

THE IMPACT OF THE NEW OPEC DOWNSTREAM OPERATIONS ON OIL INDUSTRY STRUCTURE

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Introduction

The emergence of OPEC in September 1960 signaled the determination of the oil producing nations to wrest control of oil prices and production from the multinationals and, in the process, to reduce substantially the degree of vertical integration which categorized the industry since its early days. While OPEC was successful in breaking the hold of the multinationals, its policies led to rapid, sharp fluctuations in the price of oil, which had remained relatively stable for decades. These fluctuations dominated the course of the world economy throughout the 1970s and the first half of the 1980s, and they seriously altered both the magnitude and structure of worldwide demand for oil. World oil demand nearly doubled from 1950 to 1960 and more than doubled from 1960 to 1970. But after the OPEC price increases of the early 1970s and the oil embargo of 1973, worldwide non-Communist petroleum product demand declined. In the late 1970s, the demand gradually recovered, then dropped sharply as the recession developed. In 1981, demand was below the 1973 level and continued decreasing up to 1983, and only started to go up again in 1984 (see Table 1). Demand for oil in the non-Communist world declined from approximately 54 mb/d in 1979 to 45.6 mb/d in 1983⁽¹⁾. The overall leveling out in demand for oil also reflects a declining role for oil as one of the world's primary energy sources. Although oil is still the dominant energy source, this decline is expected to continue even if the real demand for oil begins to increase again (see Table 2).

Table 1*Non-Communist World Demand for Refined Petroleum Products*

Year	Refined petroleum products (in million barrels)
1950	3390
1960	6760
1970	14,308
1971	15,076
1972	16,187
1973	17,252
1974	16,755
1975	16,111
1976	17,260
1977	18,107
1978	18,588
1979	19,836
1980	18,354
1981	17,174
1982	16,892
1983	16,557
1984	16,853
1985	16,745
1986	17,265
1987	17,593

Source: American Petroleum Institute (1989), Basic Petroleum Data Book (May).
Washington, DC: Author.

Table 2*Oil as Percentage of World Energy Supply*

Energy type	1965	1980	1990	2000
Oil	42%	47%	38%	31%
Coal	37%	26%	27%	28%
Nuclear	0%	2%	6%	0%
Hydro and other	6%	6%	7%	8%
Synthetics	0%	0%	2%	4%

Source: Exxon World Energy Outlook (December 1980), New York : Exxon Inc.

Besides changing the habits of energy consumption and depressing the worldwide demand for oil, the watershed events of the early 1970s had a significant impact on the petroleum refining industry which followed, albeit a step or two behind, the fortunes of the oil industry. Spurred on by the dramatic rise in demand of the 1950s and 1960s and seemingly stable conditions, world refining capacity increased from about 25 mb/d in 1960 to some 60 mb/d in 1973. During this period, refining capacity utilization rose from 89% to 94%, an extremely high rate of utilization and one that serves to highlight the perceived need in the early 1970s for increased refinery capacity. The oil refining industry was consequently unprepared for the appearance of OPEC and the rapid changes in price structure, overall demand and product mix which followed. In 1973, at the height of the oil embargo and the beginning of the general decline in world oil demand, some 8 mb/d of new refinery capacity was under construction. By 1980, as a combined result of this new construction and the decline in oil demand, worldwide refining capacity utilization dropped to 75%. At the end of 1988, after the massive scrapping of older and less sophisticated refineries and the closing of smaller less efficient refineries in the U.S. and abroad, there remained a current refinery surplus of some 6.6 mb/d capacity.

The OPEC refining capacity increased from 2.0 mb/d in 1960 to 6.62 mb/d in 1987 (al Fathi, 1989:91; Arab Petroleum Research Center, 1989 : 566). In 1987, the OPEC refining capacity was 9% of the world's total refining capacity (see Table 3).

Table 3

OPEC Refinery Capacity 1981 - 1987 ('000 b/d)

Year	OPEC capacity	Total world capacity	OPEC percentage
1981	5,995.5	81,823.5	7.3
1982	5,136.2	77,949.6	6.6
1983	5,943.9	76,051.5	7.8
1984	6,229.5	74,612.8	8.3
1985	6,479.5	73,186.0	8.9
1986	6,550.2	73,098.7	9.0
1987	6,628.7	73,810.5	9.0

Source: Arab Petroleum Research Center (1989), Arab Oil and Gas Directory. Paris: Author, p. 568.

The present expansion of refinery capacity in OPEC nations, particularly in the Gulf, looks at first glance to be simply a further case of unneeded capacity, an instance of planning predicated on outmoded assumptions. But the coming on-stream of the new OPEC export and refining capacity in the late 1980s has complex origins and, in fact, has now become part of a new strategy – the reinstitution, in a different alignment, of the vertical integration which had characterized the industry formerly. This integration has two components. One is the expansion of export refineries in exporting nations. The other, more recently being put into place, is the acquisition of refineries in established markets. These developments will introduce a much needed element of stability into world oil markets and will have a far-reaching impact on the world oil industry. It will entail reorientation of the relationships among oil producing nations and the multinational oil companies and will have important consequences for refiners in other countries. The world oil industry is on the verge of a period of major change.

The purpose of this paper is to describe and analyze the new OPEC downstream operations and show how they have affected the structure of the international oil industry. The study itself is composed of six parts. The first part includes the introduction, purpose and organization of the study. The second part details the rise of OPEC refining activities. The third part describes the petrochemical industries in OPEC countries. The fourth part examines the situation of Western refining in the 1980s. The fifth part analyzes the phenomenon of vertical integration and shows how it has been carried out by different members of OPEC. Finally, the last part provides some insight into future vertical integration by OPEC countries and the changes that will ensue in the oil industry structure.

The Rise of OPEC Refining

Despite the worldwide refining capacity surplus, OPEC refinery capacity is expected to expand considerably during the 1980s, rising from 3 mb/d to as much as 9 mb/d by 1990. Even conservative estimates of a total increase of 3 mb/d would represent 19% of the current U.S. and 4% of the current worldwide refinery capacity ⁽²⁾. The pattern of new refinery construction and the expansion of already-existing facilities indicates a significant change in the make-up and distribution of world refinery capacity which will have its

impact on the world. As some other areas of the world decline or remain static in refinery capacity, the Middle East (particularly the Gulf producer nations) and North Africa are poised to increase their presence in the international refinery trade.

Refining in the Gulf area is well established and has a long history. Abadan and other refineries such as Ras Tanura in Saudi Arabia were originally constructed as simple export refineries. Originally, oil exporting countries had to import much of the refined oil products needed for domestic consumption from the major multinational oil companies. After oil production returned to pre-war levels in 1949 and began its post-war expansion, oil exporting nations made gradual moves to assume more control over the refining and marketing of products for domestic consumption⁽³⁾.

But after 1973 when domestic demand for gasoline and middle distillates in the Gulf area rose rapidly, the product mixes of the existing Gulf refineries still proved ill-suited to meet the area's domestic product needs. The oil producing nations either had to produce large surpluses of fuel oil, for which there was a declining market, or import large quantities of the necessary petroleum products at what were thought to be unreasonably high prices. The second impetus for planning new capacity was that existing Gulf refineries were not suited to take advantage of a changing export market and adjust to the realities of world petroleum products demand in the 1980s and beyond. It became clear to OPEC nations that newer, more flexible refineries capable of producing a product mix to match the slight increases forecast in worldwide and domestic demand in light distillates, the sharp increase in middle distillates, and the large decrease in heavy distillates, were needed to supply the domestic products market as well as to provide the option of exporting refined products. Consequently, refinery development was slanted toward sophisticated, flexible processing employing the best available technology.

The potential production figures for the new refinery capacity coming on-stream now or scheduled to come on-stream by the end of 1990 in the Middle East and North Africa are impressive⁽⁴⁾. In 1987, OPEC nations had a total refinery capacity of almost 6.62 mb/d. This represents an increase since 1983 of 1.5 mb/d in the Gulf states alone (see Table 4)⁽⁵⁾. Refinery

Table 4*Increased Gulf Countries' Refining Capacity ('000 b/d)*

Country	Year-end 1983	1987 capacity
Iran	545	795
Iraq	170	410
Kuwait	550	630
Qatar	10	60
Saudi Arabia	950	1775
U.A.E.	130	175
Total Gulf Area	2355	3845

Source: OPEC Downstream Project (1985), *The Changing Structure of the World Refining Industry*. New York: Resources Systems Institute (February), p. 113.

expansion in Saudi Arabia has taken the form of joint-ventures with multinationals and has increased Saudi Arabia's refinery capacity from 950,000 b/d in 1983 to 1,775,000 b/d in 1987. The three facilities designed specifically for export purposes (two of which, Yanbu and Jubail, are already coming on-stream) contribute a total processing capability of 825,000 b/d⁽⁶⁾. These refineries will produce a product mix consisting of gasoline/naphtha, jet fuel, diesel fuel and fuel oil. Saudi Arabia's new joint-venture export refineries⁽⁷⁾ will have catalytic cracking and alkylation capability⁽⁸⁾, as well as catalytic reforming capabilities. This will enable the Saudis to produce high quality middle distillates for export. The Petromin/Shell Jubail refinery in Saudi Arabia started exporting in early June of 1985, running at 60% capacity and processing Arab light as its feedstock⁽⁹⁾. Al Jubail has also begun operating its aromatics unit producing benzene, toluene, and xylene from 16,000 b/d of naphtha⁽¹⁰⁾.

In much the same manner, Kuwait is upgrading its downstream refinery capabilities although Kuwait is not relying on joint ventures. Kuwait's new Mina Al Ahmadi facility, with 325,000 b/d output potential, has recently become operational. When its current expansion plans are completed, Kuwait will have a total refinery capacity of about 630,000 b/d including new hydrocracking and coking capabilities. According to one assessment

"Kuwait's refining sector will probably rate as the most advanced refinery complex in the world"⁽¹¹⁾.

Beyond the Gulf, a similar story is unfolding. Libya is not only increasing total refinery capacity but also increasing its downstream product export potential as well. The first phase of the Ras Lunuf facility, which was operational in 1984, includes, in addition to the 220,000 b/d refining capacity, a 330,000 t/y ethylene plant. The product mix as full yield will be 16% naphtha, 23% gas oil, 56% fuel oil, and 5% kerosene⁽¹²⁾. A second phase development of the facility calls for additional downstream product refining.

While domestic demand will continue to rise and to consume significant levels of petroleum product output, gross product exports by Gulf nations will be substantial by 1987 - 1990 (see Tables 5 and 6)⁽¹³⁾. From 1980 to 1990, the gross product export potential of the Middle Eastern and African producers will increase by 230%. OPEC's export of finished was 2.5 mb/d in 1987.

Table 5

Growth in Gulf Oil Production Exports 1987 - 1988 ('000 b/d)

Country	Refined product production	Domestic demand	Gross product export potential
Bahrain	225	16	209
Kuwait	640	95	545
Oman	49	29	20
Qatar	57	16	41
Saudi Arabia	1654	614	1040
U.A.E.	160	75	85
Total Gulf	2785	895	1890

Source: Compiled and corrected from industry sources.

Table 6

Oil Products Available for Export from the Gulf 1987 - 1988
(*'000 b/d*)

Country	Gasoline/ naphtha	Middle distillates	Fuel oil & other	Total products
Bahrain	48	83	78	209
Kuwait	220	325	0	545
Oman	0	3	17	20
Qatar	10	11	20	41
Saudi Arabia	260	400	380	1040
U.A.E.	30	25	30	85
Total Gulf	586	847	525	1890

Source: OPEC Downstream Project (1985), *The Changing Structure of the World Refining Industry*. New York: Resources Systems Institute. (February), p. 113b (revised).

The development of the petrochemical industry in the Gulf area essentially follows that of the refining sector. The petrochemical industry was first developed in the Gulf area in the early 1970s. Two factors justified the establishment of the petrochemical industry at the time. First, the high cost of feedstock and energy after the 1973 oil price adjustments resulted in higher costs, and prices of basic and intermediate petrochemicals in the industrialized world provided a financial incentive for the Gulf countries to establish petrochemical projects. Second, surplus funds from oil exports made it possible for Gulf states to meet the financial requirements of building and operating petrochemical plants. By the late 1970s, projects in Algeria, Iraq, Qatar and Saudi Arabia were on-line. Others, such as those in Bahrain, were under construction and a third group including refiners in Kuwait and the United Arab Emirates were in the planning stages.

The petrochemical industry in the Gulf area has two distinguishing characteristics. There is a heavy emphasis on the production of basic chemicals. Furthermore, olefins dominate the product mix as a way to avoid flaring natural gas. The opportunity cost of using the flared gas in the

production of petrochemicals is higher than that obtained from the liquification and export of gas. Presently, plants that produce basic petrochemicals are located in Algeria, Qatar, Saudi Arabia, Libya and Iraq. They mainly produce ethylene. The total planned capacity of basic petrochemicals in the Gulf area is expected to reach about 7.6 million tons per year in 1995.

The intermediate petrochemical industry is still in its infancy. Those chemicals presently produced include ethylene dichloride, monovinyl chloride, ethylene glycol and styrene. There are some nitrogenous fertilizer plants under construction which are expected to reach a capacity of 8.5 million tons in 1990. There are very few final petrochemical refineries in the Gulf area. What plants there are produce a total of 25,000 tons of polyester fibers, 278,000 tons of plastics, 155,000 tons of polyvinyl and 35,000 tons of melamine (Kasabally & Ounda, 1984).

It must be emphasized that the strategies behind these different forms of downstream expansion are not the same in all cases. Kuwait's strategy of self-reliance and growing emphasis on petroleum products means something different in the marketplace than Saudi Arabia's joint-venture policy in new refineries and its continued commitment to exporting crude. The Saudi response is similar to those made by major crude-rich companies which have historically entered joint ventures with entities with strong refining and marketing organizations. Saudi Arabia is only following the traditional avenue of cooperation in the oil business (Ghadar, 1984). Kuwait, on the other hand, having a smaller market share has found it more advantageous to enter directly and purchase or develop downstream operations on its own. However, in both cases each country has not only become self-sufficient when it comes to petroleum products for its domestic market, but also has become one of the large exporters of products within OPEC. Both countries are attempting to lessen their dependence on crude exports to non-affiliated entities. The impact of these developments in the world oil market in general, and the international refinery market in particular, depends on the moves they make as relatively independent players, and on the responses in Western Europe, Japan and the United States that these moves provoke.

Western Refining in the 1980s

During the late seventies and eighties, as new sophisticated refineries in North Africa and the Gulf moved from the planning to the construction stage, Western European and U.S. refiners faced increasing difficulties of their own. They were unprepared for shifts in the product mix, decrease in overall demand and the fluctuations in prices which characterized these years. As world oil demand fell and the nature of the demand changed, the U.S. capacity decreased sharply and some segments of their industry found themselves in serious economic difficulty. Since 1978, 79 United States refineries have shut down. In 1988, the Basic Petroleum Data Book reported that there were 213 operating refineries in the United States with a crude distillation capacity at year-end 1988 of 15 mb/d, down 3 mb/d from the 1981 level (American Petroleum Institute, 1989)⁽¹⁴⁾. Hardest hit were the small refineries with below 200,000 b/d capacity, especially those of less than 50,000 b/d output. Refinery utilization, however, did improve. At the end of 1984, it stood at 76.9%, markedly improved from the low rates of 1981 and 1982⁽¹⁵⁾.

United States oil companies also closed or curtailed many of their overseas refinery operations. In January 1985, Mobil announced the closing of its Mobil AG subsidiary's crude refinery operation at Wilhemshaven. In February, Amerada Hess Corporation reduced production at its Virgin Islands refinery by two-thirds, finding it more economical to buy finished products on the world market. Chevron attempted to sell its Italian refinery to the First Arabian Corporation in the spring of 1985, but the deal fell through in May. In March of 1985, Exxon announced the closing of its Aruba refinery, and the Royal Dutch/Shell Group's Curacao refinery was thought to be headed for a shutdown. In April of the same year, Texaco sold its refinery in Trinidad and Exxon announced the temporary shutdown of its oil refinery in Rotterdam.

Western European refiners have also faced considerable numbers of shutdowns and have felt the pressure to invest heavily in upgrading existing refineries. European refiners have seen a shutdown of 31% of distillation capacity since 1977 while average utilization capacity has dropped to 61%. Total European Community refining capacity dropped from a peak

20.86 mb/d in 1977 to 13.86 mb/d at the beginning of 1989 (American Petroleum Institute, 1989).

The Japanese refining industry has also been experiencing significant cutback. One mb/d of capacity was scrapped in 1983, reducing Japan's total capacity to 4.9 mb/d. Despite this move, utilization was at 65% in 1984. In June of 1985, the National Resources Agency of the Ministry of Trade and Industry (MITI) recommended another 20% (1 mb/d) cut in crude distillation capacity and an increase in utilization to 80%⁽¹⁶⁾.

In early 1986, with the dramatic declines in oil prices and the scramble by oil exporters to place their crude on the world market, the position of the more efficient refiners improved. Historically, during the crude surplus periods crude-rich companies have offered refiners more attractive prices to assure that their oil would be placed on the market. Net back deals which guarantee a given profit to the refiners have become more common; but, generally speaking, despite these changes the non-OPEC free world refining industry is still recovering from a period of severe contraction in the 1980s in the face of decreased oil demand and excess refinery capacity.

The Response to the New OPEC Refineries

As we have seen, the current plight of the world refining industry is not a result of the new OPEC refinery capacity, the impact of which will not be fully felt until 1990. In fact, most of the new capacity is either just coming on-stream at test levels or is still pending completion. Rather, it has its source in the larger market forces underway long before the impact of the new refineries ever became evident. There has, nevertheless, been considerable apprehension about the real and likely impact of the new OPEC refining capability on the world refining industry, particularly those of the United States, Western Europe and Japan. After a decade of intensive and costly restructuring involving massive layoffs, updating process routes and switching petrochemical feedstocks, oil refiners in the developed world believe the new OPEC refineries could jeopardize their efforts.

However, despite the heated rhetoric coming from some camps, the developed nations have so far greeted the increase of OPEC refinery capacity with restraint. In the United States, Energy Secretary Hodel called

for a National Petroleum Council study of the industry "to compare the competitive position of U.S. and foreign refineries in the current economic environment and in the future". The NPC, for its part, recognized that "although new foreign export refiners may not directly supply U.S. markets, they will supply areas now supplied by refineries in Western Europe, the Caribbean and other countries. These, in turn, may increase product exports to the U.S."⁽¹⁷⁾ Historically, 60% of product exports from the Middle East and Africa go to the Far East, 38% to Western Europe and Japan, and 2% go to the United States. The bulk of OPEC oil product exports, barring protectionist measures which keep them out, will continue to go to these traditional markets. Since the late 1970s, imports of petroleum products into the U.S. have actually dropped. However, since 1977 petroleum product imports as a percent of total oil imports have risen from 24% to 34% in 1984 and then started to drop again to reach 26% in 1988 (see Table 7).

Table 7

United States Oil Imports (thousands of barrels)

Year	Crude oil	Oil products	Total oil	Oil products as % of total oil
1973	1183996	1009992	2193988	46%
1977	2414329	774077	3188404	24%
1980	1926162	598745	2524907	24%
1981	1604703	539265	2143968	25%
1982	1273214	527195	1800409	29%
1983	1215225	540584	1755809	31%
1984	1253949	651491	1905440	34%
1985	1168297	565231	1733528	33%
1986	1524978	655335	2180313	30%
1987	1705922	622139	2328061	27%
1988	1846585	650229	2496813	26%

Source: American Petroleum Institute (1989), Basic Petroleum Data Book (May - Vol.9 No.2). Washington, DC: Author.

In Europe, which is likely to feel greater competition from the new OPEC refineries and where the costs of rationalization have been especially costly, there is some resistance to future product imports. There is, however, no general movement toward protectionism. The EEC, which has imposed quotas on petrochemicals, is keeping silent on the question of restrictions on petroleum product exports to EEC nations. As yet, however, there has been no officially stated concern over import products except for a desire not to see a flood of imports to Greece, Italy and France, where there is substantial excess refinery capacity. Industry leaders in Europe realize the importance of keeping worldwide markets open and have urged negotiations with the United States and Japan to ensure that Western Europe does not become flooded with OPEC product exports⁽¹⁸⁾.

Historically, the Japanese market has not remained as open to product exports as the Western European countries have. Although there have been, strictly speaking, no "official" (that is, legislated) restrictions in Japan, there have been until recently effective barriers against petroleum product imports. MITI told foreign marketers that all gasoline sold in Japan must be locally produced, effectively blocking the export of cheap gasoline (particularly from Saudi Arabia) to the high-priced Japanese market. Japan has recently agreed to liberalize this policy. At the International Energy Agency ministerial meeting in Paris in early July of 1985, Japan signed an agreement to allow product importation into member nations "on the basis of supply and demand as determined by market forces without distortions"⁽¹⁹⁾. This is, in European and American eyes, the best policy possible for oil imports.

The Pursuit of Vertical Integration

One reason that the Western nations and Japan have been able to maintain a measured response in face of the large-scale expansion of OPEC refining capacity is that OPEC has not delivered these products at prices which substantially undercut those of Western refiners. The factor which made the OPEC refining industry, especially in the Gulf, feasible was the availability of natural gas as a cheap feedstock (Harrigan, 1985). The Saudis charged their refiners \$0.50 per thousand cubic feet. Consequently, Saudi refiners could take advantage of advanced processes, many of which

require large quantities of energy, to produce a high-value mix of products more cheaply than elsewhere. The prospect of OPEC refined products flooding European markets led some in the EEC to accuse the Saudis of setting the gas price at a level which was in effect a hidden subsidy. This objection, however, has been rendered moot by the Saudis' failure to place refined products on the market at costs substantially lower than that of other refiners. Several factors tend to offset the advantage of their cheap feedstock. Some plants were extremely expensive to build, costing almost twice as much as similar plants in other locations. Operating costs are high, and the distance to markets is great. The cost of product transportation to Japan is estimated at \$1.33 per barrel, to Western Europe at \$2.62, and to the U.S. at \$3.12. As a result, industry leaders expect the Saudis to show a profit in some markets and losses in others. The long-term profitability of these refineries will depend in part on evolving shipping cost differentials between crude and refined. This will no doubt change as newer product tankers are developed, and may not, as is often said, depend on subsidization by the Saudi Government (Harrigan, 1985:8).

Faced with higher than expected production costs, OPEC refiners have reacted by attempting to achieve more complete vertical integration. This new strategy offers several benefits. It should lead to increased efficiency in oil operations. It should also help OPEC countries strengthen their competitive position in the world markets by enabling them to be more responsive to changes in the market needs and requirements and hence be less vulnerable to competitor's actions.

OPEC countries have pursued vertical integration in different ways. Many of them have actively sought to develop transportation facilities of their own to offset shipping costs or have purchased distribution and marketing networks. The slump in crude oil prices has only underscored the need for OPEC nations to assure their revenue base and provided additional impetus to their efforts to guarantee markets for their surplus petroleum products. Increased vertical integration has become a mechanism to assure desired market shares to major producers regardless of the price of crude. Simply put, during crude-short periods, the production end of the entity is more likely

to be profitable; during crude-long periods, refining will likely be profitable and refining facilities will guarantee market access to crude producers.

Vertical integration helps in allowing the company to have more control over the economic environment in which it operates. This is important for the national oil companies as they try to break the oligopolistic structure controlled by the multinationals ⁽²⁰⁾. Furthermore, the national oil companies have been able gradually to penetrate the refining industry because they have gained in technology and expertise, which in turn has increased their bargaining position. Perhaps the Gulf state which has pursued the strategy of vertical integration most vigorously is Kuwait. Some experts predict that when Kuwait's planned refineries are fully operational, the focus of its export trade will be petroleum products rather than oil. The national oil company, Kuwait Petroleum Corporation, took the lead by purchasing most of Gulf Oil's European refinery and marketing assets. It has also pushed through a processing deal for its crude with Italy, and presently meets a high percentage of demand in the Benelux and Scandinavian markets through its refineries in Denmark and the Netherlands. It is continuing to expand its outlets in Europe. Recently, it has taken over an additional 53 filling stations in Belgium from Elf. Estimates are that outlets in Europe currently require around 200-250,000 b/d.

The fleet which the Kuwait Oil Tanker Company has developed reflects, in part, a shift in emphasis to petroleum products. The Kuwaitis recently scrapped plans to buy six more VLCCs and instead have awarded contracts for the construction of six new product carriers. Three of the new ships will be in the 120,000-dwt class, making them among the largest product carriers ever built. When this new order is filled, the KOTC's fleet will be composed of seven crude carriers and 21 products tankers, all intended for the European trade. In addition, several of the crude carriers are slated for conversion to the products trade ⁽²¹⁾. As a result of these developments, Kuwait's exports of petroleum products and its marketing and refining capacity abroad accounted for 78% of its total oil exports in 1987 (see Tables 7 and 8). In 1987/1988, crude export generated revenues were KD 820 million while product exports were KD 1.44 billion (Arab Petroleum Research Centre, 1989:208).

Table 8

Shifts in OPEC Oil and Petroleum Products Exports ('000 b/d)

Country	Total oil exports	Petroleum product exports	Marketing & refining capacity abroad	Product exports marketing and refining abroad as % of oil exports
1984				
Saudi Arabia	3652	497	---	13%
Kuwait	1025	419	150	56%
Venezuela	1509	518	50	38%
Libya	989	77	---	8%
Indonesia	1068	192	---	18%
1987				
Saudi Arabia	3652*	1040	---	28%
Kuwait	1025	545	250	78%
Venezuela	1509	550	400	63%
Libya	989	120	100	22%
Indonesia	1068	250	---	23%

* 1984 figures

Source: Compiled and corrected from industry sources.

Among the North African states, the Libyans, on a more modest scale, have begun to integrate vertically into the European market. At the beginning of 1986, the Libyan Foreign Investment Company, a state-owned investment bank, acquired a majority holding in the Italian refining and marketing company Tamoil Italiana Spa. Tamoil owns a 100,000 b/d refinery at Cremona and has an extensive gasoline and fuel oil marketing operation⁽²²⁾. This accounted for approximately 10% of Libya's total oil export in 1987 (see Table 8).

Other large OPEC oil producers have also followed a vigorous policy of vertical integration. The Venezuelans differ from the Kuwaitis in that they have focused on joint ventures with existing refineries and distribution networks abroad. In 1986, Venezuela's Petroleos de Venezuela SA

(PDVSA) acquired a 50% interest in Citgo Petroleum Corporation, the refinery, marketing and transportation subsidiary of Southland Corporation. PDVSA will provide its share of working capital through crude and exports. In addition, PDVSA agreed to deliver to Citgo at least 130,000 b/d of crude and other feedstock, with an option to increase deliveries to 200,000 b/d. PDVSA earlier agreed to buy a 50% interest in Veba Oel AG's Karlsruhe and Neustadt, West Germany refineries as well as 50% in Sweden's Nynas Petroleum and in Steuart Petroleum, a U.S distributor. In April of the same year, it signed a letter of intent to form a joint venture that will buy and operate Champlin Petroleum Company's 161,000 b/d Corpus Christi, Texas refinery and related marketing and distribution network. PDVSA will sell at least 130,000 b/d of crude to the venture at "market related" prices. The goal of these purchases, as described by the Venezuelan energy minister, is to assure markets eventually totaling between 300,000 and 400,000 b/d. This represents some 20 to 25% of Venezuela's total oil exports (see Table 8). In order to facilitate its entry into foreign markets, PDVSA has reorganized. Its two operating units have been merged and it has created a new unit to manage joint ventures in the U.S., Sweden, and West Germany⁽²³⁾.

As the holders of the non-Communist world's largest oil reserves, Saudi Arabia did not emphasize integration into foreign downstream operations in the past. Instead, they have sought to attract international oil companies and others to invest in its new refineries and petrochemical plants. However, lately Saudi Arabia's goal, like that of other oil-rich OPEC nations, has shifted to assure downstream outlets for its low-cost oil. In fact, in 1988 it has become the largest OPEC member to have downstream operations in the United States. As a result, its policy is not far from those undertaken by other OPEC nations.

The Outlook

High economic growth rates will lead to high energy consumption rates. The world GNP growth rate from 1986 to 1995 is expected to average 3% per year. Total non-Communist world energy consumption is expected to grow by 1% per year from 1986 to 1995 (World Bank, 1988; el Mallakh, 1986:10). Domestic demand in the Arab countries is expected to increase from 112.7mt in 1985 to 196.9mt in 1995 (see Table 9).

Table 9

Arab World Petroleum Products Production (mt)

	1980	1985	1990	1995
Total production	116.2	215.1	257.2	263.5
Domestic demand	71.1	112.7	153.1	196.9
Export potential	45.1	102.4	104.1	66.6

Source: Organization of Arab Petroleum Exporting Countries and Ente Nazionale Idrocarburi (1983), Prospects of Arab Petroleum Refining Industry. Kuwait: Authors

* Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Somalia, Syria, Tunisia, the U.A.E, Yemen AR, and Yemen PDR.

The oil product strategies of the OPEC exporters have evolved gradually since the first new OPEC refineries were planned. First conceived as a natural extension of OPEC's crude oil production, these new refineries can now be viewed as the linchpin in a strategy of vertical integration, a strategy which emphasizes securing access to markets as much as production. Once seen primarily as a means of garnering a greater share of the world trade in products, OPEC refineries can now be seen as a means of assuring market share with limited price erosion. The specific strategies of the OPEC exporters are only just now beginning to evolve, and as we have noted, there is considerable variation from country to country. It is expected that there will be further experimentation with pricing and marketing policies before a definite pattern of participation in the world products market emerges.

As vertical integration is more fully implemented, it will provide a measure of stability in the oil industry which will benefit not only the Gulf refiners, but also those in Western Europe and the United States. In fact, for vertical integration to become once again an effective strategy, cooperation and coordination among multinational oil firms and OPEC national oil companies are essential. The forms this cooperation will take will have a major influence on the shape of the oil industry as it approaches the

twenty-first century. Thus, vertical integration will increase the influence of OPEC as a cartel. Oil products have come under the jurisdiction of OPEC policy mechanisms, and so it is likely that an OPEC policy on products exports will emerge.

This change in the nature of the oil industry will impose new sorts of relationships across the oil industry and will not be necessarily limited to OPEC producers. The Norwegian oil producers have, for instance, purchased the Exxon distribution network in most of Scandinavia in an effort to guarantee a market for their products and to even out the effects of price fluctuations. We can eventually expect a gradual but significant reorientation of the world oil industry production and marketing practices and major realignments of relations among multinationals and OPEC countries. As exporting nations become more competitive along a broad range of products with the multinationals, they will move toward increased cooperation. Cooperation in this new world oil market will be quite different from the historical Seven Sisters framework, but also quite different from that of OPEC. Rather than sharp fluctuations in prices and demand, refineries can expect to enter a period of relative stability. By anticipating these new alliances and by continuing to develop flexible, sophisticated plants, efficient U.S. and Western refiners will be able to compete with OPEC export refineries on the world oil products market and will be in a position to profit from the increased stability that these new refineries and alignments will bring.

Notes

- 1) Oil demand is expected to pick up somewhat during the remainder of the century, assuming renewed worldwide economic growth at 3% through the 1980s and slightly less in the 1990s, which would see total non-Communist world energy requirements at 2% a year. See Petroleum Economist 52:191 (June 1985) and Conoco (1985), *World Energy Outlook Through 2000*. Wilmington, DE : Conoco Inc.
- 2) Various estimates come from the OPEC Downstream Project (1985), *Changing Structure of the World Refining Industry: Implications for the United States and Other Major Consuming Regions*. New York: Resources Systems Institute (February), p. 112; Oil and Gas Journal 82:33 (11 November 1984); National Petroleum News 77:38 (February 1985). See also the New York Times, 14 November 1984, IV, 1:2.

- 3) For a history of OPEC strategy, see F. Ghadar (1977), *The Evolution of OPEC*. Lexington, MA: Heath.
- 4) The ambitious and expensive plans of OPEC exporters have been curtailed somewhat. Some projects, announced earlier in the decade, have been canceled such as Saudi Arabia's Qassim facilities which were to have been managed by Bechtel. Others have been cut back in production potential, reduced in sophistication, and/or delayed because of construction problems. Regardless of such changes in plans, however, a new major OPEC products export capacity will be a reality in the near future.
- 5) *Petroleum Economist* 52:135 (April 1985).
- 6) *Petroleum Economist* 51:407 (November 1984).
- 7) Saudi Arabia's joint ventures are with Shell (Jubail), Mobil (Yanbu), and Petrola (Rabigh).
- 8) Alkylation is part of the processing of high octane aviation fuels.
- 9) *Petroleum Economist* 52:258 (June 1985).
- 10) *Oil and Gas Journal* 83:36 (5 August 1985).
- 11) *OPEC Downstream Project Report* (1985), *Changing Structure of the World Refining Industry*. New York: Resources Systems Institute, pp. 123-124.
- 12) *Petroleum Economist* 52:91 (March 1985).
- 13) *Petroleum Economist* 52:135 (April 1985).
- 14) *National Petroleum News* 77:38 (February 1985); *Oil and Gas Journal* 83:39 (18 March 1985).
- 15) *National Petroleum News* 76:31 (August 1984).
- 16) *Petroleum Economist* 52:256 (June 1985). *Petroleum Economist* also reports that the Japanese Petroleum Association suspects that the call for reduced domestic refining capacity will create room for product imports from the Middle East.
- 17) *Oil and Gas Journal* 82:52 (19 November 1984).
- 18) *Oil and Gas Journal* 83:51 (23 July 1985).
- 19) *Oil and Gas Journal Newsletter* (15 July 1985).
- 20) *Petroleum Economist* 52:135 (April 1985) and 52:445 (December 1985).
- 21) *Petroleum Economist* 52:339 (September 1985).
- 22) *Oil and Gas Journal* 84:3 (20 January 1986).
- 23) *Oil and Gas Journal* 84:6 (10 February 1986), 84:9 (3 March 1986), 84:16 (21 April 1986), and 84:20 (19 May 1986).

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The Impact of the New OPEC Downstream Operations on Oil Industry Structure

Amal el-Tigani Ali Fariborz Ghadar

Since its emergence in 1960, OPEC has been able through its increasing control of oil prices and production to reduce substantially the degree of vertical integration that had characterized the oil industry for decades. OPEC policies also led to rapid and sharp fluctuations in the price of oil which resulted in changing both the magnitude and structure of worldwide demand. This paper describes and analyzes the new OPEC downstream operations and shows how they have affected the current structure of the international oil industry. The paper analyzes the phenomenon of vertical integration and shows how it has been carried out by different members of OPEC. In addition, the paper provides some insight into future vertical integration by OPEC countries and the changes that will ensue in the oil industry structure.