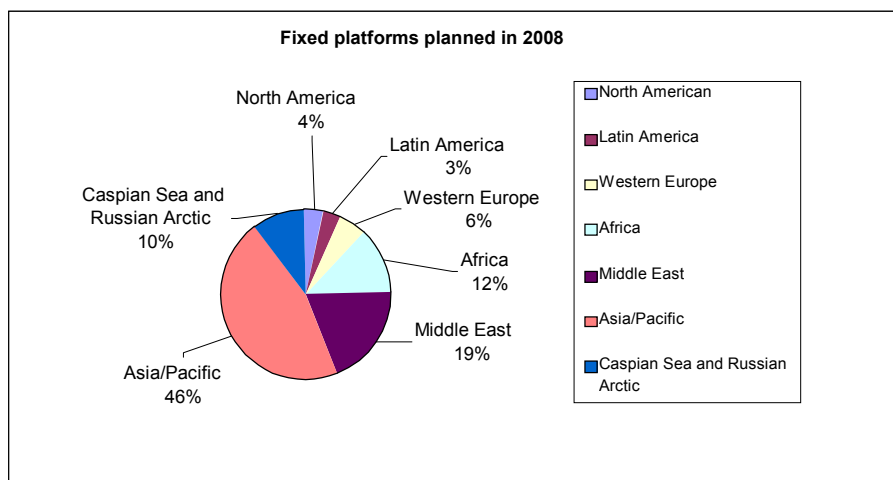
In the other geographic zones, the shallow offshore which requires fixed platforms is generally being abandoned in favor of the deep offshore which requires semi-submersibles or underwater development.

For the first six months of 2008, the construction of fixed platforms rose by 40%. All geographic zones had growth except for Western Europe which had a decline of 30%. Latin America should triple the number fixed platforms in 2008 and return to its level of 2006. India is also very active and should have growth of 150%.

Over the first six months of 2008, the number of fixed platform projects planned fell by 11%, to close to 400 projects in the world. It had increased by 44% between 2006 and 2007.

The Asia-Pacific zone has close to half of the fixed platform projects planned in the world, **Southeast Asia** has 125 projects and **India** has 29 projects. The **Middle East** represents 19% of the projects or 73 fixed platforms.

Figure 17: Geographic breakdown of fixed platform projects planned in 2008



Source: ODS Petrodata

The strongest growth in fixed platform construction projects in 2008 was in the **Caspian Sea**, in **India**, in the Mediterranean zone, North Africa and Western Europe. **The biggest drops in fixed platform projects were in North America (Canada and the United States) and in the Far East.**

- **Floating platforms**

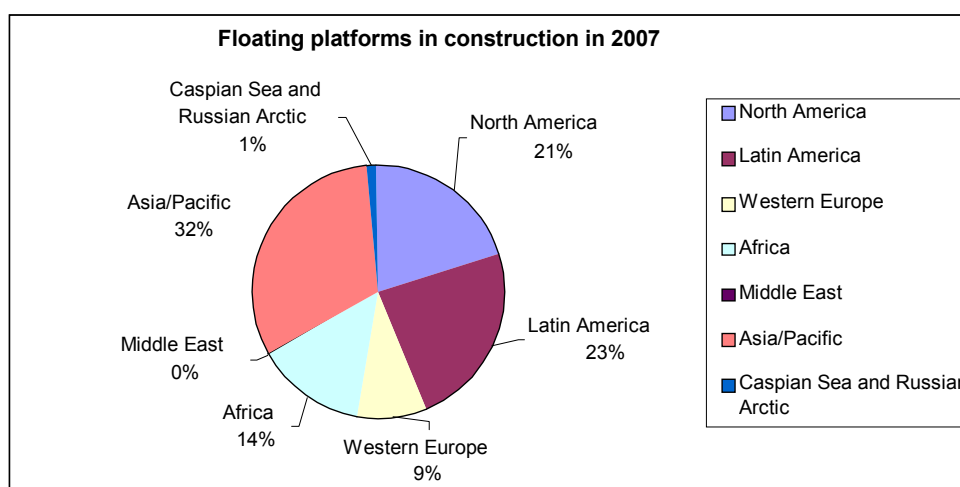
There was strong growth in construction of floating platforms in 2007 (40%).

In the first half of 2008, the average number of floating platforms in construction was 75 versus 66 in the first half of 2007, or growth of 15%.

The construction of floating platforms in 2007 is broken down with one third in the Asia Pacific region, 23% in Latin America and 21% in North America.

In 2007, except for the Far East which stagnated, all of the geographic zones have had substantial growth. North America doubled the number of construction projects in the Gulf of Mexico. Southeast Asia and Western Europe are the other two geographic zones that are driving forces of growth, each with an increase in activity on the order of 75%. Latin America had 40% growth, i.e. the average annual rhythm of the floating platform construction sector.

Figure 18: Geographic breakdown of floating platforms built in 2007



Source: ODS Petrodata

For the first six months of 2008, the growth in the construction of floating platforms fell and stabilized at 10%. Southeast Asia stagnated with practically zero growth, the Gulf of Mexico had a 10% drop after doubling its activity the preceding year, and Latin America fell by 11%.

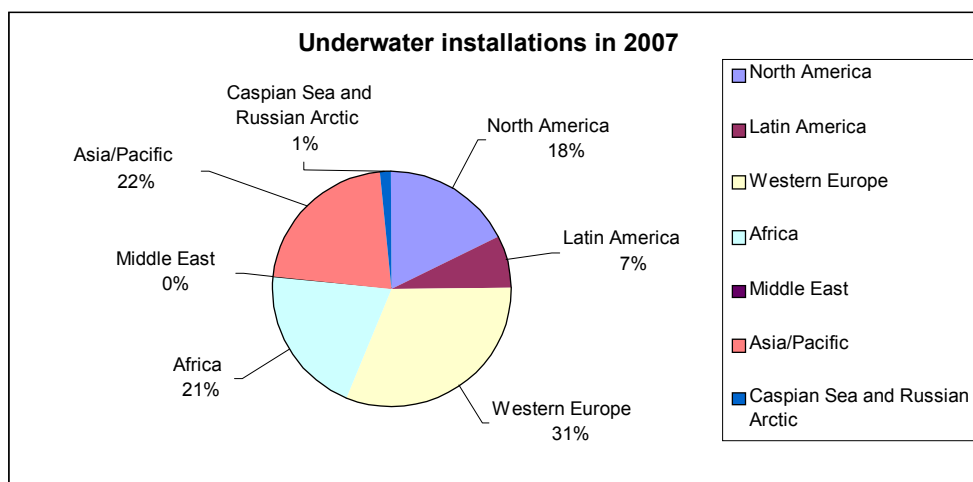
Moreover, the growth in the number of planned floating installation construction projects slowed down in 2008, the increase was only +10%, although it had been at 90% in 2006 and 17% in 2007. The sharpest drop in the number of projects was in the Gulf of Mexico with -80%. Only Latin America and Western Europe managed to maintain growth in the number of planned floating platform projects with respectively +25% and +60%.

In Brazil, in its investment plan for 2009-2020, **Petrobras** includes the development of the new sub-salt discoveries in the Santos Basin and has just approved the manufacturing of ten FPSO. Petrobras also considers that 20 to 50 platforms could be necessary to develop all of the resources of the Santos Basin.

- **Sub-sea installations**

In 2007, the number of sub-sea installations under construction was 69. The number is down by 10% compared with 2006, in which there was growth of 25%.

Figure 19: Geographic breakdown of underwater installations built in 2007



Sources: ODS Petrodata, IFP

In 2007, construction was broken down with one third in Western Europe, 22% in West Africa and 14% in the Gulf of Mexico. Only West Africa and the Asia-Pacific zone had growth in 2007, North America and Latin America declined.

For the first six months of 2008, the average number of sub-sea installations in construction rose sharply and should reach about one hundred installations, for a growth rate of 40%. This high number of construction projects is the concretization of projects planned over the preceding two years.

The highest growth expected for 2008 is in Latin America, where the number of construction projects should rise from 5 to 20, and in the Australia New Zealand zone where the number of construction projects should double to 14.

However, the number of underwater installation construction projects planned in 2008 is down by 15%. With the exception of Latin America which was stable with 18 projects, all of the other geographic zones were affected by the decline, especially the Gulf of Mexico with -60% and Western Europe with -30% for underwater installation projects.

In summary:

With regard to offshore construction of all production supports taken together, and for the first six months of 2008, the Asia-Pacific zone, which includes India, Southeast Asia,

the Far East, Australia and New Zealand, includes one third of world offshore construction, followed by the Middle East, West Africa and Western Europe which represent respectively 15%, 12% and 10%.

In 2008, with the exception of Canada, there was growth for all of the geographic zones. The strongest growth is expected in Latin America, India, and Australia and in North Africa.

These zones also include in similar proportions most of the construction projects planned in 2008. With respect to 2007, the number of construction projects planned is down by 15%. Two geographic zones are still showing growth: **the Caspian Sea and North Africa**, all the others are in decline, in particular the Gulf of Mexico and the Far East with -60% of planned projects.

2.4.2 Revenues of the activity

The revenues taken into account for the companies are for the construction of platforms, sub-sea installations, the supplying of equipment and services for offshore production. The revenues corresponding to the other activities are not taken into account.

- **2007-2008: continued growth**

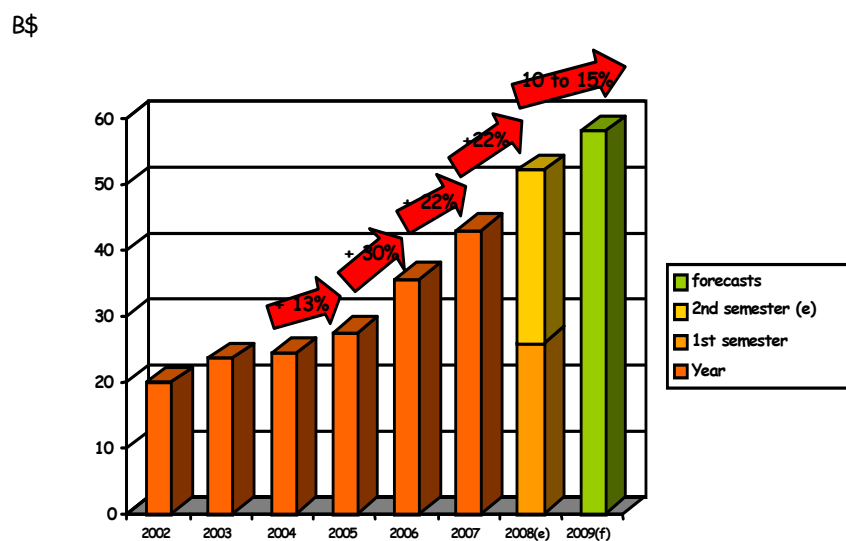
In 2007, the offshore construction market grew by **22% compared with 2006 and reached \$43 billion. The main actors of the sector had higher revenues in 2007.**

For 2008, the revenues for the first six months of the year indicate a continuation of growth of 22%, coherent with the observed increase in offshore construction activity. By extrapolation to the second half of 2008, the world revenues for offshore construction should reach \$52 billion this year.

With regard to the outlook for the offshore construction market for 2009, the order books of the main companies were well-filled at the end of June 2008. Technip's order book has 8 M€ or more than a year's worth of revenues.

As the number of offshore installations planned in 2008 is down by 11%, especially for fixed platforms and underwater installations, a slowdown in growth could be confirmed in 2009. Growth could fall to between 10% and 15%, and the market might not exceed \$60 billion.

Figure 20: Market for offshore engineering, equipment and constructions



Source IFP

- **Nature of coming offshore developments**

The outlook for the bringing in of fields for the years to come is focusing **on deep water and greater sedimentary thickness** with higher and higher pressures and temperatures (HP/HT conditions). It is thought that for the period from 2007 to 2012 the development of fields under more than 1000 m of water should triple with respect to the period of 2001-2006.

In this context of development of fields in deep water, floating supports and sub-sea installations are preferred.

For floating supports, there has been **increased interest in FPSO**, especially in the **Gulf of Mexico**, where the American Minerals Management Services authorized their use. Until now, the FPSO was not considered sufficiently reliable to act as a floating platform in this region. In the regions where this mode of production is used, as in West Africa, the FPSO must be solidly stowed to be connected to the underwater wellheads.

With regard to sub-sea installations, they are accompanied by **networks for collection and transport of production, and ever longer sub-sea tie back** to connect the wellheads to the nearby platforms or to facilities on the coast. This brings up the issue of the **formation of hydrates**, among others.

The increase in development in water depths of more than 2000 m and up to 3000 m is accompanied by the problem of the weight of bottom-surface connections. Industrialists are therefore interested in **technologies that could lighten the structures, and particularly composite materials to lighten the production risers**. Petrobras, to develop its fields

under very deep water, developed a mixed bottom/surface connection system combining steel piping and flexible tubing.

- **The main actors in offshore construction**

AkerKvaerner, Technip and Saipem are in the lead in this sector with respective market shares of 14 %, 10% and 9% in 2007.

The companies that are gaining market share in the offshore construction sector are **FMC Technologies** with +2%, **KBR** with +1.5 %, **Saipem and Mc Dermott** with 1% each.

- **FMC Technologies** specializes in the design and manufacturing of sub-sea production systems. The company also makes high-pressure equipment. These two areas are essential for the development of deep-water fields.
- Through its offshore activity segment, **Saipem** is involved in the construction of the large **Nord Stream** project for the laying of two parallel gas pipelines to connect Russia to Germany. The company also works for Total Angola for the manufacturing of a new gas injection platform.

Aker Kvaerner, SBM Offshore, Acergy maintained their market shares.

- **SBM offshore** specializes in TLP platforms and semi-submersibles as well as FPSO and anchoring systems. It is also well-positioned for the production of fields under very deep water.
- **Acergy** has developed a system of Hyperflow riser towers, used in particular on Total's Girassol field in Angola located under 1500 m of water. A floating system allows to produce under very deep water. The system was also used for the Greater Plutonio field in Angola located between 1250 and 1500 m of water.
- **Aker Kvaerner**, as the market leader, offers a wide choice of services ranging from reservoir analysis to production and particularly the construction of fixed and floating installations.

In terms of drops in market shares for offshore construction, we have **Technip** with -2% and **Global Industries** with -1.5%.

- **Technip** increased its revenues by 14% for all activities together. The subsea activity is stable, but platform construction activity fell by 38%. The other activity segments compensated, particularly the construction of onshore processing installations for

downstream processing including the LNG train for Qatar. In 2007 this segment accounted for more than half of Technip's revenues.

Table 6: Market shares of companies of the offshore construction sector

Companies	Market share 2007
Aker Kvaerner	14%
Technip	9.5%
Saipem	9%
FMC Technologies	8 %
SBM Offshore	6 %
Acergy	5.7 %
Mc Dermott	5.2 %
KBR	4.7%
Subsea7	4.5 %
Global Industries	2 %
Helix – Cal Dive	1.5 %
Gulf Island Fabrication	1 %

Source IFP

2.5 Conclusion

After 2006, which was a record year, **2007 was another very good year for the oil product/services market.** With the exception of onshore drilling for which the revenues fell by 3%, the other exploration-production sectors had growth of between 10 and 40%.

While the price effect still explains part of this market growth, **the activity is continuing to grow.** Since the end of 2007, the number of seismic teams in operation around the world has exceeded 300. Offshore construction, particularly for semi-submersibles, is still in expansion. Onshore drilling, which stagnated in 2007, has picked up again in 2008. Although there has been very little growth, the number of offshore drillings remains high.

Table 7: Evolution of investments and the main oil product/service markets

	2005	2006	2007	2008	2009
E&P Investments	+ 25 %	+ 29 %	+ 18 %	+ 19%	0%
Geophysics	+ 25 %	+ 40 %	+ 20 %	+ 10%	0 to 5%
Onshore drilling	+ 35 %	+ 35 %	-3	-5%	-5 to -15%
Offshore drilling	+ 8 %	+ 25 %	+ 40%	+ 23%	+ 10 to 15%
Offshore construction	+13 %	+ 30 %	+ 18 %	+25%	+ 10 to 15%

However, some indicators suggest that 2008 is an end of cycle year and that a turnaround is very likely in 2009. Planned offshore construction projects are beginning to decrease, and the revenues of small geophysics equipment companies are stable or falling.

The other sign of the trend turnaround is the sharp decrease in the price of oil observed since the peak of July 2008 at \$145/b. Since this high point, the price of a barrel fell back below \$60/b with the fall in demand for hydrocarbon products.

While in the short-term the oil companies are facing decreased demand and could postpone their exploration programs, in the medium- and long-term they must replace their declining reserves. The oil companies must continue to develop their fields to maintain their production level.

3 Refining

3.1 Introduction

2008 saw two rather opposite situations between the first and second semesters. We will analyze the facts in 2007 and in the first half of this year and will give some elements to try to understand the disturbances that will likely be affecting the refining industry in the months ahead.

Before the accentuation of the financial crisis and its effects on the real economy, the refining sector already had economic performances that were showing signs of a slowdown. The situations varied considerably however between the major geographic zones. In the United States, the drop in demand, which began well before the summer – as a reaction to price increases – led to a decline in refining margins, while in Europe the stagnation of demand did not have an apparent effect on margins. Conversely, the continued high growth in demand in Asia brought refiners good profitability and a steady level of investment. On the world level, Asia and to a lesser extent the Middle East provided for a fragile stability between refining capacities and product demand.

The rise in oil prices accelerated in 2008 and the resulting drop in sales of refined products – in the United States and in Europe- led to a deterioration of financial results of the downstream activities of the large oil companies. The decrease in the utilization rate of refineries, mainly in the industrialized countries, and of the costs of services and raw materials, also cut into refining margins and affected companies' profitability.

For several years now, the increase in demand, margins, costs and to a lesser extent the slow increase in the utilization rate of use of refineries have led to a significant increase in expenditures in the refining industry, and the forecasts for 2008 confirm the trend. These forecasts, which were formulated based on the economic reality at the end of 2007, may turn out to be somewhat optimistic.

In 2008, the conditions have remained favorable to increased investments in the sector, particularly in zones other than North America and Europe. The main trends that appear are the following:

- Timid increases in projects that could lead to a phase of industrialization, particularly for projects for new distillation capacities in new refineries.
- A decrease in projects favoring increases in distillation capacities at existing facilities
- A strong acceleration of conversion projects

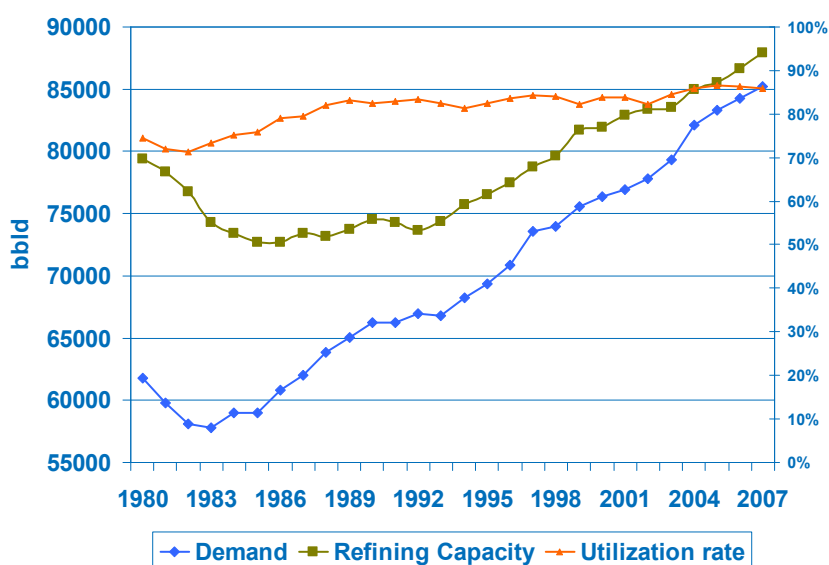
The continuation of investments programs in new refining and conversion capacities requires an economic context that is sustainably favorable: maintaining high refining margins and sustained demand is necessary to catch up with the lag in investment in refining.

But since this summer the economic conditions have changed considerably: financial crisis in the United States, transmission to the real economy and probable propagation to all areas of the globe, credit crisis, increase in investment risk, and more generally crisis of confidence in the OECD countries, in the field of energy confirmation of decreased demand and probable slowdown in the zones that were heretofore unaffected. Confronted with so many uncertainties and with insufficient perspective to establish forecasts, it is not easy to predict the future. **However, we can say that the economic context should significantly slowdown the increase in investments in 2009 which the refining sector has enjoyed over the past 2 to 3 years.**

3.2 Tensions on refining capacities and disparity of situations by zone

In 2007, as in the preceding year, world **refining capacities** increased by 1.4%, reaching 87.9 Mb/d or an additional capacity of 1.2 Mb/d. For the second consecutive year, the tensions on refining capacities, which remain strong, seem to be letting up slightly, moving from an excess capacity of 2.4 Mb/d in 2006 to 2.7 Mb/d in 2007. This is explained by a new slowing of the increase in **demand** (+1.0%) and a greater increase in the refining capacity. The **utilization rate** in the world fell again to 85.9 % in 2007 (Figure 23).

Figure 21: Worldwide oil demand and refining capacity

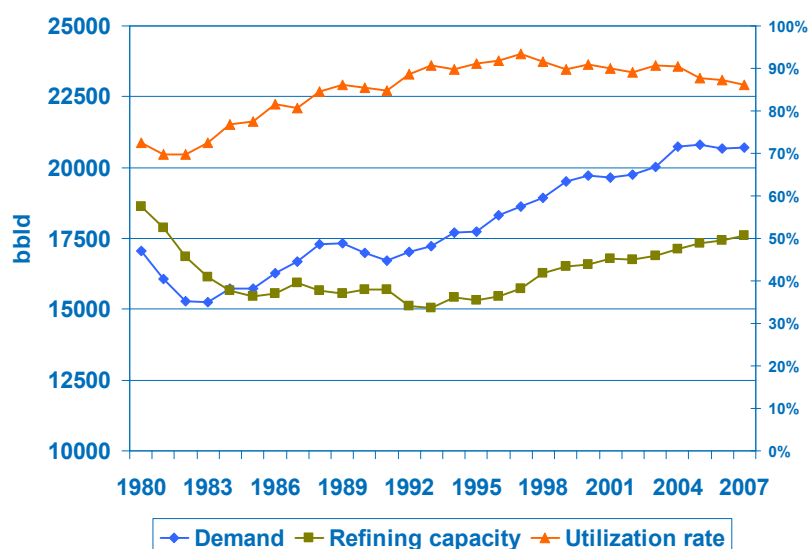


Source: IFP from BP Statistical Review of World Energy 2008

The slowdown in demand is explained mainly by the stagnation of demand in the United States (+0.1%) and by a significant decrease in Europe (-2.4%). Supply is sustained by a significant increase in refining capacities in the Asia-Pacific zone (+3.3%) and the Middle East (+3.5%).

The **United States** has long had a capacity deficit but since 2004, a record year, this deficit has been constantly decreasing. It moved from 3.6 Mb/d in 2004 to 3.1 Mb/d in 2007, an increase of 0.5 Mb/d (Figure 22). This evolution is not due to renewed investments in new capacities but rather the combination of slowing demand and refining capacities that are increasing slowly due to investments made to increase the capacities of the existing facilities. It is surprising to see in a context of structural deficit that the utilization rate of refining capacities continued to decrease for the third consecutive year to reach 86% in 2007 after reaching 90% in 2003 and 2004. In 2007, this poor result was due to a series of incidents and scheduled shutdowns for maintenance.

Figure 22: Oil demand and refining capacity in the United States



Source: IFP from BP Statistical Review of World Energy 2008

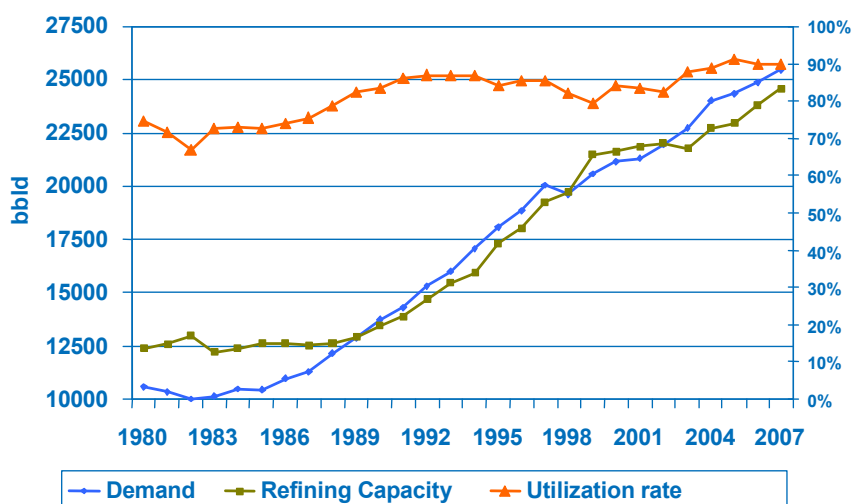
The fragile equilibrium that has characterized **Europe** for many years now benefited in 2007 from some light relief due to the decrease in demand while refining capacities remained stable. The surplus capacities rose from 0.4 Mb/d in 2006 to 0.73 Mb/d in 2007. The utilization rate decreased for the second consecutive year to 88% in 2007 while in 2005 it was 91%.

In the **Asia-Pacific** zone, the increase in demand was accompanied by a rise in refining capacities. The deficit was not eliminated but is decreasing progressively: over three years it fell from 1.4 Mb/d (2005) to 0.8 Mb/d (2007), an improvement of 0.6 Mb/d. While demand has increased by 4.4% since 2005, refining capacities rose by 7.2% during this period. The utilization rate of the refineries has remained very high, around 90%, for several years now.

In the **Middle East**, the refining capacities easily cover the demand. This situation has been deteriorating over the years due to a very strong increase in demand: the capacities/demand ratio fell from 1.4 Mbbl/d in 1999 to 1.2 Mbbl/d in 2006. In 2006 this erosion stabilized thanks to the new investments undertaken in the region over the past few years.

The tensions remain between refining capacity and oil demand in the world despite an improvement over the past two years. The Asia-Pacific zone especially but also the Middle East allow for the maintaining of a slight surplus capacity on the world level, despite very high demand from the emerging countries and a lack of investment in new capacities in the OECD zones (United States and Europe in particular).

Figure 23: Oil demand and refining capacity in the Asia-Pacific zone



Source: IFP from BP Statistical Review of World Energy 2008

In **2008**, after many downward revisions, world demand should increase by 0.5% according to IEA forecasts. The clear slowdown is essentially due to the sharp decrease in demand in North America (-3.5%) and the stabilization of European demand (-0.6%). The Middle East (+6.2%), Latin America (+5.4%) and the Asia-Pacific zone (+2.8%) particularly China (+6.7%) continue to sustain world oil consumption. The production capacities should increase as projects are completed and new units (distillation and conversion) are commissioned. The forecast for projects in 2008 is an increase of close to 1.6 Mb/d in distillation capacities and 4.2 Mb/d in conversion capacities.

The financial crisis that worsened in the second half of this year risks having an impact on the continuation of projects already underway and those in planning. The effects will not yet be very visible in 2008 due to the nature of the projects (heavy investments made over several years). For 2009, the situation could be quite different. Delays in or even cancellations of projects are foreseeable. At the moment, it is still risky to try to precisely predict the changes in the demand/refining capacity equilibrium for the months to come while the lack of visibility remains high. The slowdown in demand predicted by the IEA for 2009 and its industrial consequences suggest a certain pessimism for the months to come however.

3.3 Deterioration of refining margins

In general, the refining margins reflect supply-demand tensions in a given refining capacity context. If the capacities are too narrow with respect to demand, the margins will tend to

increase. The insufficient investment in refining over the past fifteen years and the sudden increase in oil demand –aggravated by the climatic phenomena of 2005, hurricanes Rita and Katrina- accentuated the supply-demand tensions and pushed refining margins into a structural rise. The curve of the refining margins on Brent cracking as an annual average – and on the other crudes - illustrates this trend. The average margin rose from \$0.74/b in 2002 to \$5.09/b in 2007 (with the exception of 2006 when the refining margin decreased but nonetheless remained reasonably high). Furthermore, the increasing provision of heavy crude and sulfur oil clashed with refining facilities that were partially unsuited for handling these crudes with insufficient conversion and desulfuration capacities. Tensions on light products appeared when conversely supplies of heavy products increased. As a result of this, the differentials between light and heavy products were accentuated. New needs appeared, triggering a new investment dynamic.

In 2007, in this context of high demand and insufficient refining capacities, the margins reached very high levels, particularly in the **United States**. On annual average and on average, the margins reached \$5.44/b (LLS cracking USGC). In the first semester the margin almost hit \$15/b in May. The margins did not reach these levels in the second part of the year. The brutal rise in crude prices led to a sharp deterioration of the margins until a negative figure was reached in December 2007. The prices of refined products increased but not enough to cover the cost of the raw material. The American companies did not totally manage to pass the increase in oil price to refined products, particularly gasoline.

This situation will continue in 2008 with the acceleration of the increase of crude oil price. But other factors will also contribute to the deterioration of margins: the demand for gasoline fell significantly as of the third quarter (no "driving season" effect) under the pressure of prices and a general deterioration of the economy. The addition of ethanol to gasoline will also slow down the consumption of oil products. Gasoline stocks rose considerably reaching levels that had not been seen in a long time by the end of the third quarter.

After a good year in 2007, there has been clear deterioration in 2008 with margins reaching \$3.13/b for the first nine months of the year or \$2.31/b less than in 2007. The significant decrease of gasoline demand– with a recent fall in the price of the product - should further decrease the product margins.

In **Europe** the margins remained high in 2007 despite a mild winter (\$5.09/b on Brent cracking Northwest Europe). Despite the sharp rise in crude prices, the refiners managed to maintain their high margins through the sale prices of their products. The structural tensions on the market for kerosene and diesel fuel guaranteed prices that were sufficient to cover the increases in raw material costs. In 2008, the margins fell slightly – much less than on the

other side of the Atlantic – mainly due to a drop in the demand for oil products: after 9 months the margin on Brent Cracking was at \$4.9/b, which still constitutes a quite reasonable margin. The price differential between distillates (particularly diesel fuel 0.1% and ULSD 10 ppm and also jet kero) and crude for which the trend was upward in the first semester, after a short downturn is now moving up again despite the fall in crude prices. The margins recovered in September.

In the **Asia-Pacific zone**, the margins are often lower than those of the other zones considered because of demand for light products that is lower and thus less profitable. However, the strong demand allows for the increasing and maintaining of high margins. With respect to the preceding years, the refining margins observed in 2007 in this zone have increased, stabilizing at \$3.58/b on average on Dubai hydrocracking. In 2008, for the first three quarters, the margins remained stable at \$3.44/b, which can be considered a satisfactory value.

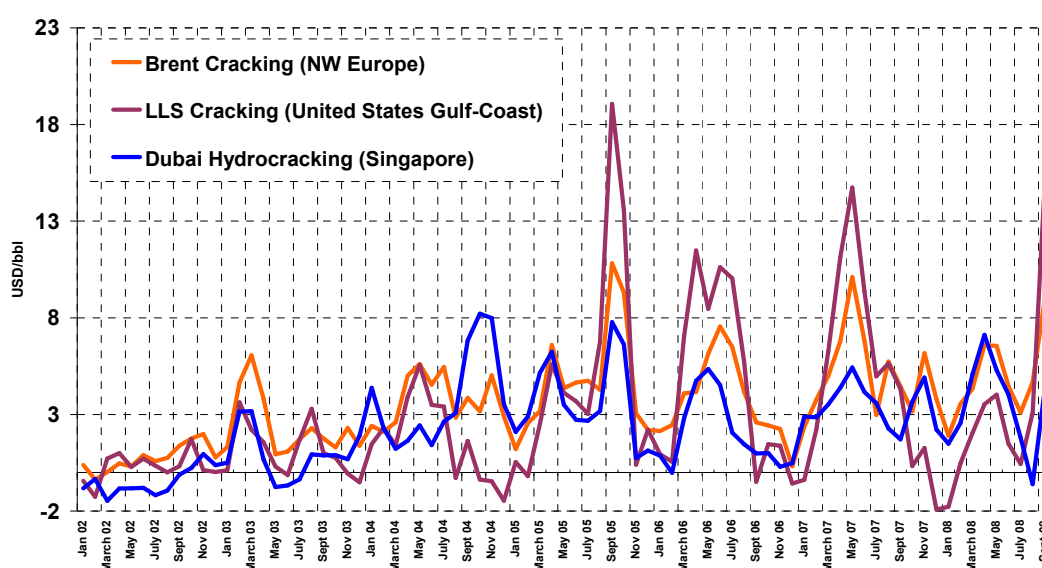
Table 8: Complex refining margins (annual average in USD/bbl)

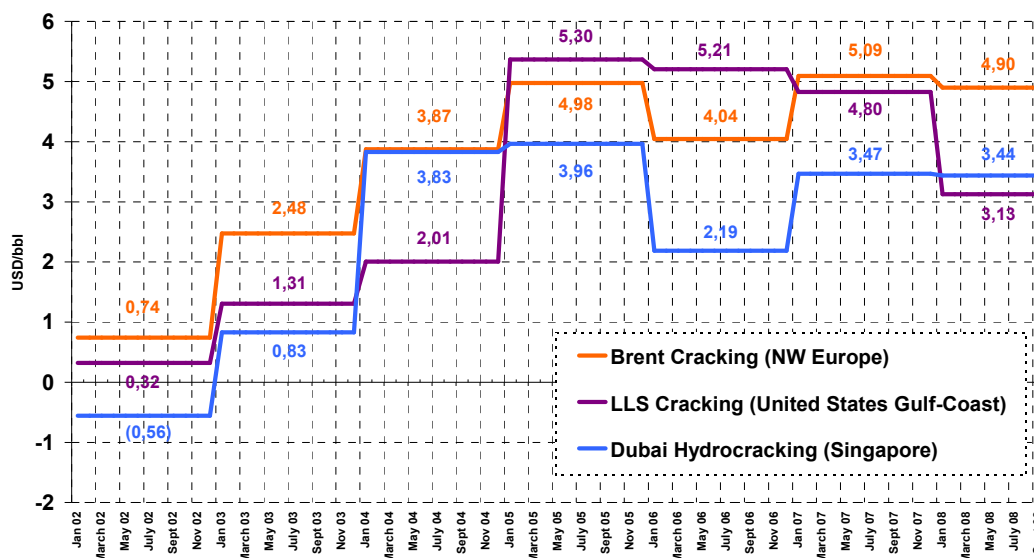
	2000	2001	2002	2003	2004	2005	2006	2007	2008 (f)**
Brent–Cracking (Northwest Europe)	3.37	2.05	0.75	2.34	3.77	4.98	4.04	5.09	4.90
LLS* (Cracking US "Gulf Coast")	1.29	1.36	0.31	1.12	1.69	5.37	5.21	5.44	3.13
Dubai-Hydrocrack. (Singapore)	0.89	-0.20	-0.56	0.82	3.74	3.96	2.19	3.58	3.44

* Light Louisiana Sweet.; ** averages over the first nine months of the year.

Source: Oil Market Report (IEA), IFP.

Figure 24: Variation in complex refining margins, monthly and yearly (in USD/bbl)





Source: Oil Market Report (IEA), IFP

What will be the impact of the current economic crisis on the margins? It is difficult to give a precise answer. The current situation characterized by a slowdown in demand despite the spectacular drop in crude prices and the probable easing on refining capacity, do not seem favorable to high margins. The confirmation of the decrease in the consumption of gasoline in the United States in 2009 will not just maintain the low margins on the other side of the Atlantic but will also affect the European market. The decrease in its imports from Europe risks creating a gasoline surplus in the European Union that will in turn affect the margins. In this scenario, Asia becomes the destination of the surplus gasoline with risks of overabundance in this zone and decreasing margins. Gasoline currently appears to be at the center of the refining disequilibria.

3.4 Lower net earnings and more mergers and acquisitions

3.4.1 Evolution of the net earnings of companies

In **2007**, the progressive degradation of economic performances in the downstream oil sector was confirmed. The **net earnings** of the main European and American companies decreased in their refining activities between 2006 and 2007. With the exception of Repsol-YPF, Shell, ConocoPhillips and ExxonMobil, the other companies selected had less favorable results in 2007. The rise in oil prices which weighed down the refining margins (particularly in the United States), and the general decline in sales of refined products in both the United States and in Europe basically account for this change. Other factors included lower utilization rates in the United States and Europe and higher costs (services and feedstocks).

Table 9: Net earnings reported by refining - distribution companies (in millions of USD)

	2007	2006	Variations %
Total	3475	3497	-0.6
BP	2617	5283	-50.5
ENI	437	790	-44.7
Repsol-YPF	944	307	+207.5
Shell	6951	7027	+30.2
Statoil	485	748	-2.5
Chevron-Texaco	3502	3973	-11.9
Conoco/Phillips	5923	4481	+32.2
ExxonMobil	9573	8454	+13.2
Sunoco	841	957	-12.1
Tesoro	1180	1455	-18.9
Valero	7604	8364	-9.1

Source: annual reports and BIP.

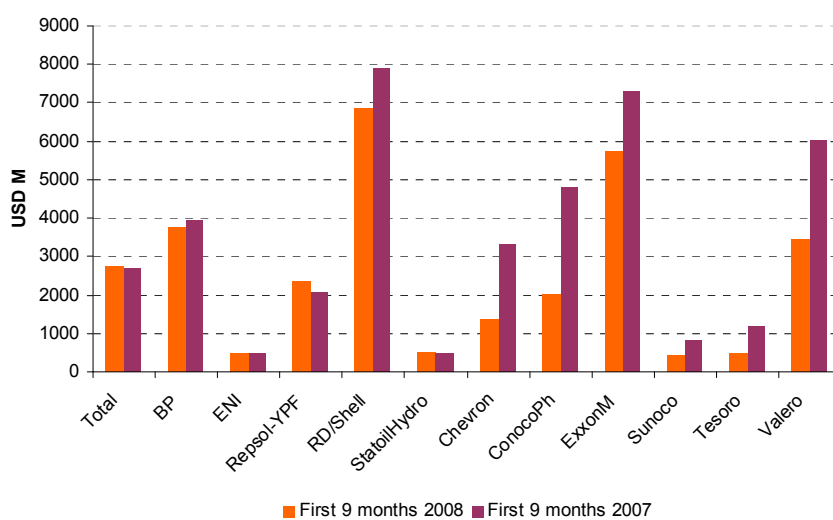
The poor results of BP can be explained – in addition to the generally unfavorable context – by the poor performances of its two main American facilities (Texas City and Whiting), which operated in 2007 at half of their capacity, a consequence of the serious incidents that occurred in 2005 at these facilities (explosion and fire). ENI explains the deterioration of its results by the very insufficient margins achieved, especially in the complex refineries (supplied with sulfur crude that reduces the comparative advantage of a complex refinery to produce from a low-cost raw material) and by the euro/dollar exchange rate. The three companies whose activity is centered only on refining –Sunoco, Tesoro and Valero- are also suffering from the context with results that are lower than in the preceding fiscal year.

Conversely and contrary to the general trends, Repsol-YPF's results improved considerably. The company explains this by a rise in its refining margin (greater than \$7.21/b in 2007), and higher distillation capacity (+1.4%). The exceptional result of this year is also due to the sale of 10% of the shares of CLH (Compañía Logística de Hidrocarburos).

For 2008, the results of the first nine months seem to confirm a deterioration of the results in refining: comparing the first three quarters of 2008 with those of 2007, we see that most of the companies selected have considerably lower results (Figure 27). The American companies have results that are clearly lower than those of the European companies. They oscillate between -21% (ExxonMobil) and -60% (Tesoro) while Shell – with the worst European result - was -13%. Chevron, ConocoPhillips and the three companies specializing in refining – Sunoco, Tesoro and Valero - had results that were much lower compared with

the same period in 2007 within a range of -40% to -60%. Total, which had a drop of 29% (in \$) in the first half of 2008 – due, according to the company, to the lesser contribution from companies by the equity method, essentially Wepec in China and CEPSA, and by a less favorable refining and marketing environment – enjoyed a clear upturn in the third quarter. For the first nine months the result became positive with +2%. Repsol-YPF and StatoilHydro had higher results in 2008 with +13% and +11% respectively.

Figure 25: Net earnings reported by refining - distribution companies (in millions of USD) first nine months of 2007 and 2008



Source: IFP

These results as of the end of June do not include the impact of the drop in oil prices. It is likely that this drop will affect the results of the companies, particularly through their E&P activities, the results of which depend directly on the price of a barrel. The companies that make substantial profits from their upstream activities in the oil sector will feel a greater financial impact in this new configuration.

3.4.2 Mergers/acquisitions

The trends in terms of mergers and acquisitions have led to the emergence over the past few years of new actors specialized in downstream oil activities such as Sunoco, Tesoro and Valero in the United States and Petroplus in Europe. In parallel, some large integrated oil companies are tending to abandon this activity in favor of E&P activities that offer levels of profitability that are much more significant despite the improvement in the refining margins over the past few years. It is this latter factor that led the "specialists" to acquire these new assets, "abandoned" by the integrated companies. The continuation of the mergers and acquisitions will depend chiefly on the movement of the refining margins and thus the expected profitability of this activity.

Since the end of 2007, the main actions in this field have been geographically very diverse.

The most notable actions were:

In the **United States**:

- BP and Husky Energy, which established two 50/50 joint ventures with BP holding 50% of the Husky's Sunrise field in Alberta and Husky taking on 50% of the Toledo refinery in Ohio (155,000 b/d). The goal for the refinery is to bring its capacity to 170,000 b/d and to start processing heavy crude between now and 2015. The value of the assets of \$5.5 billion was exchanged at value parity with no monetary transaction.
- Alon USA Energy purchased the Krotz Spring refinery (Louisiana) with a capacity of 83,000 b/d from Valero Energy Corporation for \$333 million. Valero plans to sell other assets in the near future. A total of five refineries could be sold in the near future, representing one third of the refining capacities of Valero according to Bill Klesse, the CEO of the company. Of these five refineries, three appear particularly likely: the Aruba refinery (275,000 b/d), the Krotz Springs refinery (140,000 b/d) and the Memphis refinery (195,000 b/d). The refineries of Ardmore (90,000 b/d) and Paulsboro (195,000 b/d) might also be added. According to the firm, these sales of assets in refining are motivated by the slowdown of the American economy and the resulting decrease in the demand for fuels.

In **Europe**:

- The Hungarian company MOL Oil and Gas purchased the Italiana Energia Servizi (IES) company with assets that include the Mantova refinery (56,000 b/d) and a network of 165 service stations and various logistical assets. This was an 800 million-euro transaction.
- Within the framework of the privatization of Albanian refining, the government came to an agreement with the Refinery Associates consortium (Texas) which includes Antika Enterprises Consortium and Mercuria Energy, which has its main office in Geneva, for the sale of the national company ARMO. This company includes the Ballshi and Fieri refineries. This was a 125 million-euro transaction.
- Petroplus Holding AG concluded the purchase of two refineries with RD Shell after receiving the approval of the European Commission. Petit Couronne (142,000 b/d) and Reichstett (77,000 b/d) were sold for 875 million euros.
- The petrochemical group Basell purchased the Etang de Berre refinery (80,000 b/d) from RD Shell for 700 million euros. With the sale of these three refineries, Shell totally withdrew from refining activities in France.

-
- The Russian Zarubezhneft plans to acquire the Bosanski Brod refinery in the Serb Republic of Bosnia. The amount of the transaction is said to include the value of the refinery (125 million euros) and the purchase of its existing debts. The project includes the extension and modernization of the refinery.
 - The planned takeover of MOL by the Austrian OMV failed. The requirements of the European competition services led the Austrian company to abandon its planned merger with the Hungarian company. The issue now is what OMV will do in the months ahead with the 20.2 % that it holds in MOL. New purchases and/or mergers are likely in the short- and medium-term. Lukoil and Gazprom seem interested and perhaps others as well.

In the **Middle East**:

- Saudi Aramco and ExxonMobil sold their shares in Luberef (Saudi Aramco Lubricating Oil Refining) and Petrolube (Petromin Lubricating Oil Company) to the companies Jadwa Investment Company and Advanced Petroleum Services Lmted respectively. The shares of ExxonMobil (29% of Luberef and 30% in Petrolube) were evaluated at \$500 million.

In the **Asia Pacific zone**:

- The Brazilian company Petrobras obtained the purchase of 87.5% of the shares held by the subsidiary of ExxonMobil, Tonen General Sekiyu KK, for an amount of \$55 million. The goal pursued by Petrobras through this acquisition is the reinforcement of its position in the Asia Pacific zone (and in general outside of its home country) in order to provide a market for its heavy crude.
- Saudi Aramco wants to sell its shares (40%) in Petron (Philippines) to the British Ashmore Group for \$550 million. Petron's assets include the Limay refinery (180,000 b/d) and a network of 1200 service stations.
- The Chinese group Sinopec sold five refineries and 63 service stations to its subsidiary Sinopec Corp for \$500 million. The refineries in question are: Hangzhou (100%), Vangzhou Petrochemical (60%), Zhanjiang Dongxing (60%), Taizhou Petrochemicals (100%) and Qingjiang Petrochemicals (100%).

In **Latin America**:

- RD Shell came to an agreement with the government of the Dominican Republic for the sale of 50% of its shares in the REFIDOMSA refinery. This was a \$110 million transaction.

In the **CIS** countries:

- Gazprom is purchasing the assets of Rosneft for \$3.5 billion. This amount includes the acquisition of 50% of the Strezhevsky and Tomskneft refineries.
- Gazprom is considering acquiring the 20% held by Sacyr Vallehermoso in Repsol-YPF. At this stage these are merely intentions, but the shares of Sacyr Vallehermoso could also interest other investors (Total and Shell).

In Africa:

- Tamoil Africa Holdings and the Indian Essar Oil Ltd came to an agreement with the majors Chevron, Shell and BP to take their shares (50%) in the refinery of Kenya Petroleum Refining. The remaining 50% will stay in the hands of the Kenyan government. The agreement was signed for an amount of only \$14 million and a \$350 million investment commitment for the modernization of the refinery.

According to the information obtained, the merger and acquisition transactions that took place between the last quarter of 2007 and the present represent \$14 billion. The United States was in the lead with 42% of the amount of the transactions, followed by Russia with 25% and only one deal (Rosneft/Gazprom), and then Europe with 19%.

The new economic reality is having a greater effect on smaller actors who could be rapidly fragilized by the shortage of credit and by the general economic situation. A new consolidation of the refining sector could begin, with the most powerful actors taking control of the small ones who become vulnerable. The pessimistic outlook for margins could slow down this trend.

3.5 Increased spending in the refining industry, but...

As of 2005, spending in refining activities started to rise significantly. Since that time, total spending increased by 24% while between 2000 and 2005 the increase was only 12%. The increase in demand led to an increase in the utilization rate of the refineries. Despite the rise in crude prices, refining margins increased as a whole. This evolution led to a rise in the number of new projects which, along with the increase in the prices of raw materials and services, led to a large increase in investment spending.

Before 2005, the increase in spending was due to chemical products/catalysts (+17%) and especially maintenance (+19%), capital spending had almost stagnated, with a slight increase of 2% in 5 years.

Over the period 2005-2008, spending on maintenance and chemical products/catalysts continued to increase at the same pace of about 17%-19%, while capital expenditures accelerated rapidly with growth of 36% for the same period. In the United States and in Europe, modernization investments were made, particularly to treat high-sulfur crude and to make better use of residues and heavy products at existing facilities: improvement of the quality of products and more flexibility in terms of raw material to be treated while maintaining good profitability are the criteria that guided the refiners. In order to respond to rapidly growing internal demand, the Asia-Pacific zone mostly invested in new capacity in complex refineries.

In terms of annual progression, the growth in capital expenditures was very rapid with a 20% increase between 2006 and 2007 for a shift from \$17.5 billion to \$21.0 billion. With a 9% increase, total expenditures rose from \$52 billion to \$57 billion in 2007. In 2008, total expenditures rose by 8.6% to \$62 billion of which 12% or \$24 billion was for capital expenditures.

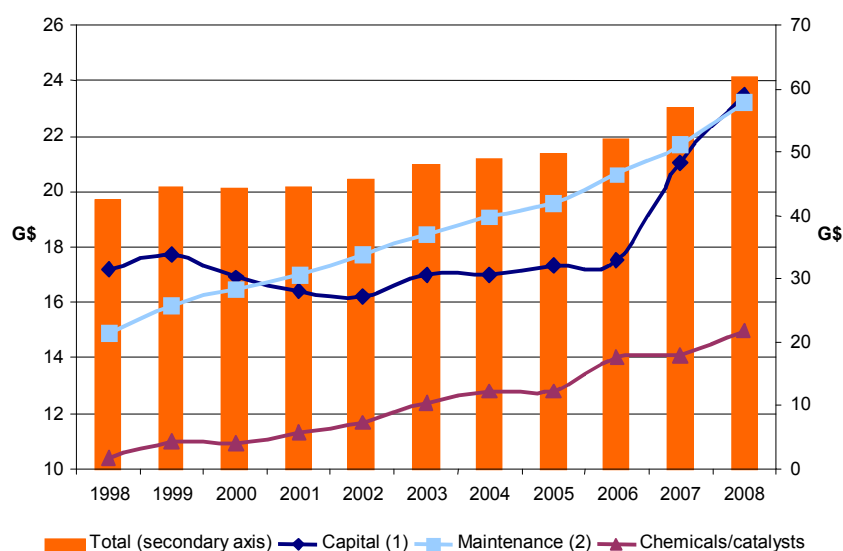
Table 10: Expenditures in the refining industry worldwide (in billions of dollars)

	2005	2006	2007	2008 (f)
Investments	17.3	17.5	21.0	23.5
Maintenance*	19.6	20.6	21.7	23.2
Catalysts and chemical products	12.8	14.0	14.1	15.0
Total	49.7	52.1	56.8	61.7

Source: IFP based on data from HPI Market Data; (f) forecast

* 40 % corresponding to facilities and equipment, the remainder to labor and services.

Figure 26: History of world spending in the refining industry worldwide (in billions of USD)



Source: IFP based on data from HPI Market Data; (f) forecast

The increase in expenditures is a positive evolution towards the goal of compensating for the accumulated lack of investment in refining capacities, whether for new refineries or increasing of the capacities of existing refineries. However, the tensions on world refining sector have not disappeared. Investment efforts are still needed, particularly for conversion capacities. These efforts are all the more necessary in light of the stricter environmental constraints that are a major factor in additional investment (according to CONCAWE, the capital investment needed in Europe to reach 50 ppm sulfur quality is between 2.9 and 3.5 billion euros and between 6.7 and 7.5 billion euros in addition to reach 10 ppm of sulfur).

These figures –table 10, forecasts for 2008- mask the possible impact of the recent financial crisis on the refining sector, particularly on the demand for oil products and on refining margins. Demand is already moving downward in the industrialized countries, and slowing down strongly in the other regions of the world. It is very likely that spending will stabilize or decline, at least in 2009.

3.6 Many planned projects announced

The data used for our statistics do not take into account the possible effects of the crisis on projects. The effects were starting to be felt in the second half of 2008 and should become more palpable in 2009.

The context in place before the events of the summer remained, this year, favorable to an increase in the number of refining investment projects, despite the decrease in margins in the United States in 2008.

Companies announce projects of two types: "Phase 2" (design, engineering or construction), or "Phase 1" (preliminary design or inception). The former have a higher probability of reaching completion.

➤ **In phase 2, design/engineering/construction,**

- **New refineries** have been announced almost everywhere in the world, in Africa, in Asia, in the CIS, in the Middle East, in Europe and in North America (Table 11). Based on the information available in 2008, 21 refineries could be built in the world between now and 2010-2012. In terms of distillation capacities, all of the new refinery projects together represent 2.7 Mb/d or 6% more than the preceding year.

The Middle East and Asia-Pacific regions alone cover 53 % of the new refinery projects planned in the medium-term in the world. Two new refineries are planned in Europe, one in

Germany with low capacity (8,500 b/d), the other in Spain (110,000 b/d). In North America, particularly in Canada, six new projects are listed among the projects in phase 2 this year. In all, these represent 555,000 b/d. No new refinery project in phase 2 is currently reported in Central or South America, nor in Australasia. Among the refineries in Phase 2, four are now in construction totaling 640,000 Mb/d.

Compared with last year, 12 new projects are included in Phase 2 or 1.37 Mb/d, the 9 other projects were renewed this year, i.e. 1.31 Mb/d (1.27 Mb/d are not considered as projects, either because they were commissioned, or are delayed, or have been suspended).

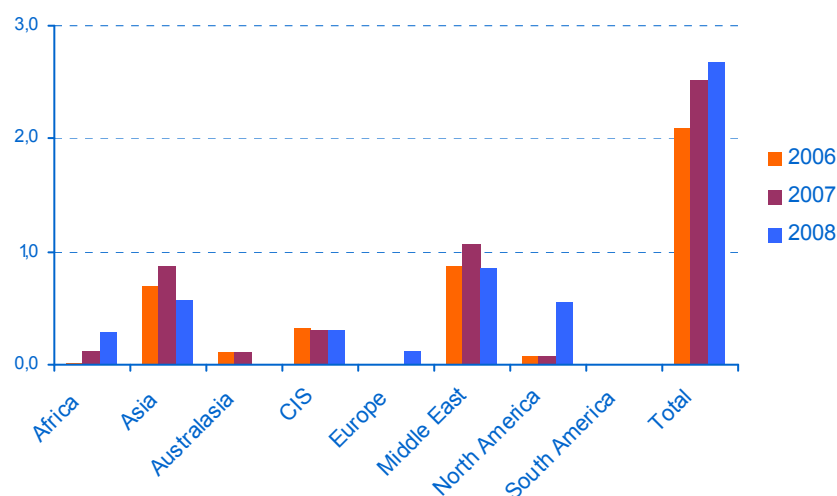
It is important to specify that these projects were mostly announced at the beginning of 2008 (1st semester). The turnaround in the situation in the course of the year and particularly the major slowdown in demand will likely have an impact on these projects. The projects that are now in the construction phase will probably not be reconsidered, but this is not the case for the projects in the design and engineering phases.

*Table 11: New refineries – Distillation capacities:
Phase 2: design, engineering, construction*

Region/Country	Status	Company	Location	Capacity bbl/d	Start
Africa					
Egypt	Design	SRPC	Sokhna	130 000	2009
Sudan	Design	Port Soudan	Red Sea	150 000	2012
Nigeria	Engineering	Amakpe	Eket, Akwa Ibom	6 000	2008
Asia					
China	Engineering	Sinopec	Yanshan, Beijing	160 000	2007
China	Engineering	PetroChina	Dushanzi, Xinjiang	80 000	2008
China	Construction	Sinopec	Qingdao, Shandong	200 000	2008
Vietnam	Engineering	PetroVietnam	Dung Quat, Quang	130 000	2009
CIS					
Kazakhstan	Engineering	AgipKCO	Kashagan	300 000	2008
Middle East					
Qatar	Design	QGPC	Al-Shaheen	250 000	2011
Qatar	Engineering	QGPC	Ras Laffan	146 000	2008
Saudi Arabia	Design	Aramco	Jubail 2	400 000	2011
Yemen	Engineering	RIRC	Ras Issa	60 000	2009
Europe OECD					
Germany	Engineering	Bayernoil	Vohburg/Ingolstadt/Neustadt	8 500	2008
Spain	Design	Repsol-YPF	Cartagena, Murcia	110 000	2010
North America					
Canada	Design	Husky	Husky Lloydminster	80 000	2010
Canada	Construction	OPTI Canada	Long Lake, Fort McMurray	72 000	2008
Canada	Construction	CNRL	Horizon, Fort McMurray	135 000	2009
Canada	Construction	Shell	AOSP Scotford	90 000	2010
Mexico	Engineering	Pemex	Minatitlan, Veracruz	143 000	2008
United States	Engineering	Wynnewood	Wynnewood, Oklahoma	15 000	2007
United States	Engineering	Sunoco	Toledo, Ohio	20 000	2007
Total				2 685 500	

Source: IFP

Figure 27: New refineries by region. Phase 2: design-engineering–construction (Million bbl/d)
2006-2007-2008



Source: IFP

▪ The **extension** projects in phase 2 represent a distillation capacity of 0.65 Mb/d for 13 projects or a net decrease with respect to the preceding year with a volume of 1.8 Mb/d for 28 projects (Table 12). All of the regions had declines, with Africa being least affected with only a small decrease. For the second consecutive year, Asia remains the most active zone despite a decrease of close to 45% in this type of project. Among these 13 projects, 3 are currently in the construction phase (85,000 Mb/d), all in Asia, 9 others in the engineering phase.

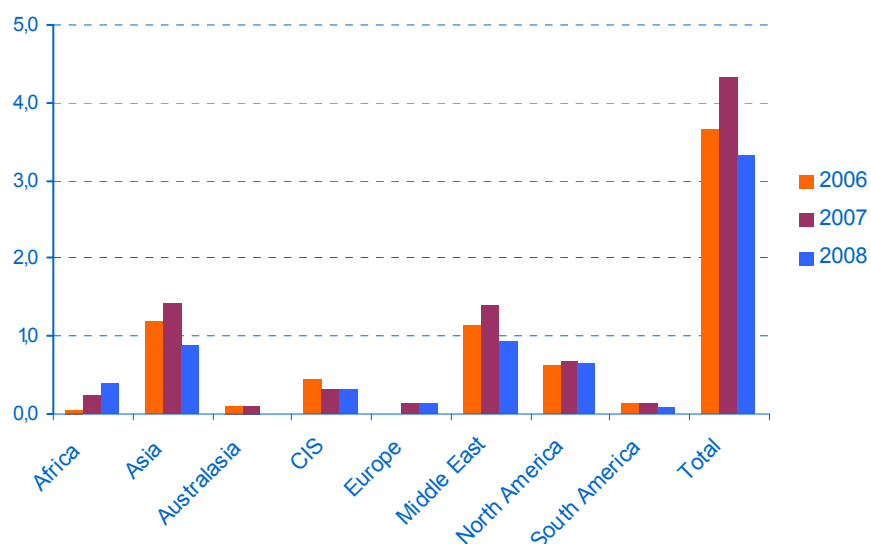
Table 12: Extensions of refineries – Distillation capacities - Phase 2: Design, Engineering, Construction

Region/Country	Status	Company	Location	Capacity bbl/d	Start
Africa					
Morocco	Engineering	Samir	Mohammedia	83 500	2008
Cameroon	Engineering	Sonara		18 000	2010
Asia					
China	Engineering	Sinopec	Quanzhou (Xiaocuo), Fujian	160 000	2008
India	Construction	HPCL	Mumbai, Mahul, Bombay	48 000	2007
India	Construction	HPCL	Visakhapatnam, Andhra Pradesh	17 000	2007
Thailand	Engineering	Thai Oil	Sriracha	50 000	2007
Pakistan	Construction	Attock	Rawalpindi	20 000	2007
Middle East					
Saudi Arabia	Engineering	PetroRabigh	Rabigh	80 000	2009
Europe non-OECD					
Romania	Engineering	Rompetrol	Midia, Constanta	10 000	2008
North America					
Canada	Engineering	Valero Energy Corp.	St. Romuald, Quebec	50 000	2011
United States	Engineering	Sunoco	Philadelphia	25 000	2007
United States	Engineering	Holly Corp Refinig & Construction	Woods Cross, Utah	5 000	2008
South America					
Venezuela	Design	PDVSA	Puerto La Cruz	80 000	2010
Total				646 500	

Source: IFP

In 2008 according to the information gathered, investments in distillation capacity seem to be oriented more to new refinery projects than to extensions of existing facilities. The latter accounted for one one-fifth of the projects in 2008 whereas in 2007 they represented 42% and in 2006, 43%.

*Figure 28: New refineries and extensions of distillation capacities by region.
Phase 2: design, engineering, construction (Million bbl/d)
2006-2007-2008*



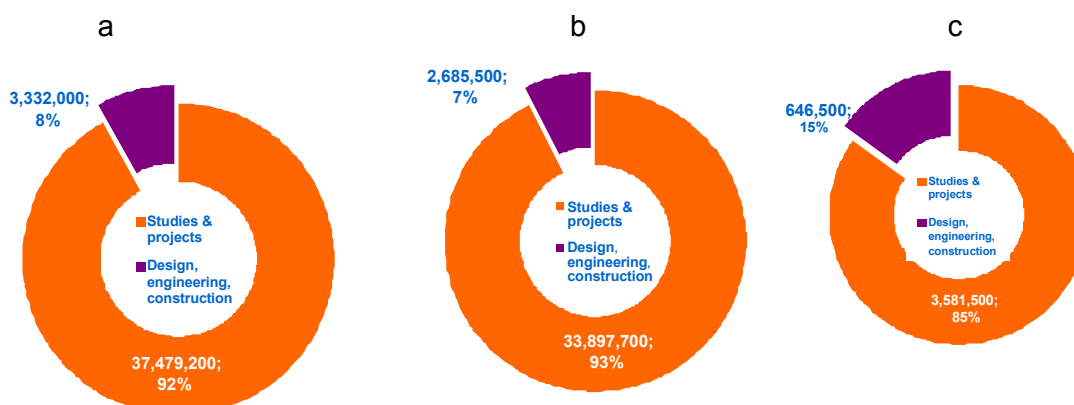
Source: IFP

All of the projects in phase 2 -new refineries and extensions of distillation capacities- after having increased by 18% between 2006 and 2007 from 3.7 Mb/d to 4.3 Mb/d, declined in 2008 to 3.3 Mb/d. The Middle East, Asia and to a lesser extent North America are the main zones of investment (Figure 30).

➤ New capacities could be added in the future if certain programs, which are still in the **preliminary design or inception** stage, manage to develop (phase 1). A real explosion of announcements of projects around the world has occurred since 2007. It is very likely that the majority of them will never come to pass, particularly since the start of the financial crisis.

All of the projects together, whether in phase 1 or 2, represent 40.8 Mb/d (Figure 31/a). The projects in phase 1 represent a total of 37.5 Mb/d of additional capacity, or 92% of the total of the projects currently inventoried. In the **new refinery** projects, the projects in phase 1 represented 33.9 Mb/d or 93% of the total for the new refinery projects currently inventoried. All of the projects in all phases taken together represent 36.6 Mb/d (Figure 31 /b). The total capacity of the projects for extension of **existing facilities** currently inventoried is 4.2 Mb/d, taking into account the projects in phase 1 which total 3.6 Mb/d or 85 % of the extension projects (Figure 31 /c).

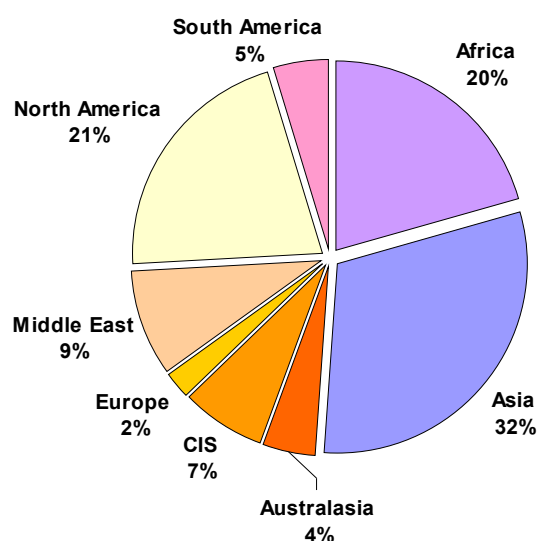
Figure 29: New refineries and extension by development phase - worldwide
 -a- New refineries and extensions - Phase 1 and 2: (40 811 000 b/d)
 -b- New refineries - Phase 1 and 2: (36 583 200 b/d)
 -c- Extensions of refineries - Phase 1 and 2: (4 228 000 b/d)



Note: Phase 1: studies and projects
 Phase 2: design, engineering, construction

The regions most cited in phase 1 are Asia (32% of projects), North America (21%), and Africa (20%). In Africa, more than in other regions, it seems unlikely that these projects will one day be carried out. The financial problems and regional instability on the continent are not factors that favor investment. Furthermore, the projects announced often seem out of proportion with respect to the growth of demand (a refining capacity estimated including the projects at 10.8 Mb/d in 2013 (7.5 Mb/d of increase in capacities between 2008 and 2013 + 3.3 Mb/d of current capacity) compared with consumption that should be between 3.2 and 3.3 Mb/d in 2013 according to the IEA). The Middle East, which had 16% of these types of projects in 2007, now has only 9% (Figure 32).

Figure 30: New refineries and extensions of distillation capacities by region in 2008: Phase 1: Pre-studies, Projects



Source: IFP

Of the 32% of the projects in phase 1 that involve Asia in the world, one third are in India and this includes both new refinery projects and projects to increase capacities. China follows with 22% of the projects planned. Between the two of them, these countries account for more than half of the announcements of distillation projects.

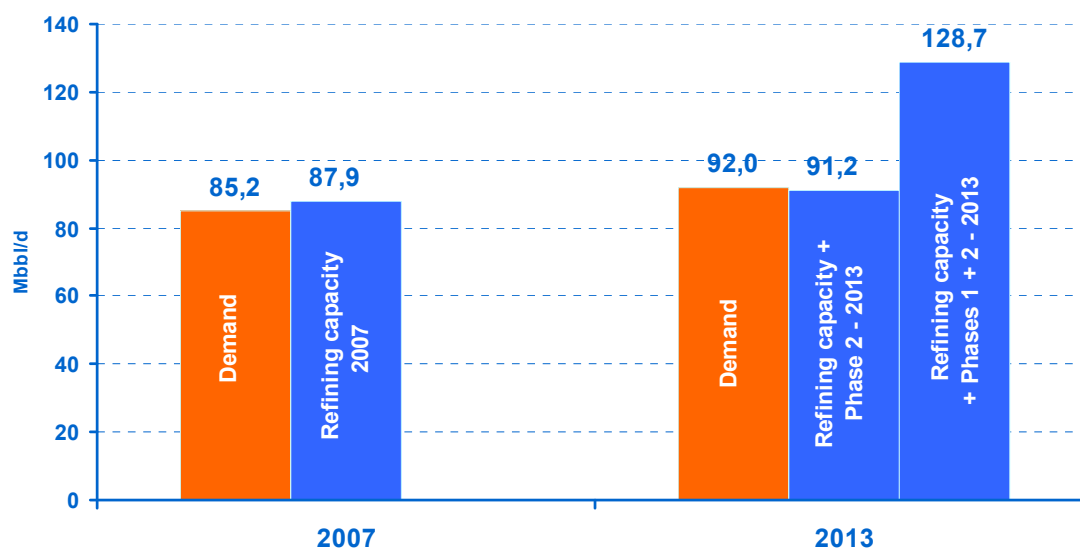
While Canada has 70% of the new refinery projects in North America, the United States has almost all of the projects for adding new capacity. The constraints on capacities and the improvements in margins led American refiners to reinvest in refining over the past few years, favoring the development of projects in existing units rather than the construction of new refineries. In 2008, the announcement of new factories was something of a breakthrough in that one quarter of the projects announced in North America were in the United States: we also note the plan for a new 400,000 b/d refinery by Hyperion Resources to process heavy Canadian crude. This plan is proceeding. A favorable ruling from the local authorities has just been received. Despite the difficulties – stricter environmental requirements – the work could begin in 2010 for commissioning in 2015. But the economic situation has deteriorated considerably since the time of these announcements. The fall in margins this year (figure 26) due to the slowing of demand could lead to reconsideration in continuing the project, at least momentarily. We will find out in the months ahead. But it is certain that the tension situation in American refining will continue for several more years.

In the Middle East, there are relatively few projects in Phase 1 (9%) with respect to the other regions cited above (3.5 Mb/d almost all of which is for new refinery projects). This region is however very present in the most advanced projects (phase 2). This zone is characterized by fewer announcements and more projects actually completed.

3.7 Demand for oil products and future projects

Considering only the projects in Phase 2, close to 3.3 Mb/d of additional capacity could be commissioned between now and 2013 (projects for new refineries and extension of existing refineries). The world refining capacity should then increase by 3.8% between 2007 and 2013, from 87.9 Mb/d to 91.2 MB/d. **Oil demand**, evaluated at 85.2 Mb/d in 2007, should increase by 8% between 2007 and 2013, according to the last reference scenario of the IEA (WEO 2008), and reach 92.0 Mb/d at the end of the period (Figure 33). A deficit of 0.8 Mb/d could then appear. The tensions are likely to continue in the future, especially since the capacity of engineering firms to take on additional projects is not guaranteed.

Figure 31: Incremental demand and projects between 2007 and 2013 - New refineries and extensions by development phase



Source: IFP, IEA World Energy Outlook 2008

By way of illustration, we can specify that, taking into account all of the projects –phases 1 and 2- the refining capacity in 2013 will have risen to 130 Mb/d. A greater effort is necessary in order to draw further on the prolific reservoir of announced projects.

The new capacities that will come on line in the years to come must be able to process heavier crude and produce lighter and lighter products. The investments must include **conversion** projects – catalytic cracking, hydrocracking, visbreaking/thermal cracking, coking - to meet this demand.

A great effort is now being made by the refiners in this area. After 2007, the first part of 2008 was also characterized by a large number of conversion projects. Table 13 describes the breakdown of the conversion projects by major zone in the world listed in phase 2. In 2008, all of these projects together represented 9.4 Mb/d of additional conversion capacity, or an increase of 115 % with respect to the preceding year.

The largest conversion projects inventoried in 2008 are found in Asia with a planned capacity of 4.0 Mb/d (42%), followed by the Middle East with 2.0 Mb/d (22%) and North America with 1.3 Mb/d (14%). These three major zones account for 78 % of the conversion projects in the world with 7.3 Mb/d.

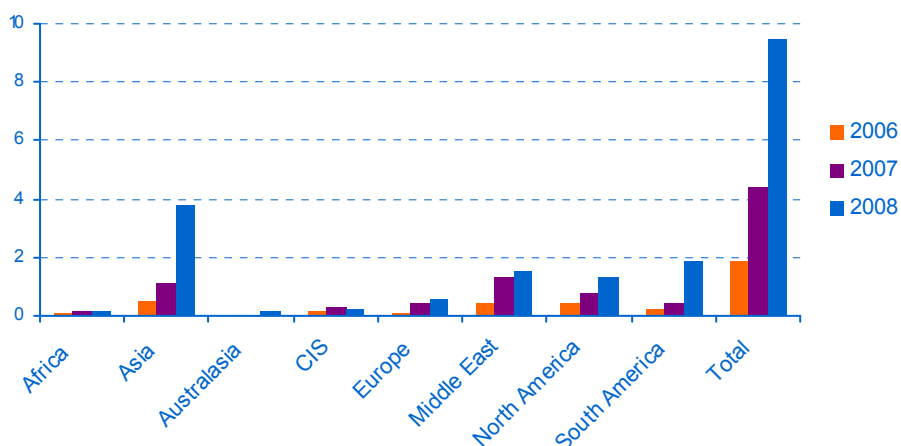
Table 13: Conversion projects by region - Phase 2: Design, Engineering, Construction

Region	Status	Capacity b/d
Africa	Design	-
	Engineering	13 600
	Construction	95 500
Asia	Design	947 000
	Engineering	2 407 345
	Construction	446 000
Australasia	Design	120 000
CIS	Design	100 000
	Engineering	107 000
Europe	Design	219 000
	Engineering	260 800
	Construction	88 000
Middle East	Design	792 000
	Engineering	626 725
	Construction	65 000
North America	Design	346 000
	Engineering	422 000
	Construction	521 000
South America	Design	1 173 000
	Engineering	647 389
	Construction	40 000
Total Regions		9 437 359

Source: IFP

Between 2006 and 2008, the projects for new conversion capacities were multiplied by five, from 1.8 Mb/d to 9.4 Mb/d inventoried recently (Figure 34). The most spectacular progression was in Asia, where the projects more than tripled the conversion volumes.

Figure 32: Conversion projects by region - Phase 2: design, engineering, construction (Million bbl/d)



Source: IFP

Over the whole period in question (2008-2013), 27 Mb/d were announced in phase 1 and 2 (Figure 35) including 82% planned in the next for years.

In conclusion...

New developments in distillation and conversion projects reveal a mainstream trend: investment is shifting away from the areas that have historically been the most active, the OECD countries, towards the emerging countries of Asia and the Middle East, in line with the trend in oil demand.

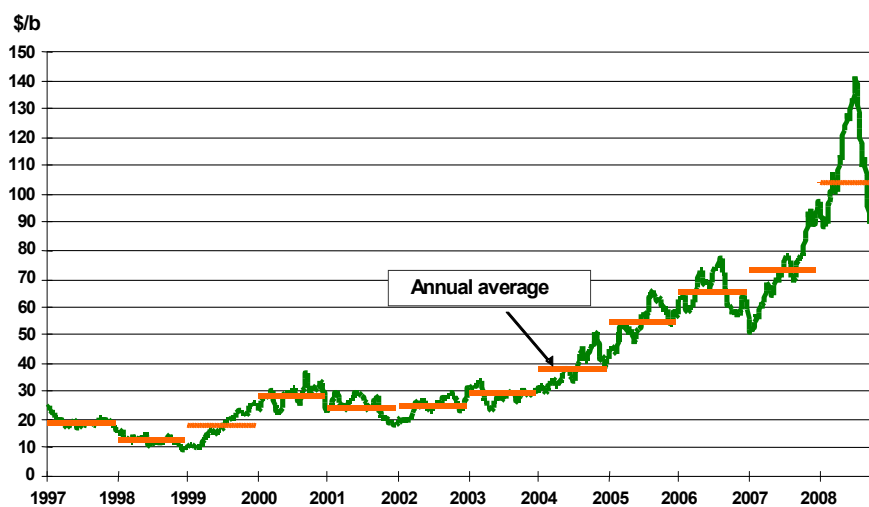
Looking exclusively at Phase 2 projects (i.e. in the design, engineering or construction phase), 2008 showed that more effort was devoted to the implementation of conversion projects. In contrast, the effort to expand distillation capacity seemed to be insufficient and was even slowing. These Phase 2 projects would simply postpone the emergence of new tensions between supply and demand until 2013.

Despite a growing need for spending to boost capacity and cover demand, planned investment in new refining and conversion capacity will see a net slowdown in 2009 due to the severe deterioration of the economic conjuncture. Demand and margins are not headed in the right direction. The profitability of refining operations is not certain. Moreover, the smaller and more vulnerable companies will certainly be affected by the credit crunch. In other words, not only are business prospects gloomy, but finding sources of financing will become problematical.

By way of an illustration, it was recently announced that the award of construction tenders for the Jubail refinery and petrochemicals project (400,000 bbl/d), a joint venture formed by Total and Saudi Aramco, will be delayed by at least three months. It was noted that conditions had changed and that recent events—the financial and economic crisis and its impact on the oil market—had to be taken into account. This announcement followed a decision by ConocoPhillips and Saudi Aramco to delay the bidding process for construction of a joint venture refinery at Yanbu (400,000 bbl/d) by several months, because of the uncertainty on the financial market. The chairman and chief executive officer of the U.S. oil major remained optimistic: "We believe that this short delay will allow the markets to adjust from the current uncertainties and provide a stronger basis for the long-term success of the refinery." One can only hope that the delay will indeed be short.

<h1>STATISTICAL APPENDIX</h1>

Fig A 1: Evolution of oil prices as of October 14, 2008*

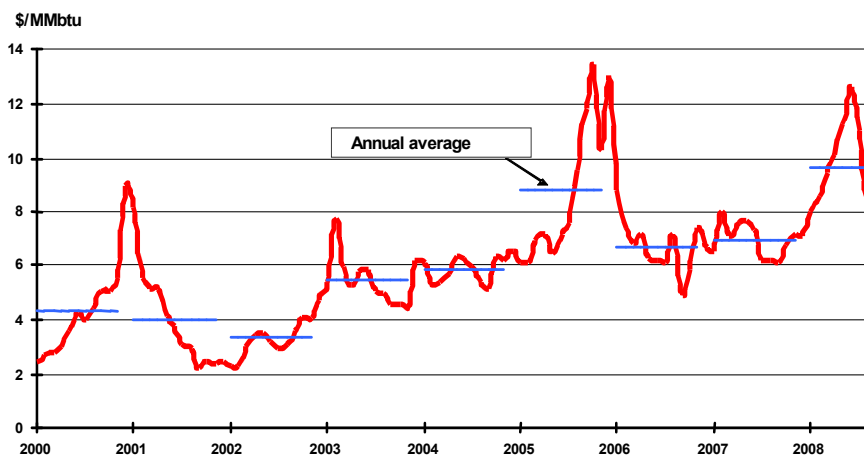


* Brent, Rotterdam quote

Source: Platt's

IFP/Economic Studies Department/2008

Fig A 2: Evolution of Henry Hub gas prices – in current dollars



Source: Platt's

IFP/Economic Studies Department/2008

Fig A 3: Variation of oil demand

in Mbbl/d	Var 2007/2006	Var 2008/2007	Var 2009/2008
OECD	-0.4	-1.1	-0.6
CIS	0.0	0.1	0.2
Rest of the world	1.4	1.4	1.1
Of which China	0.3	0.5	0.4
World	1.0	0.4	0.7

Source: IEA octobre 2008

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Fig A 4: World investments in exploration - production

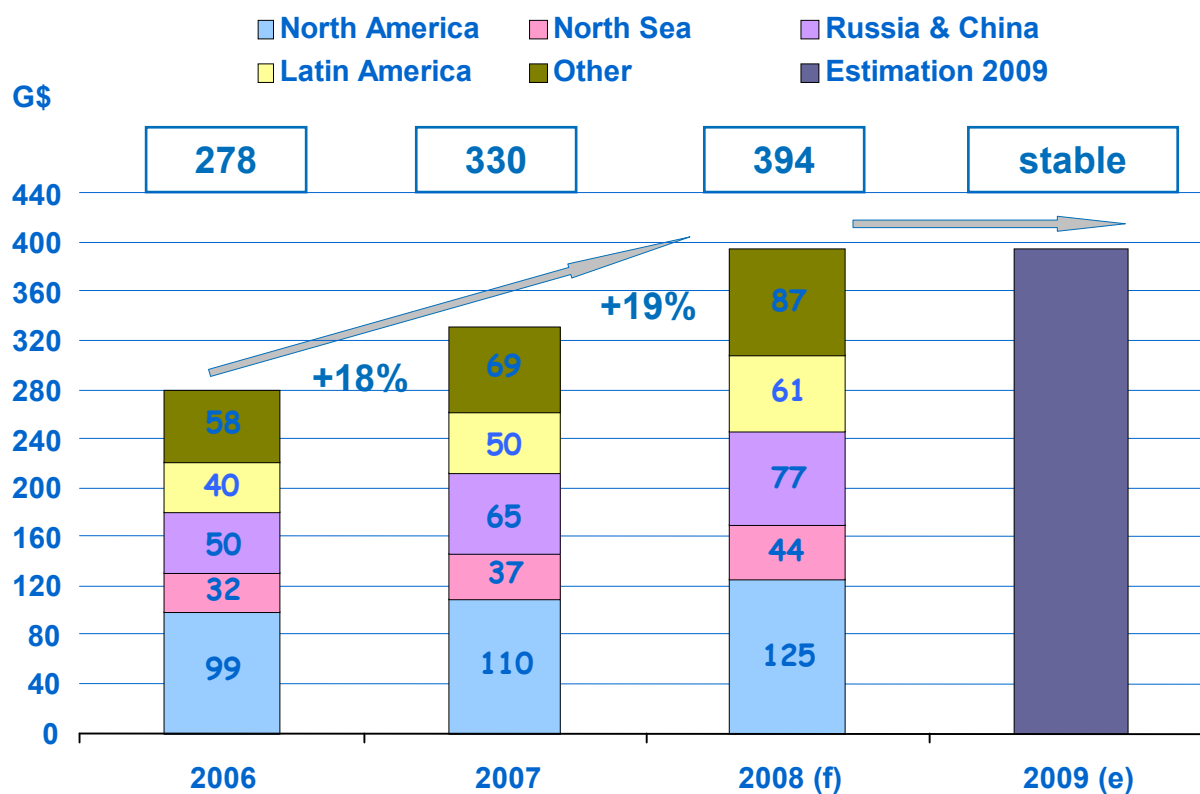
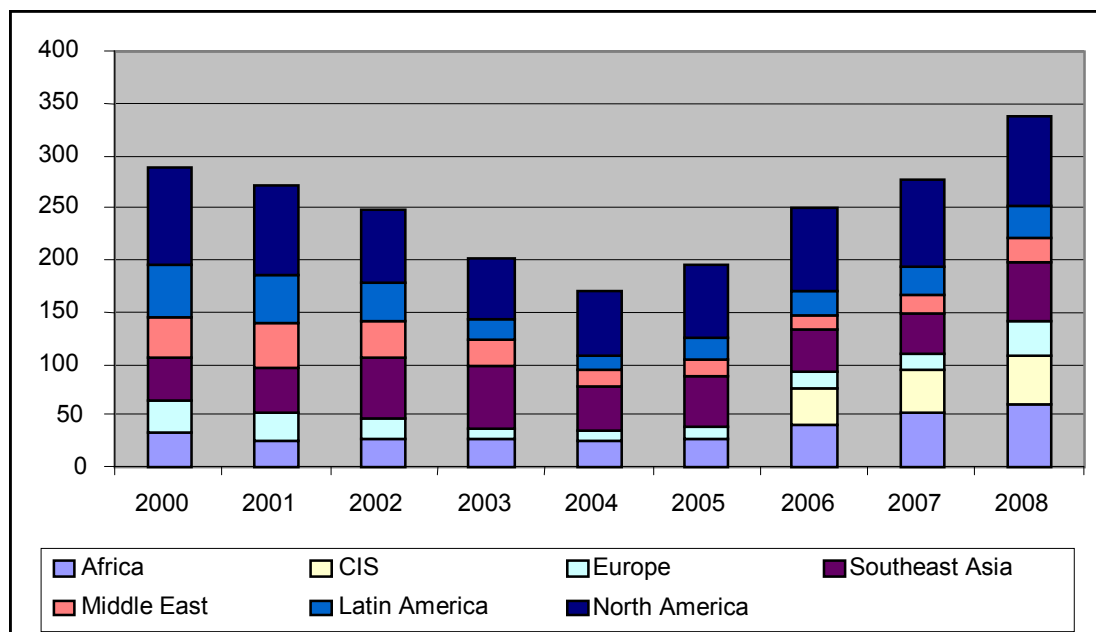
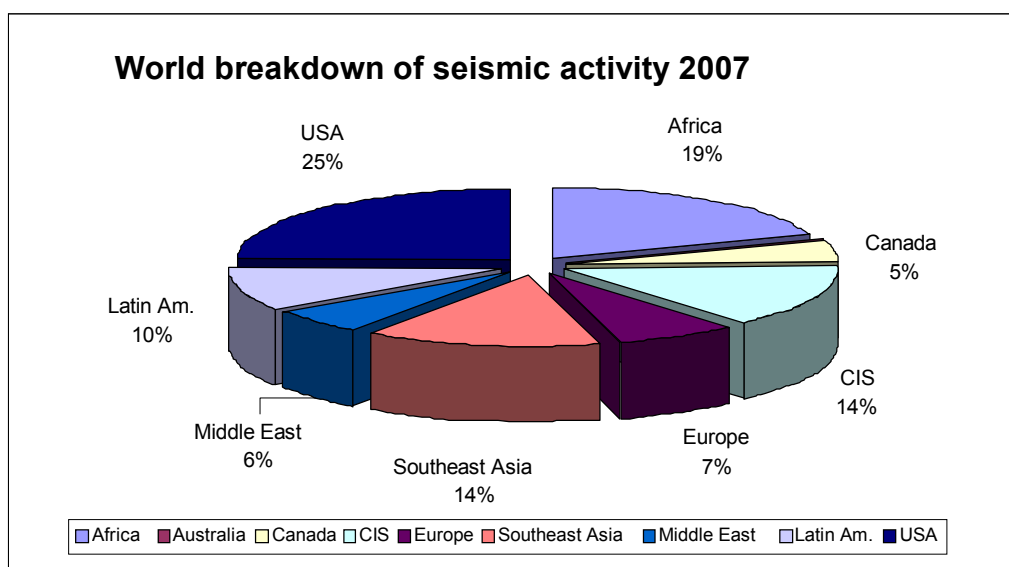


Fig A 5: Number of seismic teams in activity in the world



Source: IHS Energy, partial breakdown of seismic teams active for India, China and Russia.

Fig A 6: Geographic breakdown of seismic activity 2007



Source: IHS Energy, IFP

Fig A 7: Seismic market

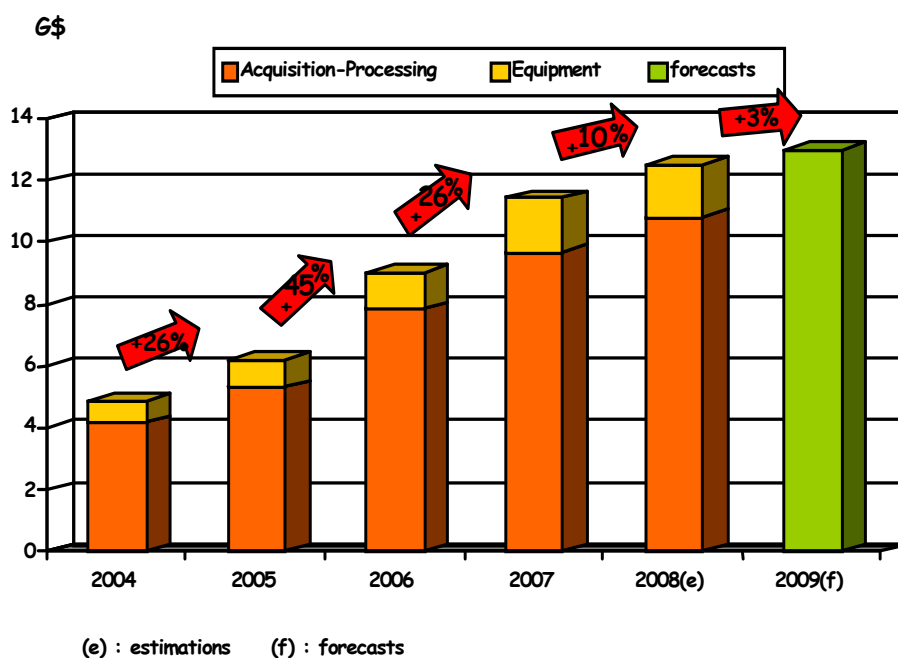
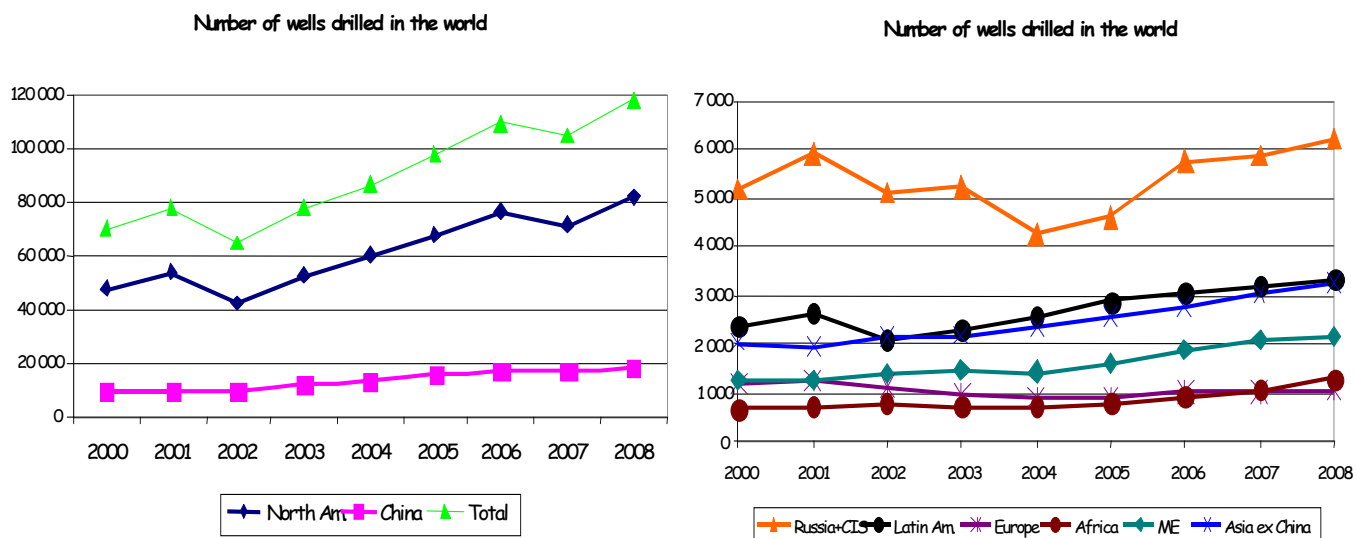
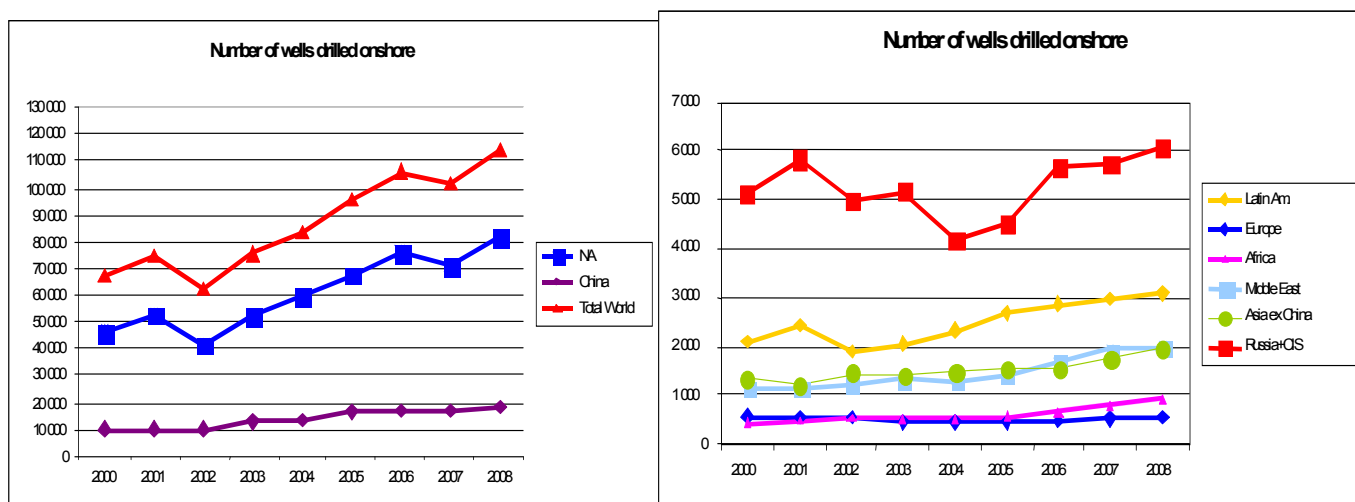


Fig A 8: Total number of wells drilled in the world



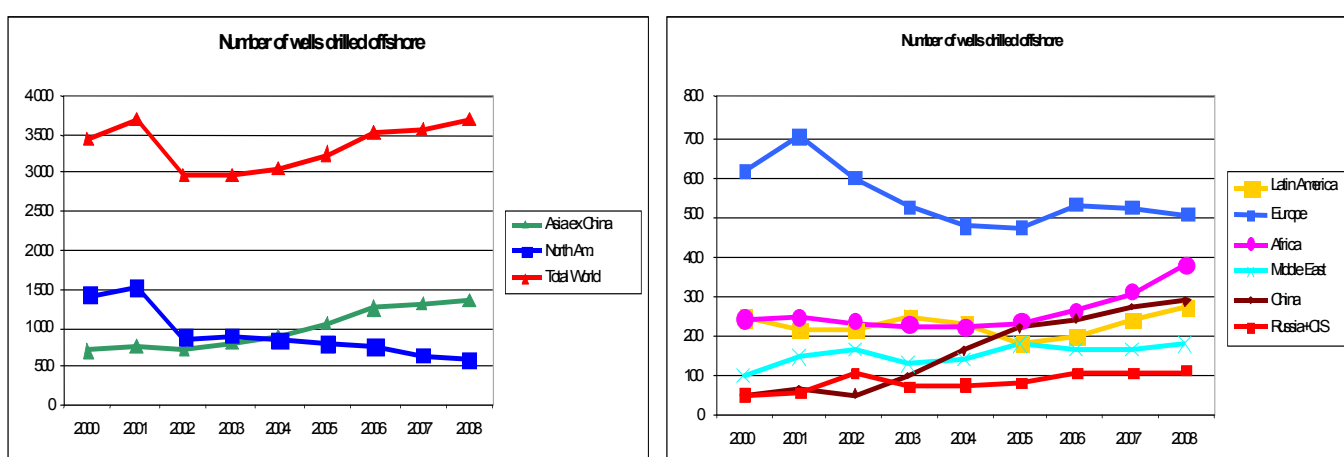
Source IHS Energy, Spears & Associates, AEUB

Fig A 9: Number of wells drilled onshore:



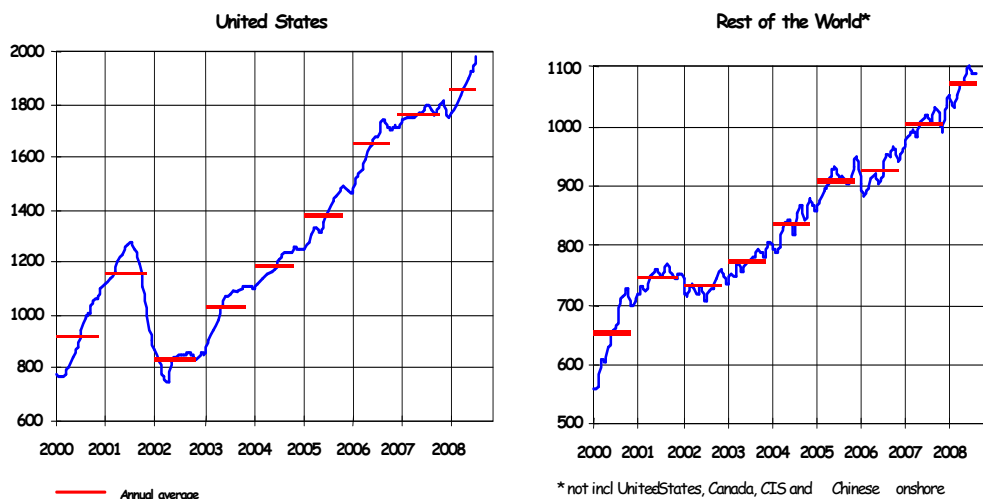
Source IHS Energy , Spears & Associates , AELB

Fig A 10: Number of wells drilled offshore



Source IHS Energy , Spears & Associates , AELB

Fig A 11: Number of drilling units in activity in the world

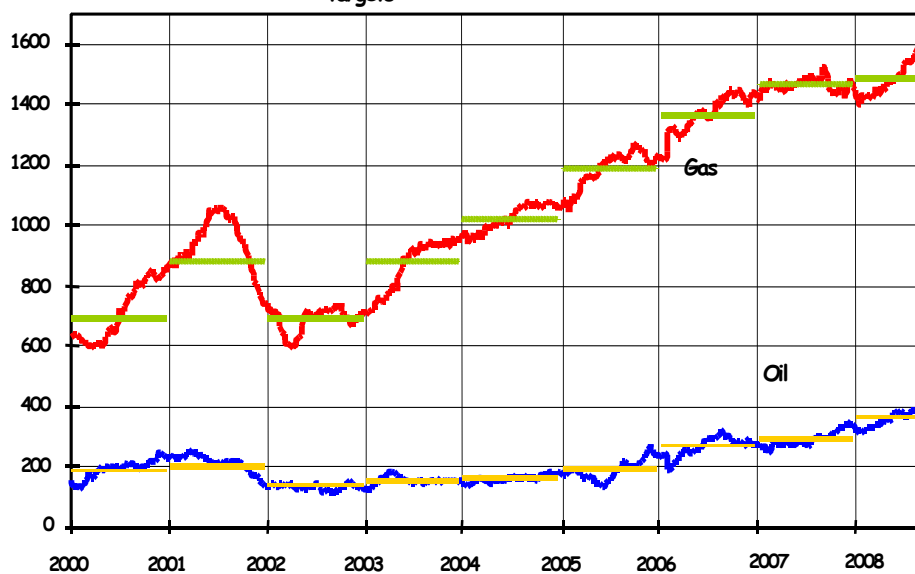


Source : Baker Hughes Rig Count

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Fig A 12: Drilling activity in the United States

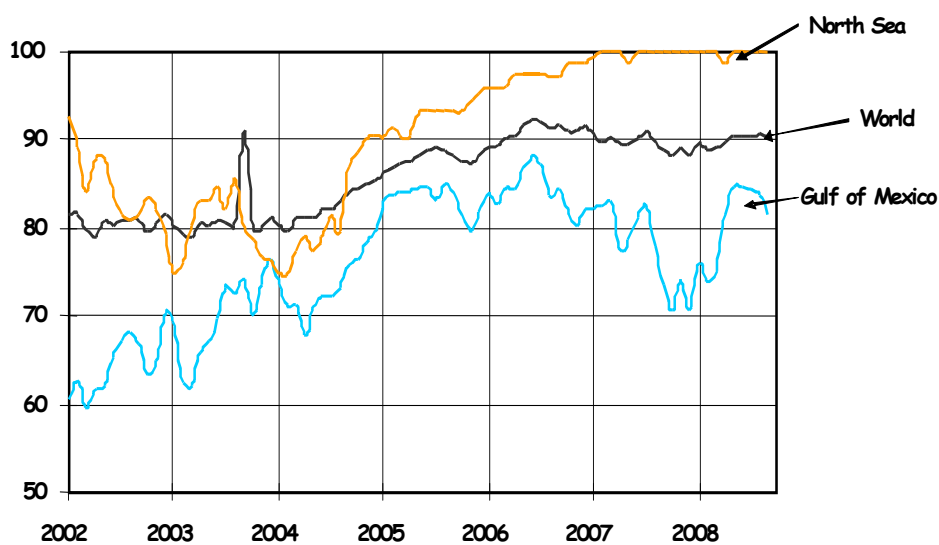
Number of rigs active on gas or oil targets



Source: Baker Hughes Rig Count

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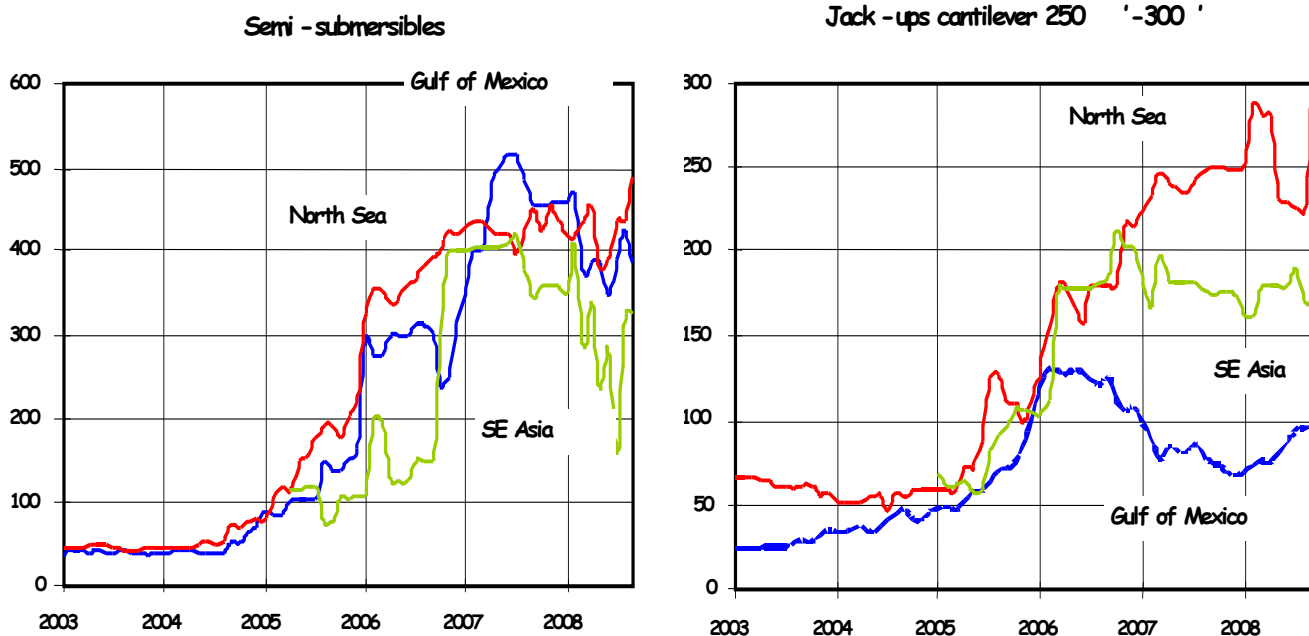
Fig A 13: Rate of use of drilling platforms offshore



Source: Offshore Rig Locator

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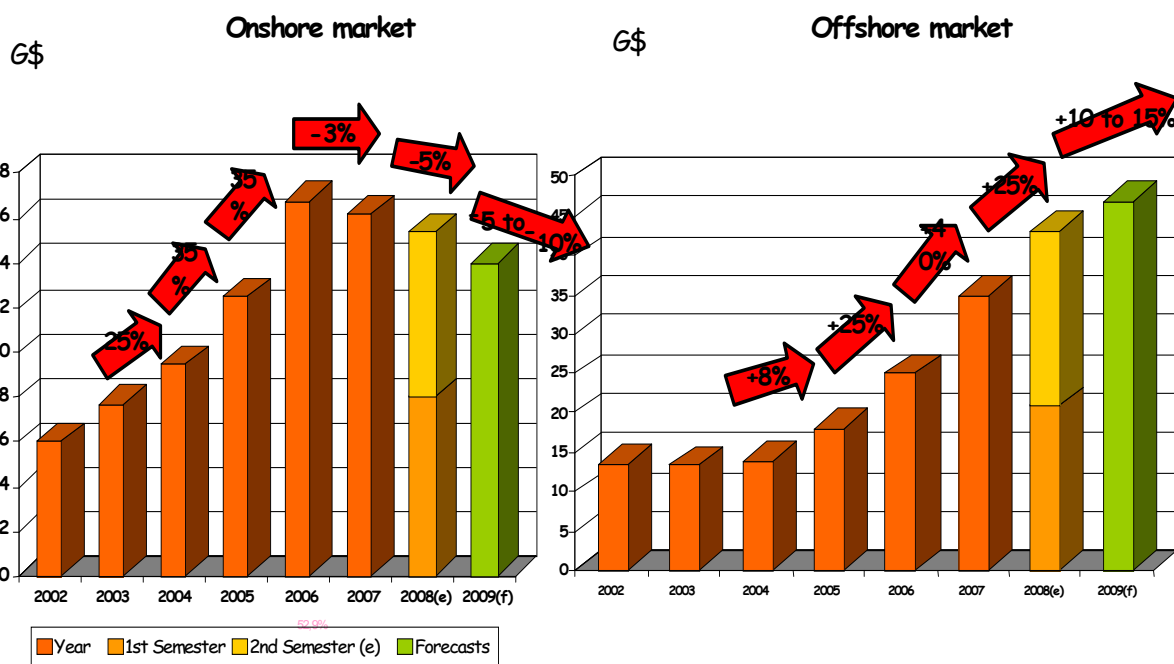
**Fig A 14: Rental prices for drilling platforms offshore
(in thousands of US dollars per day)**



Source: Offshore Rig Locator

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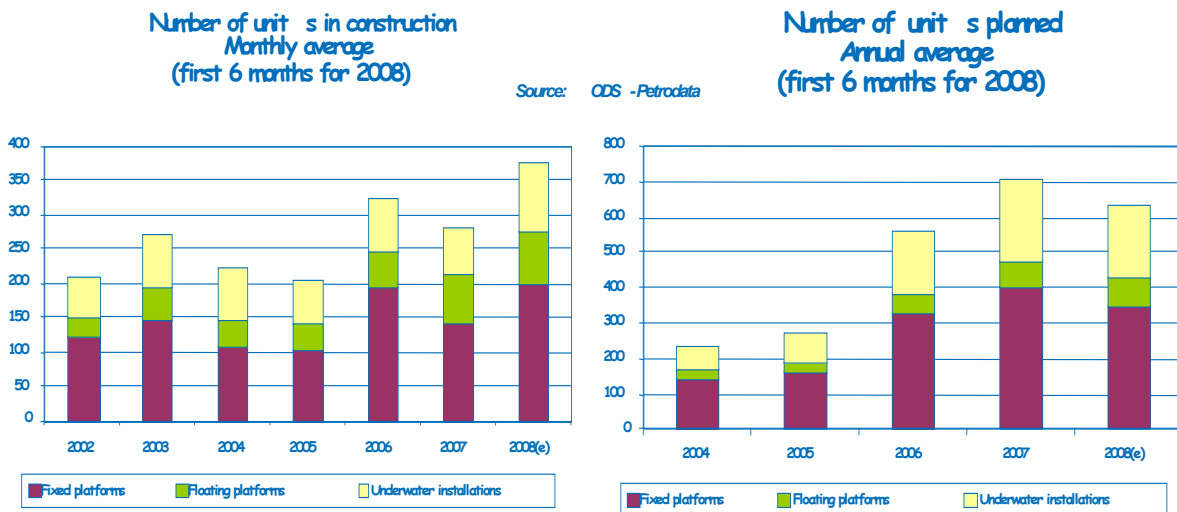
Fig A 15: Drilling market



Source : IFP (e) : estimations (f) : forecasts

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Fig A 16: Offshore construction and projects



Source: ODS - Petrodata

In 2008:
 +30% of constructions and offshore equipment
 • +40% for fixed and subsea platforms
 • +10% for floating platforms

In 2008:
 Overall drop of 10% in projects planned
 • -10% for fixed and subsea platforms
 • +10% for floating platforms

in 2008,



Fig A 17: Market for offshore engineering, equipment and construction

\$billions

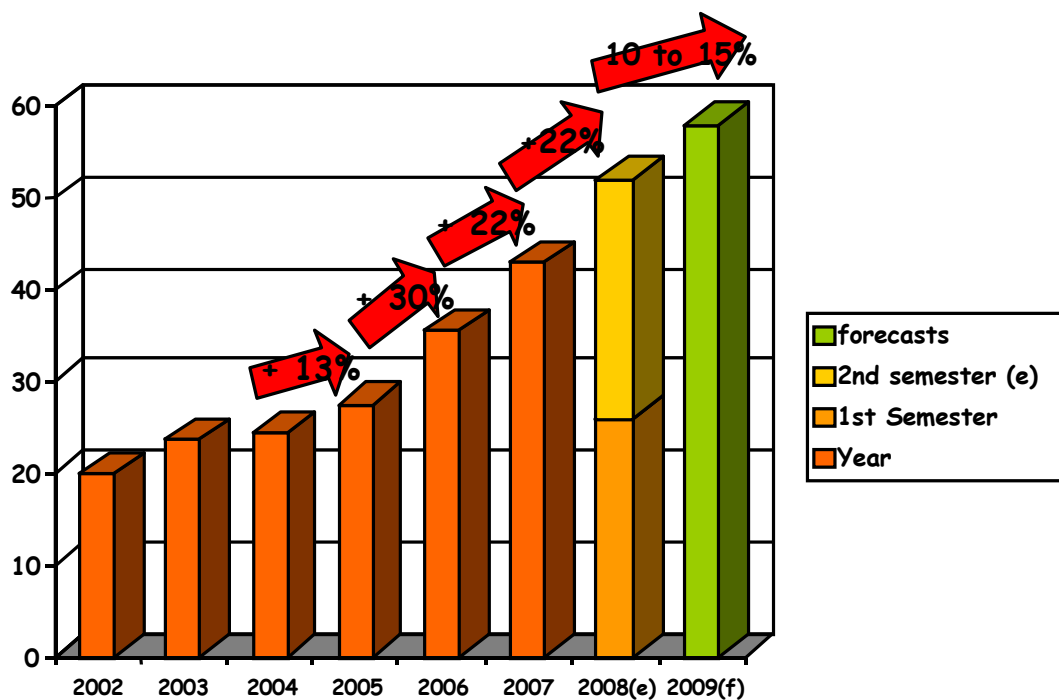


Fig A 18: Oil demand and refining capacities - Worldwide

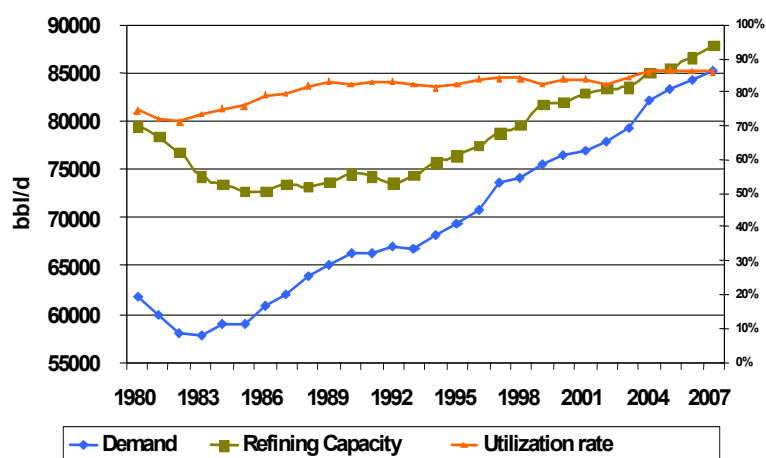


Fig A 19: Oil demand and refining capacities – United States

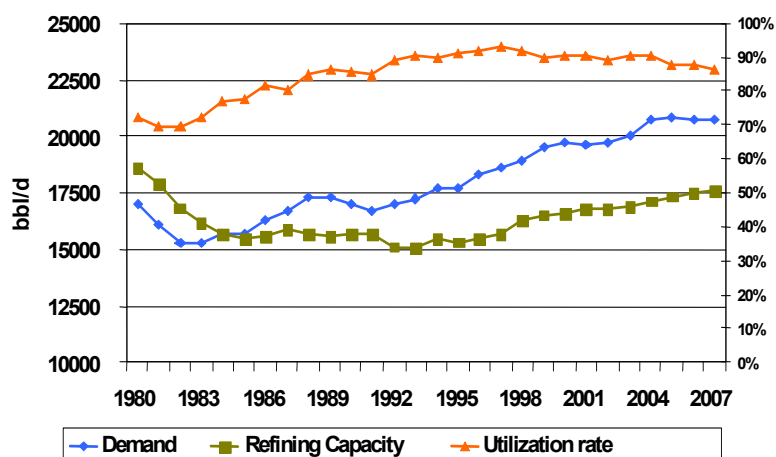


Fig A 20: Oil demand and refining capacities - Europe

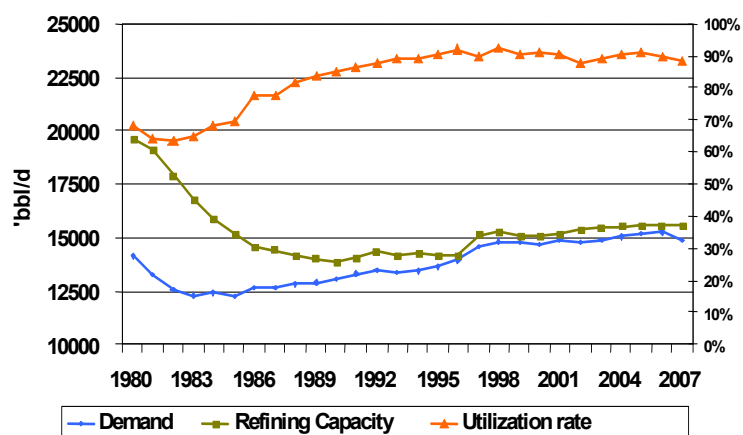


Fig A 21: Oil demand and refining capacities – Asia-Pacific

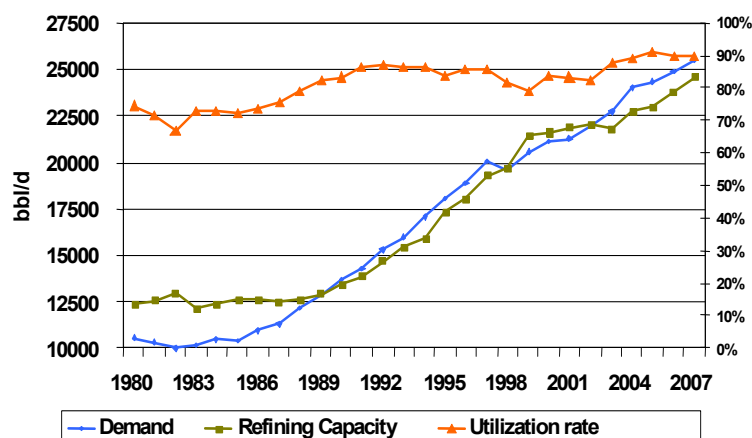


Fig A 22: Evolution of the complex refining margin - monthly average

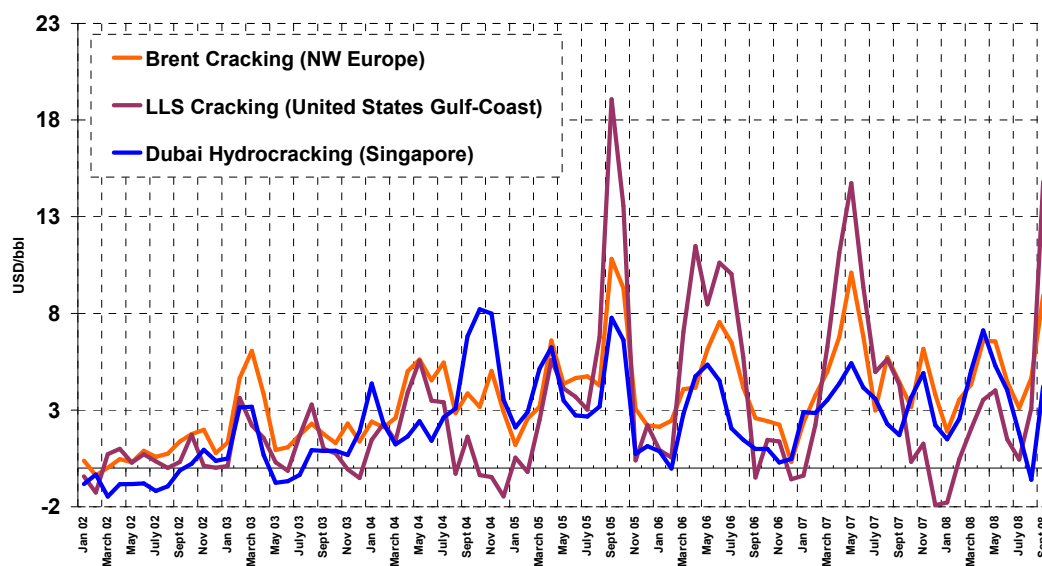
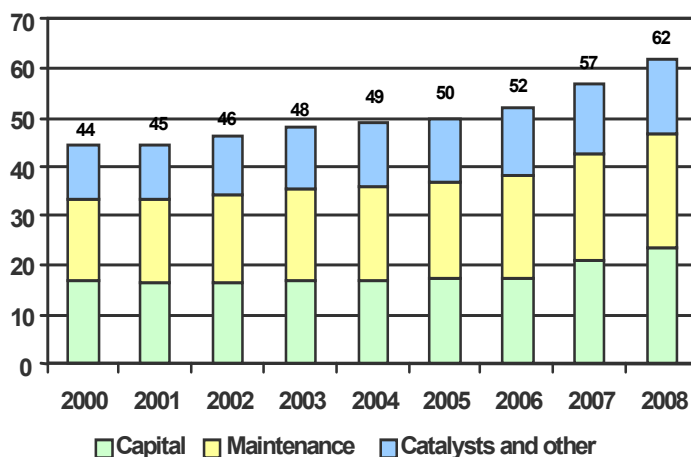


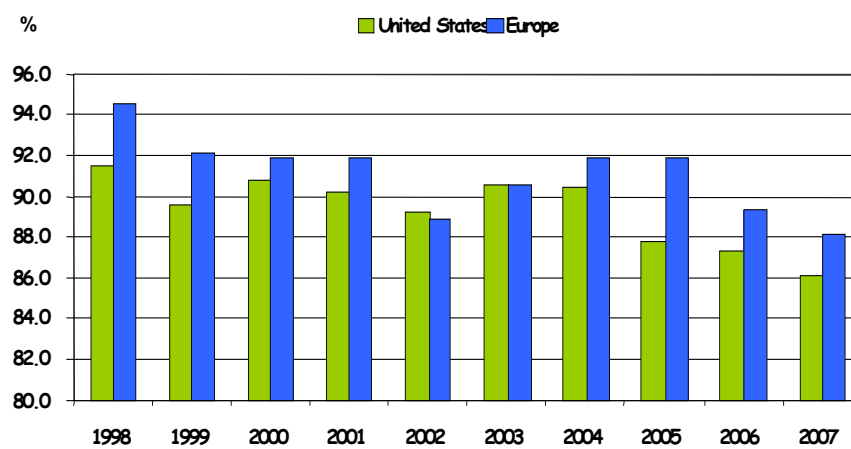
Fig A 23: Investments in refining (in billions of USD)



Source : IFP according to ~~market~~ data

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Fig A 24: Utilization rates of refining capacities



Source: BP Statistical Review of World Energy

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