

# ENERGY INVESTMENT ADVISORY SERIES

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No. 3

## Investment Opportunities in the Persian Gulf Energy Sector

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Program on Resources: Energy and Minerals  
East-West Center  
Honolulu, Hawaii

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## I. Introduction

Sometimes the greatest investment opportunities are in those areas where the least progress seems to be taking place. This report describes energy-based developments that are taking place in the Persian Gulf.<sup>1</sup> Relations between the United States and two countries covered by this review, Iran and Iraq, are currently dismal. No formal diplomatic relations exist and prospects of warm relations seem remote. Despite apparent oil wealth, both Iran and Iraq are experiencing domestic economic hardships due to their difficulties with the outside world and to low oil prices. From an investment or trade standpoint, it is tempting to write off each nation as not promising. The truth might be the opposite if an investor also has patience. The isolation of Iran and Iraq is bound to be transient though the end is perhaps not immediate, much as was the case earlier of formerly isolated nations such as China or Vietnam. When the isolation ends, Iran and Iraq might promise a well prepared investor more returns than could be found elsewhere in the region.

The rest of the Persian Gulf consists of the six nations of the Gulf Cooperation Council (GCC): Kuwait, Saudi Arabia, Bahrain, Qatar, the United Arab Emirates (UAE), and Oman. These nations are forging closer political and economic ties with each other though there is considerable question as to how much sovereignty each would willingly yield for a common interest. We doubt that any would give up as much sovereignty as has been forgone in the European Union, but similar political and social systems permit and encourage close cooperation when required. Their economic interests are generally the same, based on oil and gas production, refining, and exports. The GCC thus is an interest group or trade bloc as much as it represents efforts toward internal economic integration.

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<sup>1</sup> The Arab nations of the Gulf prefer to call it the Arabian Gulf. We follow the area's original mapmaker, Ptolemy, and the convention of the English language in calling it the Persian Gulf. For the sake of the curious, Ptolemy's Arabian Gulf was the Red Sea. His Red Sea was the Gulf of Aden

GCC members vary in their openness to foreign investments, though each allows joint ventures in aspects of its economy. Usually GCC members require involvement of either the national oil company or some other nationally dominated firm in large investments. This situation is changing, however. Saudi Arabia is receptive to private investments in petrochemicals, Kuwait is opening management contracts for its major oil fields and is seeking foreign oil exploration, and Bahrain and Oman now seek private participation in their electricity generation. Saudi Arabia is now talking about privatizing several government-owned firms, while Bahrain, Dubai within the UAE, and Oman are receptive to a variety of foreign investments. Saudi Arabia, the UAE, and others are also developing private oil firms that have invested in a variety of domestic and foreign endeavors. A contrast of sorts might be Qatar, which insists on involvement of its state oil company in most investments.

## **II. The Business Environment in the Persian Gulf**

Central to the energy environment of the Persian Gulf is the national oil company. Such companies have ranged from Petroleum Development Oman (PDO) and some firms in the UAE that have private and foreign participation dating back to World War I to Saudi Aramco or the National Iranian Oil Company (NIOC), which are monopolies fully owned by their respective governments. Most Gulf nations now allow some form of joint venture within the oil industry, with downstream activities particularly favored, but government control remains the dominant trend. Kuwait and Iran have recently experimented with upstream management contracts, and Oman and some individual emirates within the UAE permit private foreign-owned exploration. Iraq permitted upstream joint ventures prior to the Gulf and Iran-Iraq Wars. Such relationships might resume with any readmission to Iraq to the world oil trade. There is a definite trend in all sectors toward increased private participation that is more intense in nations that either are having fiscal difficulties due to today's relatively low oil prices or face the need to upgrade their oil recovery procedures.

Oil and gas reserves and production of individual Gulf nations are provided on Table 1. Reserve figures should be accepted with caution, because such figures reflect both the results of exploration and the interplay of oil politics. Most nations in the Gulf belong to OPEC (Oman and Bahrain do not), where both reserve and historic production levels have been used to justify production quotas. Also, the rate of oil or gas recovery is related to reservoir structure and management. Technically and economically advisable production-to-reserve ratios can vary widely among producers. Finally, many products such as natural gas liquids and condensates can be defined in ways that defy the OPEC quota system. Production figures thus are often arranged by nations to include or exclude such numbers as is convenient.

Table 1. Oil and gas reserves and production in the Gulf nations

| Country      | Oil, 1994                        |  | Gas, 1993                             |  |
|--------------|----------------------------------|--|---------------------------------------|--|
|              | Reserves<br>(billion<br>barrels) | Production<br>(million<br>barrels/day) | Reserves<br>(billion<br>cubic meters) | Production<br>(million cubic me-<br>ters/year) |
| Iran         | 89.3                             | 3.57                                   | 20,671                                | 27.1   |
| Iraq         | 100.0                            | 0.52                                   | 3,101                                 | 2.6  |
| Kuwait       | 96.5                             | 2.05                                   | 1,498                                 | 4.5  |
| Saudi Arabia | 261.2                            | 8.02                                   | 5,263                                 | 35.9   |
| UAE          | 8.1                              | 2.23                                   | 5,794                                 | 25.0   |
| Bahrain      | 0.2                              | 0.11                                   | 167                                   | 7.7  |
| Qatar        | 3.7                              | 0.41                                   | 7,079                                 | 13.5   |

Sources: *Oil and Gas Journal* (oil) and *BP Review of World Gas 1994* (gas).

Note: Neutral Zone allocated between Saudi Arabia and Kuwait.

Domestic politics have forced nations of the Gulf to assert that they are diversifying their economies away from oil and gas dependence. This can be misleading and much claimed diversification has been into petrochemicals, which we consider an energy

industry. Further, touted diversifications such as agriculture in Saudi Arabia or aluminum, iron, and steel in Bahrain or the UAE are subsidized by low energy costs.

Subsidies are the characteristic of Gulf nations and not the exception. Not just oil products, gas, and electricity are provided at subsidized prices, but also food, consumer goods, and housing. Local economies are thus subjected to substantial price distortions. Occasionally situations arise where public utilities make net negative contributions to gross national product as a result. Recent low oil revenues have highlighted the cost of these subsidies, as Gulf nations have struggled with budget deficits brought on by subsidy costs, weak tax bases, and a recent history of abundance. Most are cutting back on subsidies rather than instituting taxes. Even now it is difficult to say what the true "economic" cost of many goods and services are, amidst the maze of government involvement within the commercial sector. Without a clear view of such costs, for example, can it be said that the massive investment in petrochemicals over the recent decades adds to net economic welfare? Or have they taken revenues from one pocket (oil production) and put them in another?

Each Gulf nation has experienced rapid population increases brought on by some of the world's highest birthrates and by improved health standards. This has produced many young citizens with difficulty finding rewarding careers. Gulf nations have responded by restricting many employment positions (many subsidized) to their nationals in preference to expatriates. Expatriate numbers are scheduled to decline in the process, while the expatriate population is increasing from nations where workers accept lower wage levels. It is debatable whether the new employees, domestic and expatriate, have the same skills as the original expatriates.

Despite their fabled wealth, the Gulf nations are now experiencing relatively hard economic times. This means that they will continue to provide opportunities for foreign investors within their energy industries, but also that the character of these opportunities will become an evolving factor. Governments are learning to pay more attention to their budgets in the process.

### **III. Investment Opportunities in the Persian Gulf**

#### **1. Iran**

**General:** Iran's interest in foreign participation in its economy has been intensified by deterioration of the domestic economy, which has been characterized by excessive inflation and prices that do not reflect costs or availability. Iran believes itself to be open to foreign energy investments but prefers that foreigners participate in the oil industry through service contracts. Some joint venture arrangements have been recently offered. The apparent need to permit foreign involvement in many aspects of economic development has often run afoul of domestic political requirements that strive for internal political, religious, and social integrity. This is a long-standing conflict within Iran that predates the Revolution and will probably outlast it. The result has been mercurial policies that discourage all but the most hearty investor.

The government is on record in favor of privatizing government-controlled industries, a large part of the economy. In 1991 as much as 60 percent of the national budget was spent subsidizing state-affiliated firms. Policy implementation has been slowed by considerable opposition within the Majlis and other politically influential bodies, but state firms have seen their access to the budget decreased. Nonetheless, privatization efforts have been ineffective and not many former state-owned firms are now in private hands.

Iran is cooperating more than previously with the World Bank and IMF and has recently received loans from these bodies over opposition from the United States and others. Bad relations with the United States have limited Iran's access to U.S. technology imports, though trade in general is not embargoed. U.S. firms are the largest buyers of oil exported from Iran, though almost all of the purchases go to their foreign operations. This situation and the view that elements within the Iranian regime are funding international terrorism have led to some ongoing efforts within Congress to limit the commercial relationships between U.S. oil firms and Iran.

**Oil:** Oil and gas issues are managed by the National Iranian Oil Company (NIOC). Production was around 3.6 million barrels per day (b/d) in 1994 (Iran's OPEC quota), of which over 1 million b/d was consumed domestically. Iran has a targeted production capacity of 4.5 million b/d by the year 2000. Low international oil prices in recent years have reduced government revenues below budgeted levels, leading to recurrent fiscal crises.

Domestic oil, gas, and electricity prices are regulated by the government and have been set at levels that approach free distribution. A gallon of gasoline, for example, recently cost roughly 10 U.S. cents a gallon compared with perhaps 25 cents on the other side of the Gulf. Devaluation of the rial has since lowered the effective oil product price further, even though recent budgets have increased prices in rials. The outcome of such changes remains confusing and ever changing, though domestic oil product prices remain the lowest in the world. The consequence has been rapid and sizable demand growth for gasoline and other oil products and popular resistance to efforts to raise prices to levels that cover operating costs and investment requirements. In August 1994 Oil Minister Aghazadeh called for a 400 percent increase in petroleum product prices (in inflated local currency) as part of efforts to reduce domestic consumption by 20-30 percent. The proposal was significantly revised in October in favor of a gradual rise in oil prices over the coming five year planning period. The price change still kept oil prices below the subsidized level of other Gulf nations and has been eroded by subsequent inflation.

Iran's oil reserves are estimated at around 89.3 billion barrels. While this ranks Iran fifth in the world, the reserve claims of the nations ranked second through fifth do not differ statistically. Before the Revolution and the Iran-Iraq War, Iran briefly produced over 6 million b/d of crude. Sustainable levels of production have subsequently declined because of deteriorated reserve quality. Investments are planned at several oil fields, many of which are offshore. More sophisticated recovery efforts will increasingly be needed and probably will require some foreign experience and capital. While U.S. oil companies are discouraged from dealing with Iran by their governments, there is no out-

right ban at present. (Technology transfers are banned by the United States.) U.S. firms might thus appear disadvantaged in such efforts, but one large contract (at the Sirri oil field) may have gone to Conoco, and ARCO is interested in similar arrangements. Other Western firms interested in Iran's offshore include Total and Shell. Proposed activities include participation in the development and production of offshore oil fields.

Foreign onshore activity is banned by the Iranian constitution. Compared with the fields of its neighbors Iraq, Kuwait, Saudi Arabia, and the UAE, Iran's onshore fields tend to be small, dispersed, and subject to rapid depletion. So far, few firms are interested in onshore cooperation with NIOC, an act that might not be well received within Iran's more radical political circles.

Iran seeks to expand and upgrade its refining facilities, seeking to increase distillation capacity from 985,000 b/d in 1993 to 1,647,000 b/d in 2000. It is unlikely that Iran can finance its entire slate of refinery investment domestically. Any rapprochement with the international investment community might lead to joint ventures in the refining sector, though this is still controversial within Iran. Present refining capacity is inadequate to meet domestic demand, as it has been for some time. Iran consequently imports some of its refined product requirements from the smaller emirates on the south side of the Gulf and from elsewhere.

Iran's foreign exchange dependence on oil and a perceived need for redundant facilities in light of Gulf instability give Iran a continued need to maintain, expand, and improve existing terminals and incentives to find routes to foreign markets that are less dependent on passage through the Strait of Hormuz. While the Bahregan and Cyrus terminals are presently idle and thus redundant, investments in other facilities are ongoing. U.S.-based firms have been the most significant buyers of Iranian oil in recent years and are thus interested in the process.

Iran seeks to invest in oil projects outside of its borders. Announced plans include oil refineries in Pakistan and China and oil reserves in Azerbaijan. Often, announced

Iranian intentions in overseas investments are not backed by action. (The same has been said of other Gulf states.) Iran has also agreed to refine Kazakhstan's Tengiz crude at NIOC's Tehran refinery, in exchange for Kazakh title to comparable volumes of Iranian oil at the Kharg Island terminal. Iran has also agreed to participate in a variety of schemes to export Central Asian (notably from Azerbaijan and Turkmenistan) oil to Europe through Iranian territory. Such pipelines must compete with potential routes crossing Russian and Central Asian territories.

**Gas:** The North Pars (47 trillion cubic feet) and South Pars (100 trillion cubic feet) gas fields are part of the same structure as the North Field of Qatar and Bahrain. Together these are perhaps the world's largest gas field. Nations of the region count on the fields' development to augment their hydrocarbon income. Total Iranian gas reserves are placed at 27.1 trillion cubic meters, slightly less than the equivalent of 25 billion barrels of crude oil. The South Pars field is managed by the newly formed Petroleum Development and Engineering Co. (Pedco), which had intended to find foreign partners in South Pars developments. Such South Pars efforts have failed, and Pedco now intends to develop the field on its own, but perhaps with foreign contractors. (Recent requests associate Shell with South Pars.) North Pars development is reported to still be open to foreign participation because of negotiating difficulties between Iran and Shell. Current Iranian production is around 20 billion cubic meters of gas per year. Plans call for the increased use of gas for domestic energy needs as a substitute for oil, which is seen as having a higher export value. Domestic gas service is being expanded in the major cities.

The Central Asian republics are looking for secure export routes for their oil and gas. Iran has willingly offered to become part of the process, giving geographic access to either Turkey or to the Gulf, both potential shipping points. So far the principal result has been an agreement with Turkmenistan to pipe gas through Iran to Turkey and Bulgaria. Russia and Kazakhstan would also participate in the arrangement. Iran would fund half of the costs of the Iranian portion of the pipeline. A shorter gas pipeline through Iran might serve nearby but isolated Nakhichevan in Azerbaijan with gas from Azerbaijan

proper. Energy hungry Georgia and Armenia might also receive gas from Iran by pipeline.

Iran has its own gas pipeline plans and supports the idea of a regional trunk line linking the Middle East's gas reserves to Asia and Europe. Progress on such efforts would be slow, given the political differences within the region. Components are more likely to develop before an entire system comes into being. A gas pipeline from Qeshm Island to Gujarat in India has been proposed. The line would transit Pakistan's continental shelf and might thus also serve markets there. LNG projects have been proposed, with a terminal in at Chah Bahar possible. Several new markets for LNG are developing, with proposed power plants in India and China being designed for LNG fueling.

**Hydro:** Iran is one of the few nations in the Middle East with hydroelectric potential. The Karun 3 hydropower plant on the Karun River in Khuzestan is by far the largest project under consideration. It would be built by a construction firm affiliated with the Ministry of Energy.

**Nuclear:** Just before the Revolution, Siemens and Iran started building a nuclear electricity generation facility in Bushehr. Construction was abandoned after the Revolution. After recent inquiries, Germany has declined to resume work on the project. Since 1994 Russian technicians have resumed activity at the site. This indicates continued Iranian interest in nuclear power. The plant is believed capable of being put in operation within three years.

**Electricity:** Iran's renewed interaction with the World Bank has included a \$450-500 million loan for the improvement of power generation. One effect of subsidized energy prices has been a rapidly growing electricity sector.

**Petrochemicals:** Most of Iran's petrochemical plans are based on several ethylene producing complexes. Each is owned and managed by the National Petrochemical Company (NPC), a state-owned firm. Private participation is encouraged but foreign ownership cannot exceed 49 percent. Facilities at Abadan, Bandar Imam Khomeini, and Arak have

been on stream for a year or more, while a fourth complex at Tabriz is scheduled to come on line during 1995. A fifth complex at Isfahan is to open in 1998 and a sixth complex is planned, also at Bandar Imam Khomeini. The original Bandar Imam Khomeini facilities are also to be expanded early in the next century. Each facility is based on olefin production, while the Isfahan plant and the second stage of the original Bandar Imam Khomeini complex will include aromatics units. Iran is committed to producing a complete array of the more important derivative petrochemicals at its facilities. While ethane is the preferred feedstock at most facilities, the original Bandar Imam Khomeini facility can take a variety of feedstocks. The Isfahan complex will use naphtha from a nearby refinery as a feedstock and is designed to produce derivative chemicals based on heavier olefins. Iran's facilities are designed for both export and domestic markets.

Iran also produces natural-gas-based petrochemicals. A 660,000 tonnes/year methanol plant is being built at Kharg Island, with half of its output slated for export when completed in 1998. A 60,000 tonnes/year methanol plant already exists at Shiraz. A 750,000 tonnes/year urea plant is to be built on Qeshm Island, and a 100,000 tonnes/year urea plant at Shiraz will probably be expanded by 75 percent. An ammonia/urea plant in Khorasan Province might open in 1995.

Iran provides subsidies on feedstock cost (apparently 30% discounts on world prices) to petrochemical producers similar to those provided by other Gulf suppliers. Such subsidies will become increasingly expensive as gas and oil reserves become committed to other economic uses.

## **2. Iraq**

**General:** While Iraq is still subject to economic sanction on its oil and gas exports due to its invasion of Kuwait and subsequent precipitation of the Gulf War of 1990-91, many nations now speculate that this status will soon end. It remains the public policy of most members of the UN Security Council that Iraq has not met criteria set during and after the

War that would permit the resumption of its oil exports. This view is not popular with many citizens of the Gulf, with the Russian Federation, and others. Many businesses are quietly preparing for the lifting of the sanctions. Still it remains a matter of speculation when this will take place. Some smuggling of oil exports is rumored—through Iran, Jordan, and Turkey—but the volumes are a small portion of Iraq's potential. Iraq like other Gulf states has targeted public sector corporations for privatization to local shareholders. It has had difficulty finding domestic parties willing to purchase such assets at acceptable prices.

**Oil:** Iraq's oil reserves, estimated at around 100 billion barrels, are among the most abundant in the world. Further, prospects of finding new oil reserves are generally regarded to be good. The UN embargo has limited oil production to around 500,000 b/d, mainly for domestic use. Some exports to Jordan are tolerated, but recently ships have been intercepted in the Gulf carrying embargoed cargoes. Support for sanctions appears to remain firm among the United States and many of its principal allies, but is reported weakening in several neighboring countries, notably Qatar, Oman, and Iran. The possibility remains that Iraq might meet international requirements for the embargo to be lifted. A return of Iraqi oil to world markets must be expected at some undetermined point in the future.

The amount of Iraqi oil available for export is debatable but is usually seen as hovering around 2–3 million barrels per day. (Longer term targets place future oil production at 5.5–6.0 million b/d.) The exact amount immediately available will be less and will depend in part on how well Iraq has managed its shut down oil fields and on the terms under which sanctions are lifted. OPEC can be expected to have difficulties setting an appropriate quota for Iraqi production, a task that was not easy before the embargo. Several oil firms, including Elf, Total, Agip, and the Russians, are positioning themselves to participate in Iraq's return to world markets. Iraq allowed foreign participation in its exploration program before the Iran-Iraq War and is likely to permit participation in its upstream sector in the future.

In common with other Gulf nations, Iraq has sought to increase the value of its exports by refining and marketing a share of its oil exports. The Gulf War has left portions of Iraq's refining capacity idle and has left the management and maintenance of many facilities in local hands. Iraq claims to have continued its upgrading and debottlenecking of existing refineries, but when the embargo is lifted, the idled refining capacity might be called on again and might require rehabilitation and debottlenecking. Policies of refining crude oil in domestic facilities prior to export can be expected to be revived as markets reopen. At that time the issue would become one of financing any expansions or improvements.

**Gas:** Iraq can be expected to participate in any regional gas developments. Its gas reserves have been estimated at around 3 trillion cubic meters. Iraq could be both a supplier of natural gas and a transit area for shipments to more distant areas. In order to become a transit location (not argued here as a strong possibility), relations with neighboring countries would have to improve. The improved ability of nations to build subsea gas pipelines will increase the ability of gas lines to select their transit routes. This should weaken Iraq's bargaining position in any joint pipeline efforts.

**Hydro:** The water available for hydroelectric activities in Iraq is limited to the Tigris and Euphrates river systems. Much of this water is scheduled to be diverted by Turkey in elaborate irrigation and power programs and is the subject of considerable regional discussions and acrimony. Turkey has offered to share the resources that it develops but has not yet convinced its southern neighbors that any scheme that diverts available water would be equitable. Extensive hydroelectric development would require settlement of this issue, access to international financial resources, and the settlements of sovereignty issues in Kurdistan, where any sizable Iraqi hydroelectric capacity is located.

**Nuclear:** The agreements following the Gulf War have pretty well precluded any internationally accepted Iraqi nuclear plans for some time to come. Iraq is not likely to fully abandon its long held ambitions regarding nuclear electricity. A "North Korean" style

compromise cannot be ruled out, but most likely not until Iraq gains the trust of the nations providing nuclear technology.

**Electricity:** Iraq is still a member of the Mashreq (eastern) group of Arab nations that have long term ambitions to link the electricity systems of Arab states from Egypt to the Iranian border. Distances between population centers make this a long range, and perhaps expensive, goal. Iraq might have a pivotal role of any system that arises, though it has been inactive in the Mashreq group since the war.

**Petrochemicals:** Iraq has a domestic petrochemical industry, though the aftermath of recent wars has certainly halted its growth. Iraq can be expected to follow other Gulf nations in developing its petrochemical industry, once it has access to international markets and finance and after domestic markets resume their growth.

### **3. Kuwait**

**General:** Kuwait's recent receptiveness to foreign investment is a direct outgrowth of the Gulf War. Kuwait sees foreign, particularly American and European, economic involvement as a guarantee of defense support if Kuwait were threatened again by invasion from Iraq or other neighbors. Low oil prices have diminished government revenues, leaving the nation's ambitious investment plans short on domestic financial support.

**Oil:** Kuwait's oil field and refining facilities were severely damaged during the Gulf War but have now been essentially repaired. It remains to be seen whether the months of uncontrolled flow and burning of oil from the oil fields after the Gulf War damaged Kuwait's reserves. Reserves are sufficient (96.5 billion barrels) that damage might not appear for several years. Recent exploration activities have found deep oil sources below existing oil fields that might yield lighter, higher priced crudes than have previously been produced in Kuwait. Most oil field developments have been the exclusive territory of the national oil company, Kuwait Petroleum Co. (KPC). Kuwait has recently expressed an interest in foreign, specifically American and European, involvement in upstream activi-

ties. This has recently taken the form of three year management contracts for oil fields. Chevron obtained the contract for the large Burgan field, BP has the contract for the Minagish and Umm Gudair fields in western Kuwait, and Amoco has bid on the contract for the northern Bahrah, Sabriyya, and Raudhatain fields. Kuwait also seeks foreign oil companies to explore for untapped oil fields in its northern border areas. Texaco has the contract for Kuwait's share of onshore Neutral Zone activities.

Opportunities for joint ventures in downstream investments are also developing, though the government will be selective. Domestic investments are handled by the Kuwait National Petroleum Corp. (KNPC), a KPC affiliate. Greatest opportunities should be in petrochemicals (see below) rather than refining, and companies that have upstream contracts seem to have particular advantage in downstream opportunities. Kuwait has targeted increasing domestic refining capacity from its current 800,000 b/d level to 1 million b/d by the end of the century. Refining capacity will also be upgraded to raise the value of products produced. Kuwait is interested in new joint refining ventures overseas, including 400,000 b/d of refining capacity scheduled in India, Pakistan, and Thailand. KPC's European network is also to be expanded from 135,000 b/d to 300,000 b/d. Many of these investments will depend on Kuwait's ability to fund the ventures, a condition that will vary with oil prices and the country's receptiveness to joint venture participation.

**Gas:** Despite long term efforts to locate independent natural gas reserves, most gas in Kuwait is associated with oil production. Reserves are placed at 1.5 trillion cubic meters, a still substantial sum. Relatively low levels of gas reserves have limited Kuwait's ability to develop downstream investments in areas such as petrochemicals.

**Electricity:** The main electricity market in Kuwait is limited to the city of Kuwait and to industrial regions located to the south along the coast. Industrial development is resuming following the Gulf War, and several electricity-intensive plans, notably in petrochemicals, are being developed near Shuaiba and other refining centers.

Kuwait is one of several Gulf nations that is considering a 750 mile electricity interconnection along the southern and western Gulf. The longest reaches of any such plan would be in Saudi Arabia, but if developed the system would permit transfers of electricity among regional utilities.

**Petrochemicals:** Kuwait has generally been slow to develop petrochemical production but things seem to be changing rapidly. Petrochemical plans in Kuwait are centered on a long planned complex located near the Shuaiba refinery. Plans for the site are to be based on a 650,000 tonnes/year ethylene plant at Shuaiba to be owned by Kuwait's Petrochemical Industries Co. and Union Carbide. Feedstock for the complex is ethane from Kuwait's associated gas supplies. Ethane would probably be priced below world levels, as is the case in nearby Saudi Arabia and Iran. This plan has been on the books since before the Gulf War, but had been repeatedly delayed. It apparently will now go through. Derivative product facilities for polyethylene and ethylene glycol will consume much of the plant's output. MTBE facilities are also being considered. A planned 100,000 tonnes/year polypropylene facility at Shuaiba would receive propylene feedstock by pipeline from the nearby Mina al-Ahmadi refinery's fluidized catalytic cracking unit. Amoco is also interested in possible aromatics supplies from Kuwait.

#### **4. Saudi Arabia**

**General:** The Saudi economy still depends on state-controlled corporations that are active in areas such as oil, gas, petrochemicals, and transportation. The government intends to privatize parts of this structure, though Saudi Aramco, the national oil company, is effectively off limits and Saudia, the airline, is in such bad financial shape that no one seems to know how to privatize it. Petrochemicals are an area where foreign joint ventures are permitted and in which the national company, Saudi Basic Industries (Sabic), has private shareholders. Generally, shares in Saudi corporations are available only to Saudi nationals, and joint ventures require significant Saudi ownership. There is consid-

erable private capital available, and there is a willingness to invest some of that capital domestically. Yet further private funds are stored in overseas investments and accounts.

**Oil:** Saudi Aramco enjoys a monopoly in most exploration, production, transportation, and wholesale marketing of oil and gas in Saudi Arabia. Saudi Aramco also has a monopoly on domestic refining and a share in all refining. Retail marketing of oil products by locally owned firms is permitted and encouraged. Some oil products, notably lubricants, are sold under major international brand names. Much of the lubricating oil manufacturing in Saudi Arabia is done by Luberef, a Saudi Aramco affiliate, though private lubricant blending firms exist.

Saudi Arabia has, if anything, too much oil. Proven reserves are estimated at about 260 billion barrels, well over twice the level of the next nearest producing nation. Recent exploration has found new oil and gas reserves on the Red Sea coast (at Midyan in the north), in several oil fields in the central region of the nation, and in the Empty Quarter (Shaybah). These new reserves have generally been of qualities that command higher prices on world markets than established oil supplies, but only the fields in the central region are located near enough to existing transportation systems to warrant further development. Much of Saudi Arabia's reserves are from limestone rock formations which will not permit as high production-to-reserves ratios as do classical sandstone formations. Thus, increases in sustainable production levels in Saudi Arabia require more investment expense than might be expected. Given Saudi Arabia's excess of available reserves, foreign participation, in the form of equity, is usually regarded as not likely outside of the Neutral Zone, where foreign firms have long been active. Surprisingly, however, there are preliminary indications that the remote Shaybah oil field might also be opened to foreign participation.

Refining for export has been an area where the Saudis formerly have sought joint venture activities. Local oil product markets are growing rapidly, owing to low retail prices and to subsidies elsewhere in the economy (such as agriculture). Saudi Aramco's take from the "export" refineries has been increasingly devoted to meeting domestic

needs especially for middle distillates and gasoline. This will most likely lead to further upgrading of existing refineries (already planned and in many cases under way) and perhaps even new facilities. Joint venture refineries with the Japanese within Saudi Arabia have been announced and apparently abandoned. There remains a possibility that some refined oil products might be imported into Saudi Arabia if refining facilities are not expanded rapidly enough. Saudi Arabia's 1995 government budget includes a 6 percent reduction in expenditures, some of which is to come from reductions in subsidies on oil products, including gasoline. In consequence, domestic retail oil product prices have been effectively doubled to levels still substantially below international product prices.

**Gas:** Saudi Aramco enjoys an effective monopoly over most aspects of natural gas production and distribution in Saudi Arabia. Most gas produced in Saudi Arabia is associated with oil production, but the days when a decrease in crude oil production also meant a domestic shortage of natural gas are gone. This is partly due to higher levels of crude oil production and partly to the development of deep gas sources from lower strata of the large Ghawar oil field and from the Central region's new fields. Proven gas reserves are now placed at 182 trillion cubic feet and should rise with time.

Natural gas has been the preferred source of fuel for desalination plants in Saudi Arabia. The nation's demands for such water have been substantial. The same plants also supply part of local electricity requirements. A large portion of this water has been used for agricultural developments that have succeeded in making Saudi Arabia an exporter of several crops, notably wheat, but at operating costs that have proven to be a drain on the national treasury (through subsidies). The government has recently diminished agricultural subsidies as a budget-controlling measure. It is not yet clear whether this will mean a decrease in the requirements for gas in desalinization.

Saudi Arabia, the UAE, and Qatar have proposed a gas pipeline that would cross Jordan in order to supply European markets. Past difficulties with pipelines carrying oil to Europe seem to have been forgotten in the public statements and it is by no means

certain that the project would be economically feasible, especially if Russian and North African gas prove sufficient for Europe's needs.

**Electricity:** Electricity in Saudi Arabia is managed by four utilities referred to respectively as SCECO-East, SCECO-Central, SCECO-West, and SCECO-South. SCECO is an abbreviation for the Saudi Consolidated Electric Company. Each SCECO unit is relatively independent, including its management structure. The East (Dammam, Dhahran, Jubail, and Al-Khobar) and Central (Riyadh and the neighboring regions) grids are interconnected, and the West (Jeddah-Yanbu-Rabigh) constitutes a complete grid. The South unit is small and consists of several isolated units in the Asir Region, near Yemen. Generally power plants in the East system burns natural gas, while much of the power in the Central region consumes crude or fuel oil. We expect that the Central region will shift its generation plans more in the direction of gas and electricity imports from the East as conditions permit, since this would allow more oil exports under OPEC production quotas. It would also take advantage of coastal desalination needs. South region plants are small and often involve diesel fired facilities. Some industrial facilities generate their own electricity, but the low price and relative reliability of existing public supplies have led some firms to switch to the national grid. Recent government subsidy cuts to oil product prices have exempted fuel oil, thus continuing, in effect, subsidies to those SCECO units (Central and apparently West) that use fuel oil as a fuel. The electric utilities generally have a poor record of paying for their fuel supplies in any case.

Plans to further connect the regions of Saudi Arabia are progressing but are inhibited by low electricity rates that are not related to operating costs or to the costs of new capacity. If a regional interconnection takes place in the South, incentives to change generation methods there should develop. Similarly, as connections are expanded among SCECO utilities, energy producing areas (the East) might also increase their present role as electricity exporters. There are four new power stations planned for Saudi Arabia, though financing is not complete. These plants will be built by international consortia,

but future ownership and operation remain with the SCECO utilities. Recent reforms have raised electricity prices, but collection is a major problem for Saudi electric utilities.

Saudi Arabia does not presently have independent power producers generating electricity for the national grid, but is very much concerned about financing future electricity requirements. The government has recently indicated that private sector investment in electricity might be permitted. The country is also committed to offering \$5 billion in shares of the SCECO firms to the public by 2000. Shares in Saudi corporations are usually available only to Saudi nationals. We believe that some form of independent power production is inevitable through joint ventures. Experience in other sectors of Saudi Arabia indicates that local participation will be required and that a government-managed entity (i.e., a SCECO utility) might be the most reliable choice. Existing electricity tariffs (even though now raised) would preclude private incentives to participate, without subsidies.

Saudi Arabia, the UAE, Kuwait, Qatar, and Saudi Arabia are investigating a 750 mile, 400 kV transmission line to serve as a Gulf power grid. (More ambitious regional grids have been proposed and studied, but must be considered remote possibilities.) The grid would allow power to be transferred among participating nations to meet local needs. Saudi Arabia's geographic position in the center of this network would certainly be key to any plan.

**Petrochemicals:** Sabic (Saudi Basic Industries) is the national petrochemical corporation. Shares of Sabic are traded on local stock exchanges. A majority of Sabic shares are government-controlled, but further privatization has been proposed in response to financial problems brought on by the Gulf War and low oil prices. Sabic is the only Saudi entity whose shares may be bought by citizens of other southern Gulf countries. Many Sabic affiliates are either joint ventures with large foreign firms or have private shareholder participation.

Saudi Arabia promotes Sabic's petrochemical industry investments through 30 percent discounts in natural gas feedstock prices from Saudi Aramco and through low prices for electricity used in the production of petrochemicals. The availability of these discounts to other petrochemical investors (i.e., not Sabic) has been subject to considerable debate. Saudi Aramco and the SCECO system find the subsidies economic burdens and feel that such subsidies might lead to inefficient investments. It appears that these subsidies might become more generally available, but we expect that subsidies, even to Sabic, will be questioned, if international oil prices do not rise substantially and public funds are consequently scarce.

Early developments in the petrochemical area were centered on natural-gas-based petrochemicals and their derivatives. Specific attention was given to ethylene, methanol, and ammonia-derived products. Saudi interests have expanded more deeply into derivative products with methyl tert-butyl ether (MTBE, a gasoline additive), ethylene glycol, and polyethylene receiving particular attention. Sabic intends to develop a more complete array of petrochemicals in the future. Future developments will continue in these areas and will also involve heavier olefins (propylene, butylenes, and butadiene), aromatics (benzene and xylenes), and their derivatives (polypropylene, synthetic rubbers, styrene monomer, and polyesters). Opportunities will develop in these areas on a continuing basis, though many prospective partners have already been identified and will be given some market protection.

## **5. United Arab Emirates**

**General:** The United Arab Emirates is a true federation. Its seven constituent emirates are autonomous city states that can often resist central authority. The bulk of oil resources are owned by Abu Dhabi, but Dubai has its own oil resources and Sharjah is rich in natural gas. Small quantities of hydrocarbons have been exploited elsewhere. Generally, volumes of hydrocarbons decline as one moves eastward within the nation. While each emirate is receptive to foreign investment, Abu Dhabi has a reputation for being

more self-reliant than the others, whereas Dubai and Sharjah are more commercially minded. Policies regarding private and foreign access to domestic oil markets vary among the emirates. While the native population is growing rapidly, it is still small and the UAE is thus heavily dependent on expatriate labor.

**Oil:** Abu Dhabi, which has by far most of the UAE's oil and gas reserves, is also the most economically dependent on oil and gas. Dubai, Sharjah, and Ras al-Khaimah have lesser oil and gas reserves and have developed more broadly based economies that depend on trade and services as well as hydrocarbons. The oil market's recent relatively low prices have meant relatively depressed economic times in Abu Dhabi and the other emirates.

Each emirate has its own oil company and its own policies toward foreign participation in the industry. The major oil company in Abu Dhabi, the Abu Dhabi National Oil Company (Adnoc), is by far the largest of these firms. Adnoc has recently found it necessary to spend considerable funds to maintain the productivity of its major Bab oil field through advanced recovery techniques.

Dubai's oil, among the more freely traded of the Middle East crudes, had been used as a "marker crude" to estimate the prices of regional crudes that are less freely traded. Declining production has recently reduced this role. Small amounts of oil have been found in the other emirates, but oil's direct contribution to their economies remains small.

**Gas:** Abu Dhabi has produced LNG at its Das Island plant for some time. Partners in the venture include Adnoc, Mitsui, BP, and Total. A third train was added to the plant in May 1994, doubling capacity to 5 million tonnes per year. Abu Dhabi's claimed gas reserves are among the highest in the world.

Sharjah and Dubai also have large natural gas reserves, though together perhaps one-fourth the level of Abu Dhabi's gas reserves. While formerly a large portion of this

gas was flared, in Sharjah at least, much of the gas now finds commercial or economic use.

Plans that have been put forward by Qatar to pipe natural gas to Pakistan would involve transiting the UAE. The project is also led by a Sharjah firm, Crescent Petroleum, and could become a basis of a gas network connecting the Middle East and South Asia.

**Electricity:** The United Arab Emirates is among the Gulf nations that are studying the possibility of a regional electricity interconnection. We expect the UAE members would be interested in such possibilities, with some of the most ambitious members viewing an interconnection as an opportunity to sell some of the UAE's energy production to the western Gulf.

**Petrochemicals:** The UAE has been slow to develop its petrochemical industry. As is the case in other sectors of the nation, each emirate has its own policies and plans in the industry. Plans for the most part are small except for an 825,000 tonnes/year methanol plant in Sharjah, which would be based on local methane feedstock. The plant would be operated in association with Amoco. Japanese firms would assist in marketing the output. Amoco would also use some of the methane as feed in a planned MTBE facility. Dubai's Jebel Ali port has attracted some small polyester manufacturing plants.

## **6. Bahrain**

**General:** Bahrain is unique among the Gulf countries in that it is not a major crude oil producer. The Sitra refinery is, however, perhaps the region's oldest export-oriented refinery. Bahrain has long played a trading role with other Gulf nations and serves (as does Dubai) as a business base for firms dealing with the Gulf as a whole. Generally, business activity in Bahrain depends more on commercial requirements than on subsidies. Nonetheless, Bahrain does depend on subsidies for its existence. Crude oil from Saudi Arabia

is sent to the Sitra refinery, and domestic natural gas supplies are directed to facilities such as the Alba aluminum smelter on a preferential basis.

**Oil:** Bahrain's national oil marketing company, Bahrain Petroleum Company (Bapco), is the majority owner of the 250,000 b/d Sitra export refinery (which also includes Caltex participation). The output of the refinery has shifted in recent years to the production of more middle distillates and less fuel oil. Bapco is committed to upgrade and modernize the refinery, but the undertaking has been delayed owing to uncertainty of future profitable export markets, the Gulf War, and higher investment priorities placed on the expansion of Aluminum Bahrain (Alba). Only about 10,000 b/d of the refinery's output is consumed domestically.

Crude oil imports for the refinery are acquired by the Bahrain National Oil Company (Banoco). Roughly 50,000 b/d is local production<sup>2</sup> and 200,000 b/d is imported by pipeline from Saudi Arabia. A portion of the imports from Saudi Arabia is imported under preferential terms. Banoco and Saudi Aramco are studying rerouting the pipeline in response to urban encroachment and to a leak that occurred in early 1994. Recent exploration activities in Bahrain by the American firm, Harken Oil, did not produce commercial oil finds.

**Gas:** Part of the North Field/Pars gas field lies in Bahraini territory, though the reserves of the Bahraini portion have not been found to be substantial. Claimed reserves in Bahrain have been dropping in recent years. Bahrain hopes to use its gas reserves from the field in its future development plans. North Field gas is a major fuel source for the Alba aluminum plant, at an iron pelletizing facility, and for electricity generation. Plans for a 200,000 tonnes/year steel works and expansion of the electricity system would require more natural gas in the future.

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<sup>2</sup> We placed domestic production in Bahrain around 100,000 b/d on our table above, using our *Oil and Gas Journal* statistics, even though this number is at least twice normal estimates for Bahrain. We suspect that the *Journal* might be including oil produced under arrangements governing oil fields jointly claimed by Saudi Arabia and Bahrain, though they are physically located in Saudi Arabian waters.

**Electricity:** Electricity in Bahrain is managed by a state-owned utility, Electricity Affairs. Electricity demand is now growing more rapidly than electricity supplies from Electricity Affairs. Electricity Affairs has been forced to buy electricity from Alba's aluminum facilities to avoid a shortfall. This is functionally the beginning of a local co-generation industry.

Bahrain recently opened its electricity markets to independent power producers. British Gas is now building a 400 MW gas fired power plant near Manama and has developed close relations with the government. The plant might be opened as early as mid-1995. Like many Gulf electricity plants, the Bahrain plant is associated with a water desalination facility. The desalination plant is being developed as a separate private joint venture.

Bahrain's electricity market is rather small, but one might speculate regarding long term export possibilities to Saudi Arabia, where energy-intensive economic development continues. The Saudis, concerned about financing new electricity plants, might be receptive to limited electricity imports, if local supplies prove to be inadequate or expensive. Economic relations between Bahrain and Saudi Arabia have traditionally been close, and Bahrain is near to the Dammam-Jubail development corridor. Plans for an electricity interconnection in the Gulf would affect local opportunities.

**Petrochemicals:** Bahrain does not have any olefins or aromatics plants but does produce methane-based ammonia and urea. Bahrain's recent petrochemical plans have been rather inconsistent lately. In 1993 Bahrain abandoned plans for a 180,000 tonnes/year MTBE plant and a 130,000 tonnes/year polypropylene plant that had been under study since 1990. These changed plans occurred roughly at the same time as a temporary withdrawal of plans to upgrade its refinery. Bahrain is, however, still interested in finding foreign partners to expand its petrochemical industry as it is for its refinery.

## 7. Qatar

**General:** Qatar's energy plans are characterized by large scale investments in which the national oil company, Qatar General Petroleum Co. (QGPC), participates as a majority shareholder. Such ventures are numerous and are usually identified by a confusing array of alphabetical acronyms. Contractors building projects are often required to provide funding to participate and are paid out of the revenues of the venture.

**Oil:** The national oil company, Qatar General Petroleum Company (QGPC), is actively involved in all sections of Qatar's upstream and downstream oil industry. It is difficult to conduct oil or gas business in Qatar without QGPC's participation. Oil production has been around 250,000 b/d recently. Oil reserves are frequently seen as becoming depleted, and QGPC is interested in foreign participation in oil exploration that might preserve or restore production levels. QGPC has recently signed an offshore oil exploration contract with Pennzoil and has made similar agreements with Elf, Maersk (Denmark), and Wintershall (Germany).

QGPC had previously shelved plans to expand the 63,000 b/d Umm Said refinery, but these plans show signs of being revived. Reasons for the new interest include the high sulfur content of North Field gas condensate and changes in the refinery's market toward lighter products. The refinery is operated by QGPC's wholly owned subsidiary, National Oil Distribution Company (NODCO). If the refinery is expanded, contractors would probably be required to find their own financing, to be refunded from sales from the expanded production.

**Gas:** Qatar's North Field gas field is part of the same structure as the Pars gas fields in Iran and Bahrain's North Field. Much of Qatar's ambitions for economic development depends on gas in preference to oil. This is reinforced by a rather low OPEC oil quota. Qatar now has two projects under development to develop gas liquefaction plants and a third is arising. Qatargas is scheduled for 1997-98 while Rasgas is targeted for 1999. Qatargas is owned by QGPC, Mobil, Total, Mitsui, and Marubeni. The second, Ras Laf-

flan Liquefied Natural Gas Company (Rasgas), is owned by QGPC and Mobil. While Qatargas is designed primarily for Japanese markets, Rasgas has had less success in identifying markets. Korea and Taiwan as well as Japan have been mentioned.

Dissatisfaction with efforts to market Rasgas's output has led to Qatari agreements with Enron regarding LNG exports from Ras Laffan to developing markets such as India. This would constitute a third ongoing LNG project in Qatar.

Qatar is also actively investigating exporting natural gas to Pakistan by pipeline. The project, led by Sharjah's private Crescent Petroleum, would transit the UAE and thus might permit the development of a regional gas network supplying Middle Eastern gas to South Asia. International financing would certainly be sought, including from agencies such as the World Bank. Qatar has also discussed supplying natural gas to Israel.

**Electricity:** Qatar is among the Gulf nations that are considering building an electricity interconnection along the southern and western Gulf. Qatar has a tradition of being economically ambitious, but usually requires outside technical support. Such large industrial activities in Qatar have often had room for private and foreign participation, but it is not clear whether this would yet include electricity generation.

**Petrochemicals:** Qatar seeks to develop its abundant natural gas resources, and the petrochemical industry is one of the more promising means of doing this. Qatari firms involved are represented by an array of initials that often sound alike and which are interlinked through varied ownership patterns to QGPC. Most developments have been at Umm Said port. The Qatar Petrochemical Co. or Qapco (80% QGPC and 10% each Atochem and EniChem) is the lead organization for olefin-based petrochemicals. Production is based on ethane feedstocks. Qapco's current 195,000 tonnes/year of ethylene capacity is scheduled to be increased to 525,000 tonnes/year, while low-density polyethylene production would grow from 180,000 tonnes/year to 360,000 tonnes/year. The firm also has 140,000 tonnes/year of high-density polyethylene capacity.

Part of Qatar's petrochemical effort is a plan by Qatar Fuel Additives (Qafac) to set up 660,000 tonnes/year of methanol and 550,000 tonnes/year of MTBE capacity in partnership with International Octane Ltd., two Taiwanese firms, and Total (each 12.5% owners). QGPC thus owns 50 percent of the facility. The Chinese Petroleum Corp. would also use Qatari methanol in its gasoline additives production in Taiwan. The project would be completed in 1998. An additional 825,000 tonnes/year methanol plant is planned at Umm Said by Qasenco, a partnership of QGPC, Petronas (Malaysia), and British interests. Petronas would buy as much as half of the output.

The Qatar Fertilizer Co., Qafco (75% QGPC and 25% Norsk Hydro), operates an ammonia-based fertilizer complex at Umm Said. Plans call for the expansion of ammonia production from 750,000 tonnes/year to 1.3 million tonnes/year, and for urea production to rise from 820,000 tonnes/year to 1.55 million tonnes/year, when facilities are completed in 1997. Exports are planned to China and East Africa. Two Indian fertilizer manufacturers have also investigated building a 780,000 tonnes/year ammonia plant and 1.45 million tonnes/year urea plant in Qatar.

## **8. Oman**

**General:** The government of Oman intends to privatize the businesses that it currently holds. These include insurance, hotels, flour mills, cement, aviation services, and banks. The difficulty with such plans is that Oman also seeks to expand industrial and energy services and activities, likewise with private funds. Omani participation is required in any domestic venture. This raises questions whether Oman has sufficient private capital to undertake all of the ventures and privatization that it wishes to do, especially at a time when oil revenues are depressed by low prices. Schedules for privatization and investment might have to be adjusted to meet requirements for local funds.

**Oil:** Oman's oil reserves are found in rather thin formations that tend to deplete rapidly. Production in Oman, which has been growing, is thus dependent on continued discovery

and development. Output in 1995 is expected to be around 850,000 b/d. Oil and gas operations are primarily the concern of Petroleum Development Oman (PDO, 60% state-owned, the remainder owned by Shell, Total, and Partex), although several tracts have been leased to other firms. PDO has released its interests in many onshore areas and Oman is consequently considered a promising area for private exploration. Available territories include several along the border with Saudi Arabia near where (Shaybah) Saudi Aramco has found substantial reserves.

**Gas:** Oman's gas reserves are located onshore, promising faster and cheaper development than the offshore North Field/Pars gas zone of Qatar, Iran, and Bahrain, though not comparable volumes of gas. Oman has dedicated 6 trillion cubic feet of its gas reserves to the production of LNG. The facility, located at Bimmah, might represent competition for plans to supply gas to India by undersea pipeline. Partners in the LNG project include the Omani government, Shell, Total, Mitsubishi, Mitsui, Partex, and Itochu. The project has received high priority in Oman's development plans and is progressing rapidly. It is likely that much of the LNG might be destined for Taiwan, Korea, or Thailand. Output is expected to be around 6.2 million tonnes/year, roughly equal in energy to 200,000 b/d of crude oil. Estimates for the cost of the project range between \$5 billion and \$9 billion.

Oman has also agreed to supply India with natural gas through an undersea pipeline, if justified by ongoing feasibility studies. This project was followed by similar, separate plans by Qatar and Iran to pipe gas to Pakistan and India. If parts of these projects are carried out, an elaborate network of gas pipelines might develop between the two regions. Oman's 24-inch pipeline could move 56.6 million cubic meters of gas a day (roughly equal in energy to 350,000 b/d of crude oil) at depths as low as 3 km below the sea surface. It is not presently clear that financing is available for the ambitious project, which is scheduled for completion in 1999. The technical feasibility of the project has also been challenged. This is an ambitious and expensive (allegedly \$2.5-4 billion depending on design) project that might make sense only if very large. Size implies that other parties and perhaps nations might be allowed to participate at both ends of the pipe-

line, in which case the line might develop elements of a "common carrier." Chiyoda of Japan, ENI (Italy), and the United Nations Industrial Development Organization (UNIDO) have proposed such broad participation in the project.

**Electricity:** Oman permits the private construction of electric power plants and other utilities (waste water and toll roads) on a build-operate-transfer (BOT) basis. Projects are required to be joint stock companies in which Omani citizens are offered 40 percent of the equity in public offerings. Oman expects that planned utility project will require \$2 billion in financing. This means that \$800 million of local equity must be found. Electricity is sold to the government utility at a contract price, thus sales are guaranteed and there is no bidding system for access to the transmission grid. The first power plant to be built under the program will be at Manah (three 30 MW gas fired gas turbines with possible expansion). A Salalah Electricity Project is also under way involving 150 MW of capacity to replace existing generators. At Salalah electricity generators might be permitted to sell directly to consumers and would buy the existing distribution network. Prices would be regulated by the government. Another electricity plan at Al-Barka (1,900 MW) is progressing rapidly.

Oman is not among the Gulf nations said to be interested in a regional electricity grid. Barring further information, we attribute this to distance from the other regional markets. Oman is expanding its own internal electricity system and this has recently led to the initiation of a foreign contract to build a 180 km, 132 kV power line from the Muscat area into the central part of the nation. Further development of the transmission system can be expected, since Oman has several remote population centers. Many recent generation capacity activities have involved natural gas fuel.

**Petrochemicals:** Oman's petrochemical industry has been slow to start, but Oman's revitalized business contacts with India are showing signs of extending to the industry. An Indian-Omani joint venture is interested in building a 1.1 million tonnes/year ammonia and 1.45 million tonnes/year urea facility at Sur using natural gas feedstock. This is the only major petrochemical plan in Oman of which we are aware. Given the uncertain long

term capacity of Oman's oil reserves, we would expect future commitments to petrochemical complexes to be cautious. Neighboring nations have more abundant potential feedstock supplies.

#### **IV. Expected Industry Trends**

Interpretations of business opportunities in the Persian Gulf are shaped by several factors including the dismal state of Iraq's and Iran's relations with the outside world, a desire to preserve elements of the local culture (including Islam), the current low prices of international oil, and the invasive system of subsidized prices in each nation. It would be a mistake to assume that any of these trends will persist in their current form, even though they are well entrenched.

The eight Gulf states are building their nations. Each has large minority groups and swelling populations that are young and underemployed, if not idle and bored. Their economies are built on one product, hydrocarbons, and its derivatives (refined products and petrochemicals). While access to energy is needed to build a nation, energy itself seldom employs many. This problem is made more complex by large expatriate populations who provide services within the energy industry that local populations are not able to provide at comparable quality. Local populations would, however, seek equivalent wages if filling the positions. Expatriate populations are integrated into local societies and economies, and some expatriate groups have been present in the area for more than a generation. The apparent hostility of Iran and Iraq to outsiders is partly a response to this environment. It also explains the guarded access that many Gulf states have provided to contacts with the outside world.

Low oil prices are particularly transient. They are also institutional. Small changes in oil availability and in world demand can move prices significantly over short periods of time and can delay adjustments over longer periods. The current embargo on Iraqi oil exports is keeping perhaps two million barrels a day off world markets. All na-

tions of the Gulf might face a significant price drop whenever Iraqi oil is again exported. At the same time a rapid rise of world oil demand within the current regime of relatively low prices is particularly notable in the Asia-Pacific region and in parts of Latin America where economic growth is now rapid. This presents a demand-based scenario that in a few years might raise oil prices if adequate supplies are not found. Gulf nations cannot benefit from any oil price rise as they once did. Their populations have grown too rapidly for that.

The fall of communism in Europe has left the Gulf as an area with as extreme a system of price distortions as anywhere in the world, save perhaps China. High oil incomes and a private domestic distribution systems have often prevented these distortions from creating the shortages within the GCC states that might be expected. Iran and Iraq, the region's most populous nations, are contrasts to this and have experienced product and service shortages. Further, electricity supplies throughout the Gulf now show signs of becoming inadequate, partly because of demand-inducing low prices.

Low hydrocarbon prices have starved national budgets throughout the region. One response has been area-wide policies reducing government roles in prices and industrial ownership. Nation-building goals and the domestic politics have retained an interest in central and government control of business activities, whatever the ownership structure. The result is a learning process and the learning is continuous and potentially painful. Policies change daily and are as capable of being changed back to original systems as into new ones. Oil, and to an extent gas, are likely to remain longest under government control. The nations of the Gulf lack experience with tax systems, and the oil and gas industries are the primary source of government revenue.

Table 2 summarizes energy-based investment potentials in the Middle East.

Table 2. Current investment potential in the Gulf nations

| Sector                 | Iran | Iraq | Kuwait | Saudi Arabia | UAE | Bahrain | Qatar | Oman |
|------------------------|------|------|--------|--------------|-----|---------|-------|------|
| Upstream oil           | yes  | yes  | yes    | yes?         | yes | yes     | yes   | yes  |
| Refining               | no   | no   | no     | export       | no  | yes     | no    | yes  |
| Domestic oil marketing | no   | no   | no     | lubes        | yes | no      | no    | yes  |
| Upstream gas           | yes  | yes  | yes?   | no           | yes | yes     | yes   | yes  |
| LNG                    | yes  | no   | no     | no           | yes | no      | yes   | yes  |
| Electricity            | no   | no   | no     | possibly     | no  | yes     | no    | yes  |
| Petrochemical          | yes  | no   | yes    | yes          | yes | yes     | yes   | yes  |

*Note:* All conclusions are judgmental.