

## Refining

Investment rallied in 2007, and many distillation and conversion projects likely to reach the industrial stage were announced. With economic growth sustained in 2006 and still pronounced in 2007, oil demand remained strong – especially in emerging countries – and refining margins stayed high. Despite these favorable business conditions, tensions persisted in the refining sector, which has fallen far behind in terms of investing in refinery capacity. It will take renewed efforts over a long period to catch up. Looking at recent events that have affected the economy in many countries (e.g. the subprime crisis), prudence remains advisable.

### Business environment

In 2006, economic growth remained firm. World GDP grew by 5.4% in 2006, up 0.6 point over 2005. The fast-growth cycle that started in 2002 was still underway in 2006.

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

	2004	2005	2006	2007 (f)	2008 (f)
World	5.3	4.8	5.4	5.2	4.8
United States	3.6	3.1	2.9	1.9	1.9
European Union	2.7	2.0	3.2	3.0	2.5
China	10.1	10.4	11.1	11.5	10.0
India	7.9	9.0	9.7	8.9	8.4

(f): forecast  
Source: IMF

Although growth slackened a bit, the cycle continued in 2007, fueled mainly by the European Union among the industrialized countries and by China and India among the emerging countries. The latest forecasts see a downturn in world growth, owing to a net slowdown in growth in the United States (down from 2.9% in 2006 to 1.9% in 2007) caused mainly by the subprime mortgage crisis that started last summer.

Forecasts for 2008 estimate that GDP will be 4.8%, lower than in 2007. It is not yet known precisely what the consequences of the subprime crisis will be. According to the IMF, the world growth forecast could be revised downwards in the next few months.

### Oil market trends

Since the late 1990s, the oil market has been heavily influenced by a steady increase in the price per barrel.

After breaking its August 2006 record, the WTI exceeded the USD 90/bbl mark in November 2007, nearing the symbolic threshold of USD 100/bbl.

In fact, there is a real, persistent lack of convergence between supply and demand. Demand for energy, especially hydrocarbons, continues to climb at a sustained pace while supply is struggling to keep up, for reasons that are geological and political.

In 2006, world oil demand grew moderately, slowing in North America and Europe. China, the Middle East and the CIS countries are maintaining pressure on demand. The IEA forecast for 2007 sees a measured rally, again fueled by China and the Middle East. A gradual recovery is expected in North America whereas Europe should see a drop in demand.

The world oil supply should increase at a slower rate in 2006, with an additional 0.7 Mbbl/d, which is approximately equivalent to the increase in demand.

Table 2  
Petroleum products: world demand, supply and stock variations  
(in Mbbl/d)

	2004	2005	2006	2007 (f)	2008 (f)
World demand	82.5	83.9	84.7	85.7	87.7
Variation [n - (n-1)]	+3.3	+1.4	+0.8	+1.0	+2.0
World supply	83.3	84.6	85.3	85.2*	-
Variation [n - (n-1)]	+3.4	+1.3	+0.7	-	-
Stock variations	+0.8	+0.7	+0.6	-	-

(f): forecast  
\*Average for the first two quarters  
Source: Oil Market Report (IEA)

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In the medium term, the crude market should continue to be tight. The forecasts for demand in 2008 are relatively high, so there is a risk that the prices of petroleum products will continue to climb.

In the short term, the factors causing high price volatility will probably continue to do so and sharp fluctuations are to be expected. The factors are:

- Recurring incidents in the refining sector. Throughout 2007, one technical problem after another occurred at refineries, especially in the United States. Crude stocks reached all-time highs in North America;
- The weather conditions: cyclonic activity and mild winter temperatures;
- OPEC policy. OPEC's strategy, or rather the balance of power between competing strategies within the organization, is the largest source of structural uncertainty on the oil market;
- Economic growth and the subprime crisis in the U.S. The latter revealed the vulnerability of economic growth.

Although investment is showing a perceptible recovery evidenced by the announcement of many projects, there is still considerable pressure on refinery infrastructure. Apparently, the firm projects will not suffice to cover the increase in demand. The fact that refining infrastructure is still "out of synch" with demand continues to exert pressure on the price of petroleum products.

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### Overall trends

The economic performance of the refining sector was reasonable in 2006. Refining margins were down compared to the previous year but high nevertheless. Tension between supply and demand persisted despite an improvement in 2006, thanks to investments made in the Asia-Pacific region, the Middle East and, to a lesser extent, North America. The risk persisted of acute temporary tensions in the event of an unplanned decrease in available capacity.

Business conditions favored an increase in sectoral investments. This led to:

- A slight rally in projects to expand distillation capacity at existing installations;
- An increase in projects likely to be carried out (i.e. reach Phase 2), especially at new refineries;
- An increase in conversion projects.

The three regions of the world most active in developing future capacity are Asia, the Middle East and North

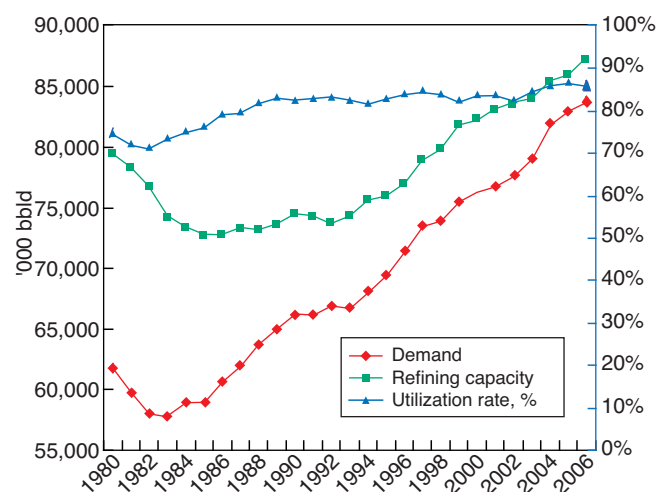
America. The first two are planning projects in all categories, while the latter is concentrating on development at existing installations.

This trend should help relieve tension on the refining market in the years to come.

### Refining capacity up slightly

In 2006, world refining capacity stood at 87.2 Mbbl/d, i.e. an increase in capacity of 1.3 Mbbl/d, following an increase of 0.6 Mbbl/d in 2005. In 2006, there was a slight relaxation of pressures on refining capacity: overcapacity went up from 2.8 Mbbl/d in 2005 to 3.5 Mbbl/d in 2006. The reason was that demand increased at a lower rate (+0.8%) and refining capacity was up (+1.5%). After rising for three years straight, the world refinery utilization rate dipped slightly to 85.8% in 2006 (Figure 1).

Fig. 1 - Oil demand and refining capacity worldwide



Source: IFP based on data from BP Statistical Review of World Energy 2007

In the United States, the deficit in refining capacity fell in 2006, like in 2005, dropping from 3.6 Mbbl/d in 2004 to 3.1 Mbbl/d in 2006. This did not happen because investment in new capacity recovered, but because a slowdown in demand coincided with a gradual increase in capacity as consequence of modernisation of existing equipment. In the U.S., the average refinery utilization rate decreased slightly in 2006 (87.3%), due to planned maintenance shutdowns and work yet to be completed after the hurricanes of 2005. These events in the United States had an adverse effect on the average world utilization rate.

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Europe showed a precarious balance in 2006, as refining saw its situation deteriorate and demand rose (+1%) after stabilizing in 2005. Refining capacity was up, but only barely. The utilization rate remained high at 89.4% but was down year on year (92%).

In the Asia-Pacific region, the upswing in demand was accompanied by an increase in refining capacity. The deficit has not been resorbed despite a large boost in capacity this year (+4.3%) and the fact that demand rose at a lower rate (+1.2%). However, the deficit was halved within twelve months: 0.645 Mbbl/d in 2006 versus 1.35 Mbbl/d in 2005.

In 2007, world demand is expected to rise slightly. The most active regions should be Africa (+6.9%), followed by China (+5.6%), the Middle East (+4.8%), and Latin America (+3.8%). North America should report low growth (+1.2%) while Europe and the CIS countries see demand drop by 1.2% and 2.4%, respectively.

Production capacity should grow as projects reach completion and new units (distillation and conversion) are placed in service. Judging by project status predictions, capacity should be up this year by nearly 0.53 Mbbl/d for distillation and by 0.67 Mbbl/d for conversion.

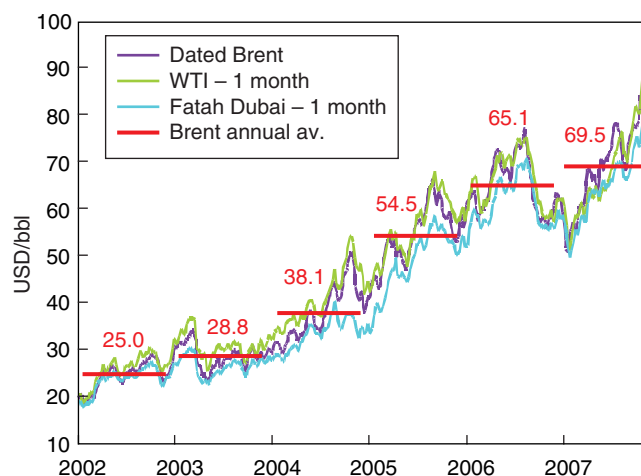
### Steeper price uptrend for crude and petroleum products

In 2006, the price of dated Brent in London and of WTI (1st month) in New York averaged USD 65.13 and 66.05 per barrel, respectively.

This trend persisted in 2007. Over the first eleven months of the year, the Brent price averaged USD 69.50 bbl and the WTI USD 68.95 bbl (Figure 2). Prices escalated sharply during the year: the Brent climbed from USD 57.73 (first quarter) to 81.73 (fourth quarter) and the WTI from USD 57.93 to 84.78.

Between 2004 and 2007, the Europe North West zone saw gasoline and diesel prices follow the uptrend for crude. The price spread between the Brent and petroleum products progressively widened. The differential between the price of fuel oil and those of Brent and light products, which had diverged significantly starting in 2004, remained stable in 2007.

Fig. 2 - Quotes for reference crudes



Source: Platt's

### Refining margins hit record highs

2005 was an outstanding year for margins, due largely to the fact that nearly 25% of U.S. capacity was forced to shut down as a consequence of hurricanes. In 2006, refining margins fell slightly: LLS Cracking dropped from USD 5.37 per barrel in 2005 to 5.21 in 2006, Brent Cracking from USD 4.98 per barrel to 4.04 (Table 3). Under the circumstances, 2006 was a very good year, especially if one takes a look at average margins for the last ten years: USD 2.74, 2.07 and 1.34 for Brent Cracking, LLS Cracking and Dubai Hydrocracking, respectively. The slowdown in demand registered in 2006 did not translate into a significant decrease in margins.

In the United States, the market with the greatest reaction capability, scheduled maintenance shutdowns and various unplanned failures pushed margins to over USD 11.00 per barrel during the driving season. Looking at the margins reported for the first three quarters of 2007, we note that this trend is not only persistent but becoming more pronounced. The other two markets (North-West Europe and Singapore) display the same trend, but with more moderate fluctuations.

Table 3  
Complex refining margins (annual average in USD/bbl)

	2000	2001	2002	2003	2004	2005	2006	2007 (f)**
Brent Cracking (NW Europe)	3.37	2.05	0.75	2.34	3.77	4.98	4.04	5.0
LLS* Cracking (Gulf Coast, US)	1.29	1.36	0.31	1.12	1.69	5.37	5.21	6.9
Dubai Hydrocracking (Singapore)	0.89	- 0.20	- 0.56	0.82	3.74	3.96	2.19	3.83

\* Louisiana Light Sweet

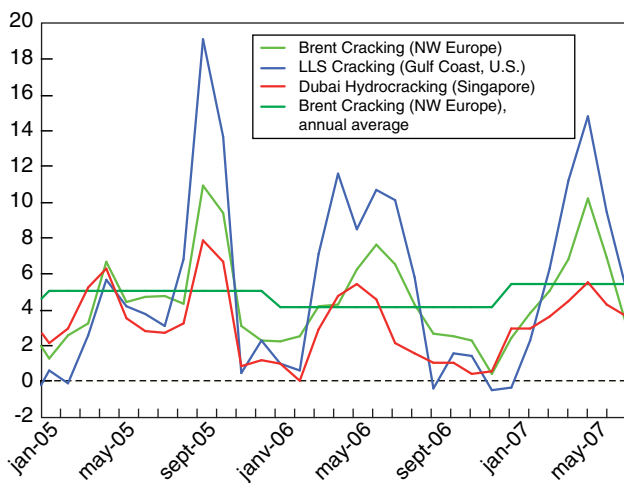
\*\* Averages for the first 7 months of the year

Source: Oil Market Report (IEA)

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In Europe, despite a mild winter, margins stayed high, fueled by strong demand for gasoline and naphtha. The gasoline stocks in the United States dropped to seasonal lows, which also helped raise margins in Europe, exerting pressure on light distillate production. In addition, when margins fell in the autumn of 2006, facilities were more inclined to schedule maintenance shutdowns.

Fig. 3 - Variations in complex refining margins (in USD/bbl)



Source: Oil Market Report (IEA)

Compared to previous years, the refining margins in the Asia-Pacific region in 2007 remained high: the average for Dubai Hydrocracking was USD 3.83/bbl. Strong demand from the petrochemicals industry was a key factor.

Refineries are more complex today and units have become more interdependent than in the past. There will probably be more scheduled maintenance shutdowns and more unplanned failures than formerly. For example, the hydrotreatment units needed to meet increasingly stringent specifications require more frequent maintenance operations than distillation and conversion units do. All of this justifies a degree of optimism in thinking that margins will stay high, but highly volatile.

### Earnings fall in relative slowdown of mergers/acquisitions

If we take changes in net earnings by international majors for our yardstick, economic performance in the refining industry was down over the previous year, except for BP and Chevron, whose bottom line showed a clear improvement. For Chevron, this was partly due to better operating performance and a high rate of refinery

utilization, especially in the United States, where Chevron saw its net earnings in the refining sector almost double.

There are several explanations for this drop in earnings in 2006, especially a downturn in margins starting in the second half-year, a slowdown in world demand, a rise in costs (services and raw materials) and a heavier burden in terms of taxes and royalties.

The situation looked brighter in the first half-year 2007: Chevron, ConocoPhillips and ExxonMobil saw earnings increase by more than 40% between first half-year 2006 and first half-year 2007 (up 85%, 66% and 41%, respectively). European majors also reported improved earnings for the same period, year on year, except Statoil, whose earnings stagnated (Table 4).

Given this situation, the refining sector is pursuing its reorganization in the United States and elsewhere in the world, but more slowly than in 2005, a big year for mergers and acquisitions. The transactions concluded in 2005 bore on the disposal of USD 23 billion in assets. In 2006, "only" USD 13 billion in assets changed hands, but the year was nevertheless a busy one for M&A activity.

As for the geographic breakdown, the transactions that took place in the United States—involving the disposal of USD 7 billion in assets—remained roughly equivalent to those carried out in other parts of the world.

Table 4  
Net earnings reported by refining-distribution companies  
(in millions of dollars)

	1st half 07	1st half 06	Variations%
Total	4,945	1,767	+10.1
BP	3,578	3,468	+3.2
ENI	332	316	+5.2
Repsol-YPF	1,730	1,452	+19.1
Shell	4,424	3,398	+30.2
Statoil	608	624	-2.5
Chevron-Texaco	2,921	1,578	+85.1
ConocoPhillips	3,494	2,098	+66.5
ExxonMobil	5,305	3,756	+41.2

Source: Annual reports and BIP

The largest transactions reported in the United States in 2006 were as follows:

- ConocoPhillips transferred its 50% holding in the Wood River and Broger refineries (total capacity: 226,000 bbl/d) to EnCana for USD 2.8 billion. EnCana's build-up on the American market is part of a larger upstream/downstream deal with Conoco calling for

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the latter to take a stake in EnCana's tar sand projects in Alberta (Foster Creek and Christina Lake );

- PDVSA sold a 42.25% interest in its Houston refinery (capacity: 99,000 bbl/d) to Lyondell Chemical for USD 2.1 billion.

These two sales represent 41% of all transactions carried out in the United States in terms of value and 57% in terms of refining capacity.

Large transactions also took place in other parts of the world in 2006. PKN Orlen acquired a 53.7% stake in Yukos and 30% of the Mazeikiu Nafta refinery belonging to the Lithuanian government, for USD 2.34 billion (total refining capacity: 218,000 bbl/d). Harvest Energy Trust purchased the East Coast Canada refinery (115,000 bbl/d) from the Vital Group for USD 1.43 billion. These three projects accounted for 64% of all transactions occurring outside the United States in terms of value and 2% in terms of refining capacity.

In 2007, several deals have already been concluded or are about to be:

- Shell decided not to keep its French refineries and plans to sell its holdings to Petroplus and Basell. Petroplus is interested in two of them, Petit Couronne (142,000 bbl/d) and Reichstett (77,000 bbl/d). The contract is said to be worth USD 875 million. Basell is interested in acquiring the third refinery – L'Etang de Berre (80,000 bbl/d) – for USD 700 million;
- Given the fierce competition on the refining market in Europe and its objective of "managing a smaller European network of profitable refineries" and despite very "respectable" refining margins, BP is selling its Coryton refinery (172,000 bbl/d) in the United Kingdom to Petroplus for USD 1.4 billion. The agreement includes the bulk terminal and BP's UK bitumen business, as well as a long-term supply agreement to provide BP's UK based retail and other businesses with the products they require;
- Petroplus is finalizing its purchase of the Ingolstadt refinery (110,000 bbl/d) from ExxonMobil for USD 627.5 million. This acquisition, together with those mentioned earlier, would confirm the position of Petroplus as an independent refiner in Europe, owning and operating five refineries: Coryton and Teesside in the United Kingdom, Ingolstadt in Germany, Cressier in Switzerland and the BRC refinery in Antwerp, Belgium. Petit Couronne and Reichstett may become part of the Petroplus conglomerate in the near future;
- Total is selling its interest (70%) in the Milford Haven refinery and concentrating its refining activities in the U.K. at the Lindsey refinery. Murco Petroleum Ltd (a

subsidiary of Murphy Oil) would like to purchase Total's shares for USD 250 million and become sole owner of Milford Haven (107,000 bbl/d);

- The Russian company Sibir Energy is buying the Moscow refinery (240,000 bbl/d) for USD 922 million;
- The Hungarian company MOL has been the object of many M&A rumors (e.g. about a deal in which MOL would sell assets to the Austrian company OMV and about a merger with PKN Orlen). MOL is seeking to take over Italiana Energia Servizi which, among its other assets, runs the Mantova refinery (52,000 bbl/d). Operating in northern Italy, one of MOL's objectives is to build up its presence on the Austrian, Slovenian and Croatian markets. There is a great deal of uncertainty about the outcome of all this; things can change in the next few months;
- Lukoil would like to buy the Whitegate refinery in Ireland (71,000 bbl/d), which now belongs to ConocoPhillips, for €300-380 million. The two parties are also talking about transferring 16.33% of the Czech refinery Ceska Rafinerska to Lukoil;
- ENI is purchasing 16.33% of Ceska Rafinerska, thereby doubling its holdings in the Czech refinery;
- Valero Energy is selling its refinery in Lima, Ohio in the U.S. (165,000 bbl/d) to a Canadian buyer, Husky Energy Inc., for USD 1.9 billion. Husky aims to secure treatment capacity for its tar sands;
- Pursuing a downstream divestment strategy, Shell Oil Products US, a subsidiary of RDS, is selling its Wilmington refinery (97,500 bbl/d) south of Los Angeles to Tesoro Corp. This will strengthen Tesoro's presence in the western United States by bringing its refining capacity up to 560,000 bbl/d.

### World refining sector boosts spending

Between 1999 and 2005, world spending on investment, maintenance and catalysts/chemicals only showed a small increase. Capital expenditure did not grow by more than 2% in six years. For this period, the spending increase was generated by chemicals/catalysts and, more particularly, by maintenance (+19%).

Table 5  
Expenditure in the refining industry worldwide in billions of USD

	2004	2005	2006	2007 (f)
Capital expenditure	17.0	17.3	17.5	21
Maintenance*	19.1	19.6	20.6	21.7
Catalysts and chemicals	12.8	12.8	14.0	14.1
Total	48.9	49.7	52.1	56.8

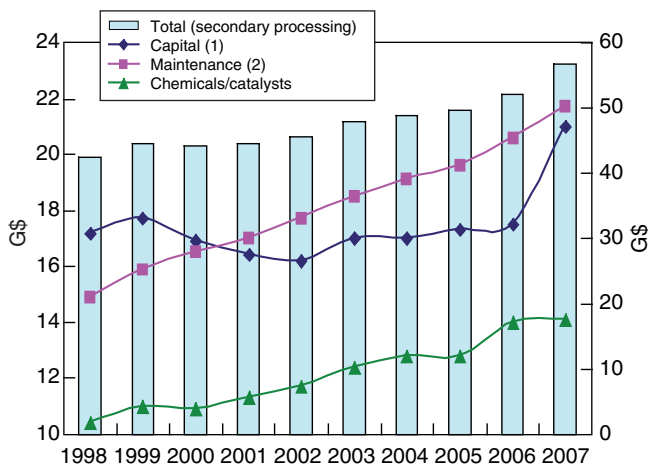
(f) forecast

\*\* 40% spent on equipment, 60% on labor and services

Source: IFP based on data from HPI Market Data

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Fig. 4 - History of spending in the refining industry worldwide (in billions of USD)



Source: IFP based on data from HPI Market Data

World spending in the refinery business grew at a faster annual rate (+4.8%) in 2006—thanks to maintenance and chemicals/catalysts, because capital expenditure remained low (in 2006, total capex was lower than in 1999!)—and is expected to set a record of 9% in 2007. Spending on maintenance should increase by 5.3%, with the United States and Europe mainly responsible. Investment spending has risen by a substantial 20%, from USD 17.5 billion in 2006 to 21.0 billion in 2007. The increase in capital expenditure may indicate the beginning of a new era where the sector will make up for falling so far behind in its investments in refining capacity (new refineries or extensions), but it also reflects the upturn in unit costs observed in all sectors of the oil and energy industry.

Even so, world refining infrastructure is still under pressure. Further investments are required, especially in conversion capacity, to manufacture products that will conform to increasingly stringent standards.

### Many investment projects announced

Margins are still rising, creating favorable business conditions again this year. One can expect an increase in the number of investment projects announced in the refining sector. We will make a distinction between "Phase 2" (design, engineering or construction) and "Phase 1" (preliminary design or inception) projects. The former have a higher probability of reaching completion.

With regard to Phase 2 projects involving design, engineering and construction, new refineries have been announced in Africa, Asia, Australasia, the CIS countries, the Middle East and even the United States

(Table 6). Based on the data available in 2006, it is thought that 15 new refineries will be built worldwide by 2010-2012. These projects represent an aggregate distillation capacity of 2.5 Mbbl/d (Table 7), up 21% over the previous year, with the Middle East and the Asia-Pacific region accounting for 76% of new projects world-wide to be built between now and the end of the decade. Among the new refineries listed below, only three are currently under construction, representing total capacity of 370,000 Mbbl/d. No new refinery project is planned in Europe (OECD or non-OECD) or South America. In North America and Australasia, no new project has been undertaken since our review of the situation last year.

Table 6  
New refineries and extensions of distillation capacity geographic breakdown 2006-2007  
Phase 2: Design, engineering, construction

	New crude distillation at new refinery		New crude distillation at existing refinery	
	2007	2006	2007	2006
<b>Africa</b>	4.7%	1.2%	6.3%	1.9%
<b>Asia</b>	34.4%	33.5%	29.7%	31.4%
<b>Australasia</b>	4.0%	4.8%	-	-
<b>CIS</b>	11.9%	15.1%	-	7.6%
<b>Europe, non-OECD</b>	-	-	-	-
<b>Europe, OECD</b>	-	-	6.6%	-
<b>Middle East</b>	42.3%	42.0%	17.2%	15.9%
<b>North America</b>	2.8%	3.4%	33.4%	34.4%
<b>South America</b>	-	-	6.9%	8.8%
<b>Total</b>	100.0%	100.0%	100.0%	100.0%

Source: IFP

Phase 2 extension projects represent 1.8 Mbbl/d of distillation capacity, up 14% over the previous year, at 28 refineries worldwide (Table 8). North America, Asia and the Middle East contain 80% of the extension projects (1.45 Mbbl/d). Among these 28 extension projects, 8 are under construction (480,000 Mbbl/d).

Table 7  
New refineries – distillation capacities  
Phase 2: Design, engineering, construction

Region/Country	Status	Company	Location	Process	Capacity bbl/d	Start-up
<b>Africa</b>						
Sudan	Design	Port Soudan	Red Sea	Crude distillation	100,000	2006
Algeria	Engineering	Naftec	Sbaa, Adrar	Crude distillation	12,500	2008
Nigeria	Engineering	Amakpe	Eket, Akwa Ibom	Crude distillation	6,000	2008
<b>Asia</b>						
South Korea	Design	S-Oil Corporation	Daesan	Crude distillation	240,000	2009
South Korea	Design	S-Oil Corporation	Daesan	Crude distillation	240,000	2009
Viet Nam	Engineering	PetroVietnam	Dung Quat, Quang Ngai	Crude distillation	130,000	2009
Japan	Engineering	Kashima Aromatics	Kashima Ibaraki	Crude distillation	80,000	2008
China	Construction	Sinopec	Qingdao, Shandong	Crude distillation	200,000	2008
<b>Australasia</b>						
Indonesia	Construction	Jambi Refining	Jambi	Crude distillation	100,000	2008
<b>CIS</b>						
Kazakhstan	Engineering	AgipKCO	Kashagan	Crude distillation	300,000	2008
<b>Middle East</b>						
Qatar	Design	QGPC	Al-Shaheen	Crude/condens. distillation	250,000	2011
Oman	Engineering	QGPC	Ras Laffan	Crude/condens. distillation	146,000	2008
Kuwait	Engineering	KNPC	Al-Zour	Crude distillation	615,000	2010
Yemen	Engineering	RIRC	Ras Issa	Crude distillation	60,000	2007
<b>North America</b>						
Canada	Construction	OPTI Canada	Fort McMurray, Alberta	Crude distillation	70,000	2007
<b>Total</b>					2,529,500	

Source: IFP

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Table 8  
Refinery extensions - distillation capacity  
Phase 2: Design, engineering, construction

Region/ Country	Status	Company	Location	Process	Capacity b/j	Start-up
<b>Africa</b>						
Morocco	Engineering	Samir	Mohammedia	Crude distillation	83,500	2008
Sudan	Construction	KRC	Shajarah, Khartoum	Crude distillation	30,000	2006
<b>Asia</b>						
China	Engineering	Petrochina	Dushanzi, Xinjiang	Crude distillation	80,000	2007
China	Engineering	Sinopec	Quanzhou (Xiaocuo), Fujian	Crude distillation	160,000	2008
China	Engineering	Sinopec	Yanshan, Beijing	Crude distillation	160,000	2008
Thailand	Engineering	Thai Oil	Sracha	Crude distillation	50,000	2007
Pakistan	Construction	Attock	Rawalpindi	Crude distillation	20,000	2007
India	Construction	Hindustan	Mahul, Bombay, Maharashtra	Crude distillation	48,000	2007
India	Construction	Hindustan	Visakhapatnam, Andhra Pradesh	Crude distillation	17,000	2007
<b>CIS</b>						
Kazakhstan	Construction	KazakOil	Atyrau	Crude distillation		2006
<b>Middle East</b>						
Iran	Design	AORC	Abadan	Crude distillation	150,000	2008
Iran	Engineering	SAORC	Arak	Crude distillation	80,000	2010
Saudi Arabia	Engineering	PetroRabigh	Rabigh	Crude distillation	80,000	2009
<b>Europe</b>						
Spain	Design	Repsol-YPF	Cartagena, Murcia	Crude distillation	110,000	2010
Germany	Engineering	Bayernoil	Vohburg/Ingolstadt/Neustadt	Crude distillation	8,500	2008
<b>North America</b>						
Canada	Design	Husky Oil Operations Ltd.	Lloydminster, Alberta	Crude distillation	80,000	2010
Canada	Engineering	Valero Energy Corp.	St. Romuald, Quebec	Crude distillation	50,000	2008
Mexico	Engineering	Pames	Minatitlan, Veracruz	Crude distillation	143,000	2008
United States	Engineering	Chevron	Pascagoula, Mississippi	Crude distillation	12,000	2006
United States	Engineering	Sunoco	Toledo, Ohio	Crude distillation	20,000	2007
United States	Engineering	Sunoco	Philadelphia, Pennsylvania	Crude distillation	25,000	2007
United States	Engineering	Wynnewood Refining Co.	Wynnewood, Oklahoma	Crude distillation	15,000	2007
United States	Engineering	Holly Corp Refining & Marketing	Woods Cross, Utah	Crude distillation	5,000	2008
Canada	Construction	Suncor	Suncor, Fort McMurray, Alberta	Crude distillation	35,000	2006
Canada	Construction	Syncrude Canada	Syncrude, Fort McMurray, Alberta	Crude distillation	217,000	2006
<b>South America</b>						
Aruba (Neth.)	Engineering	Valero	San Nicolas	Crude distillation	50,000	2007
Jamaica	Engineering	Petrojam	Kingston	Crude distillation	13,000	2008
Colombia	Construction	Ecopetrol	Cartagena, Bolivar	Crude distillation	61,000	2010
<b>Total</b>					1,803,000	

Source: IFP

Each region takes a different approach to investments in the refinery sector. Asia spreads out its spending fairly evenly between new refinery projects and projects to expand distillation capacity. The Middle East gives preference to new refinery projects but does invest in extensions, only to a lesser extent. North America clearly prioritizes extension projects (Table 6).

Crude distillation projects (new refineries or extensions) show an increase of 18% over 2006 (up from 3.7 to 4.3 Mbbl/d). Africa saw a large increase but, in 2006, there were virtually no projects on that continent.

In future, new capacity could be added if certain programs, still at the preliminary design or inception stage (Phase 1), are eventually developed. Many such projects are announced in different parts of the world, but it is highly probable that many will never be carried out. Asia represents 36% of all Phase 1 projects, the Middle East 16% and North America 14%.

As for the MENA (Middle East and North Africa) countries, their program represents 5.77 Mbbl/d of new refining capacity by 2011, with more than half in five countries: Saudi Arabia, Kuwait, the United Arab Emirates, Iran and Iraq. The most ambitious project, located in Saudi Arabia, involves the construction of two refineries of 400,000 bbl/d each (Yambu 2 and Jubail 2, presently in Phase 1). Iran has an ambitious program to boost capacity by 565,000 bbl/d by 2015 at existing refineries (Bandar Abbas, Tabriz and Esfahan).

We saw that Asia represents 36% of all Phase 1 projects in the world. Of these, more than 40% are located in

India and include new refineries as well as extensions. Next comes China, with 13% of the Phase 1 projects planned in Asia.

As for North America, Canada represents 70% of the new-build projects (14% of Phase 1 projects worldwide) whereas the United States accounts for 70% of the extension projects. In the last two or three years, capacity constraints and improved margins have led American refiners to reinvest in refinery infrastructure, preferring to develop projects at existing units rather than build new refineries. However, a few projects to build new facilities have been announced. Hyperion Resources is planning a new refinery (400,000 bbl/d) to process heavy crude from Canada, and Arizona Clean Fuels would like to build a new refinery (150,000 bbl/d) in Yuma. The future of these two projects remains uncertain: they require heavy (and rising) investment and involve financial and administrative difficulties. Some investors also fear a turnaround in market conditions: they are afraid that demand will slow as a result of an economic recession, increased use of alternative energies and improved energy efficiency, and therefore that margins will fall.

The Phase 1 projects – preliminary design and projects – total 22.6 Mbbl/d in extra capacity, which corresponds to 84% of the total for known projects. The latter (Phase 1 + Phase 2) represent 26.0 Mbbl/d (Figure 6). Once again, it is important to point out that many of these projects will not be carried out within the specified time frame, or not at all.

Looking at the projects for new refineries, Phase 1 projects account for 15.4 Mbbl/d, or 86% of the total for known new-build projects. All known projects (Phase 1 + Phase 2) amount to 18.0 Mbbl/d.

Total capacity for known extension projects at existing installations comes to 9.1 Mbbl/d. Of these, Phase 1 projects represent a capacity of 7.3 Mbbl/d, or 80% of all extension projects.

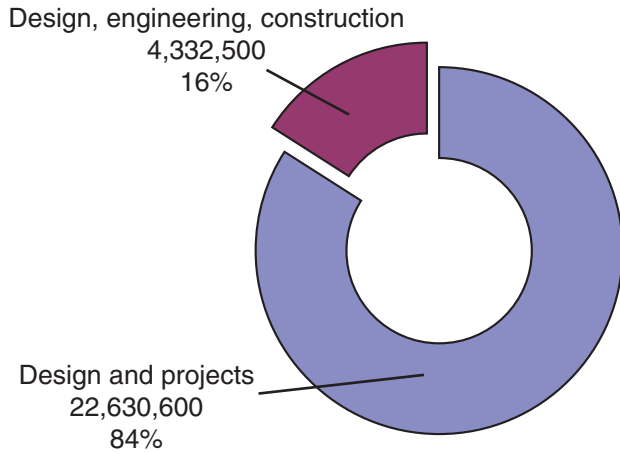
How have these projects evolved in 2007?

## Projects and demand for petroleum products. Investments required over the long term.

Looking at all distillation projects – new refineries and extensions – we observe that the sector is obviously starting to draw on "reserves" of projects that can be considered Phase 1 (Figures 5 and 6). While the latter are virtually stagnating (+1.4%), Phase 2 projects are up considerably (+18%) and their share of the total has increased from 14% to 16% in 2007.

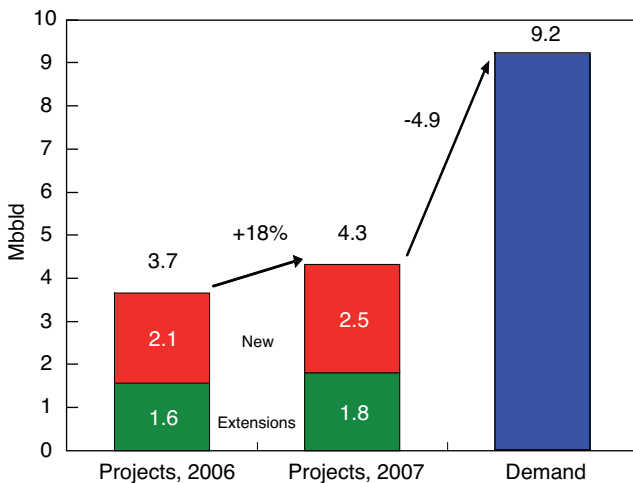
## Refining

Fig. 5 - New refineries and extensions of existing refineries worldwide - Phase 1 and Phase 2 (25,988,000 bbl/d)



Source: IFP

Fig. 6 - Incremental demand and projects between 2005 and 2011  
New refineries and extensions, by development phase



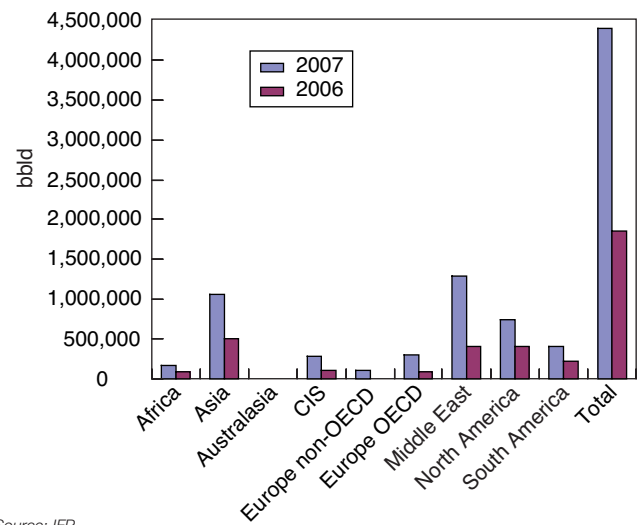
Source: IFP; IEA World Energy Outlook 2005

All in all, by 2011, not counting Phase 1 projects, nearly 4.3 Mbbld of additional refining capacity may come onstream (projects for new refineries and extensions), which is 18% more than in 2006. By comparison, according to the latest IEA reference scenario, demand may rise by an additional 9.2 Mbbld by 2011, compared to 2006 (Figure 6). In theory, Phase 1 projects could easily cover the deficit of about 5 Mbbld. In practice, there remains a great deal of uncertainty as to whether said projects will be carried out. Tensions are therefore likely to persist in future, especially since there is no guarantee that engineering firms have sufficient capacity to cover demand for additional projects.

The new capacity to be provided in future will also have to process heavier crudes and supply lighter products. Investment will have to include conversion projects – catalytic cracking, hydrocracking, visbreaking/thermal cracking, coking– to meet this type of demand.

In 2007, Phase 2 conversion projects have represented 4.4 Mbbld of conversion capacity, or 2.5 Mbbld of additional capacity compared to 2006.

Fig. 7 - Conversion projects, by region  
Phase 2: Design, engineering, construction



Source: IFP

The largest conversion projects reported in 2007 are located in the Middle East (planned capacity: 1.3 Mbbld), followed by Asia (1.07 Mbbld) and North America (0.75 Mbbld). In 2007, the Middle East overtook Asia as the leading geographic zone in the world for conversion projects planned for the medium and long term. Between them, the Middle East, Asia and North America account for 71% of the world's conversion projects (3.1 Mbbld).

### Economic prospects

In 2006 and 2007, the growth of the world economy remained firm, accompanied by an increase in demand for oil that was steady but lower than in 2004 and 2005. Demand forecasts are currently being revised downwards, following sharp hikes in the crude price in 2007 and in anticipation of an expected slowdown in the world economy in 2008.

Although quotas were recently raised, the market supply continues to be inadequate, which causes shortages to persist and keeps prices high.

## Refining

Refining margins, which reached record levels in 2005, remained elevated in 2006 and should reach all-time highs in 2007, especially on the American market.

In this favorable business environment, many new projects were announced. This is progress, but much remains to be done to relieve the tight situation in the refining sector in the years to come. The industry will only pursue programs to invest in new refining and conversion

capacity if business conditions continue to be favorable over a long period. Having fallen behind in its refining investments, the sector needs years of high refining margins and sustained demand to catch up. Considering the deterioration of the world economy in the second half of 2007, cautious optimism may be justified.

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