



Gas – gold for the future



When the Anglo-Persian Oil Company lost its concession in Iran in 1932, scouts were dispatched around the Gulf States to look for new exploration territory. Qatar was no exception, and agreements were made. But, it was not until after World War II that the petroleum boom began to take effect. It was timely because of the demise of the country's principal industry, pearling, following the introduction of Japanese cultured pearls. Qatar, however, soon began to enjoy the economic and social rewards from its new, liquid benefactor.

Furthermore, the discovery of the formidable North field, the largest nonassociated natural gas field in the world, has made the country a major exporter of liquefied natural gas, supplying countries such as India, South Korea and Japan.

For centuries, pearling, fishing, and trade were the main sources of wealth in Qatar. At one time, Qataris owned nearly one-third of the Gulf fishing fleet. With the world recession in 1928 and the introduction of Japan's cultured pearl industry, pearling in Qatar declined drastically. Oil exploration, therefore, made a timely arrival, and was to bring unforeseen prosperity in the next 60 years.

Today, Qatar has proven oil reserves of 3.7 billion barrels. The country has the third largest natural gas reserves, around 300 Tcf, and the largest nonassociated gas field in the world. Qatar exports over 600,000 barrels of oil daily and has become a major exporter of liquefied natural gas.

The early days

The search for oil in Qatar began in the early 1930s. The Anglo-Persian Oil Company (APOC), subsequently British Petroleum (BP), was already producing oil in Iraq and Iran, and in 1931 began a detailed geological survey of Qatar. In 1932, a new Iranian Government revoked APOC's concession in Iran, which was one of the reasons for a sudden upsurge of interest in the oil potential of the smaller Gulf States. Other incentives included their geological similarities with Iran, and a strike in the same year by the American consortium, Socal, in Bahrain.

In 1935, the first oil concession was granted to APOC, giving it the exclusive rights for production, marketing, refining and transportation of petroleum and natural gas in Qatar for 75 years. Three weeks later, the political agreement between Britain and Qatar was signed and the Anglo-Persian concession was transferred to Petroleum Development (Qatar) Ltd. This company was later renamed Qatar Petroleum Company (QPC), a newly created subsidiary of APOC that discovered high-quality oil with its first exploration well near Zekrit, on the Dukhan anticline on the western side of the peninsula, in 1938.

The appraisal well came in at a depth of 5,685 ft with a rate of 5000 B/D. Two more appraisal wells were drilled 18-km

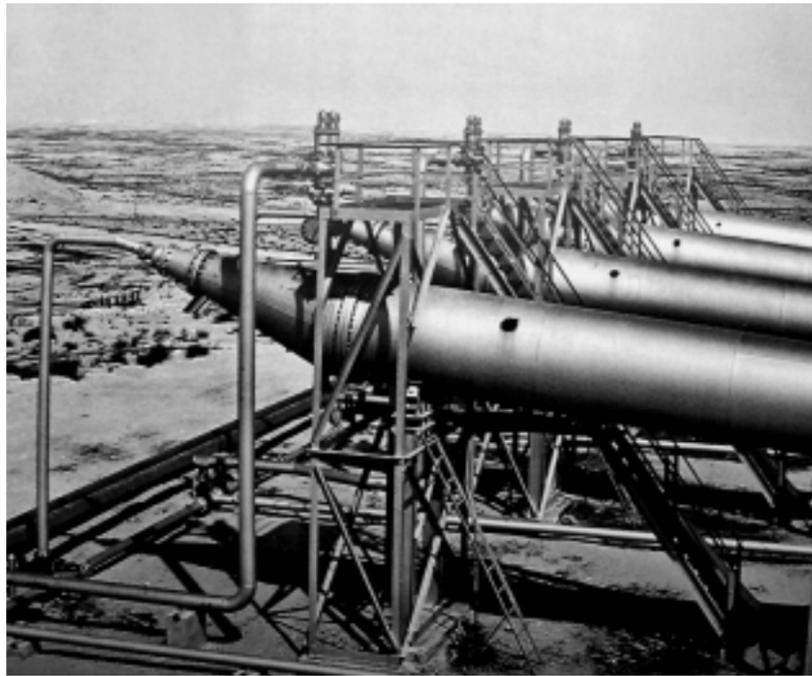


Figure 12.1: Separators at a degassing station

south and 4-km east to confirm the quality and the quantity of the reserves to ensure viable commercial production. These wells, which had reached production of 40,000 B/D by 1942, were all sealed for the duration of World War II. A harbor was built at Zekrit to handle small supply boats from Bahrain, but the main oil terminal was built at Umm Sa'id on the east coast, south of Doha. Pipelines had to be laid to carry the crude 35 miles across the peninsula. A degassing station (see Figure 12.1) was constructed at al-Khatiyeh near Dukhan and a road was built between Dukhan and Umm Sa'id. Exports did not restart until 1949, when the Dukhan field produced 640,000 barrels of crude oil.

Offshore exploration begins

Oil was discovered in the Arab D Number 4 limestone member in 1949, and a minor accumulation was also found in the lower Jurassic Uwainat member of the Araej formation. The Dukhan field remains the only onshore oil field in Qatar.

Offshore activity began in 1952 when Shell Company of Qatar (SCQ) obtained, not without difficulty, a

concession for offshore exploration on the continental shelf. The concession was for a period of 75 years and the company was to pay the Ruler a fee of £232,000 annually, an annual rental of £75,400 until exports began, and £37,700 thereafter until the expiry of the agreement. Additional sums were related to quantities and profits.

The results of gravimetric and seismic surveys led Shell to drill two appraisal wells between the two domes of Idd El Shargi, 95-km east of the northern tip of Qatar. These efforts met with little success before there was a major setback when a heavy storm destroyed the specially constructed drilling platform. Using a stronger structure, the company resumed drilling in 1959 in a 30-m water depth on the northern dome of the Idd El Shargi structure to a depth of 2600 m. Oil was found at depths of 1400 to 2600 m. More oil was discovered on the southern dome in 1961, and in January 1964 the company started production from the Shuaiba, Arab C and D formations of the Idd El Shargi North field. Figure 12.2 shows some of the Sikorsky helicopters used in these operations.

The makings of modern history

By this time, the country was beginning to see the benefits of gradually increasing oil revenues, which brought prosperity, rapid immigration, substantial social progress and the beginnings of Qatar's modern history.

Major discoveries, which centered on the island of Halul, included the Idd El-Shargi, Maydan Mahzam and Bul Hanine fields, in 1960, 1963 and 1970 respectively. Maydan Mahzam became operational in 1965. Its production is currently 75,000 B/D, which is significantly down from its peak level. Bul Hanine came onstream in 1973, producing more than 100,000 B/D, a figure which has fallen to the present-day 70,000–80,000 B/D. Current output from Idd El-Shargi North dome is around 135,000 B/D and is increasing thanks to a \$700-million investment in a development plan by Occidental Petroleum (Oxy) which took over operations from Shell in 1994.

Joint exploitation of the offshore Al Bunduq field, which falls on the maritime border between Qatar and Abu Dhabi, was agreed by the two countries in 1969. Production from this field started in 1969, and by 1972 offshore production exceeded that of the onshore Dukhan field. Facilities for offshore crude storage, including pumping stations and two single-buoy moorings for loading tankers were established on Halul Island (see Figure 12.3).

The move to government ownership

When, in 1968, the British Government announced a policy (reaffirmed in March 1971) of ending the treaty relationships with the Gulf Sheikhdoms, Qatar joined the other eight states then under British protection (the seven Trucial Sheikhdoms – the present United Arab Emirates – and Bahrain) in a plan to form a Union of Arab Emirates. By mid-1971, however, the nine sheikhdoms still had not agreed on terms of union, and the termination date (end of 1971) of the British treaty relationship was approaching. Accordingly, Qatar sought independence as a separate entity and became the fully independent State of Qatar on September 3, 1971.

In the same year and following independence, the Qatar National Petroleum Company (QNPC) was formed to handle the country's oil operations. In 1973, the government signed participation agreements with two foreign companies; QPC for the Dukhan field and SCQ for offshore fields, giving the government a 25% holding in each concession.

Two years later the Qatar General Petroleum Corporation (QGPC) was set up. This concluded the service contracts of QPC and SCQ and assumed 60% ownership of them. At the same time, provision was made for the two companies to operate the country's oil fields on its behalf.

By the end of 1974, the government had acquired the remaining 40%, giving the country full ownership of its hydrocarbon resources. Service contracts with QPC and Shell were concluded but provisions were made for those companies to continue operating Qatar's oil fields on behalf of QGPC (see Figure 12.4).

All other exploration agreements with foreign companies were converted to production-sharing contracts. QGPC has itself been carrying out seismic and geophysical exploration work since 1980 and made seismic maps of all Qatari territory. As a result, special projects were launched to explore the possible stratigraphic traps between the North field and other known offshore structures.

In the mid-1980s, the government invited foreign companies to apply for exploration rights to relatively unexplored areas of the country. Between 1985 and 1997, nine exploration licenses were granted. The first of these was awarded to Standard Oil Company of Ohio (Sohio), a subsidiary of British Petroleum (BP). Sohio obtained a 25-year license for Block 1, a 12,000 km² tract off the east coast of the peninsula. BP raised its holding in Sohio to 100% and took over the concession in May 1987, although it was relinquished in 1989 after drilling six wells.



Figure 12.2: Sikorsky helicopters at Doha heliport, 1974



Figure 12.3: Facilities at Halul Island

The Hawar Islands off Qatar's west coast were considered to have high potential for oil and gas, but claim to the islands had for some time been the subject of a dispute between Qatar and Bahrain. In 1986, Qatari troops briefly occupied a coral reef that was being reclaimed from the sea, but was later destroyed after negotiations between the two countries. During 1991, there were two standoffs between Bahraini and Qatari gunboats in the disputed waters around the Hawar Islands while the International Court of Justice (ICJ) gave Qatar until February 1992 to present its sovereignty claims over the islands. In September 1991, Saudi Arabia's Foreign Minister, Prince Saud al-Faisal, visited Qatar and Bahrain in an attempt to end the dispute.

An onshore acreage of some 8000 km², known as Block 2, covers the whole of the Qatari peninsula except for the Dukhan field. In February 1986, Block 2 was awarded to Amoco, which drilled a total of nine wildcat wells, all of which were stopped dry. The company relinquished its license in 1993. However, in March 1998, Qatar signed a five-year, onshore oil exploration and production-sharing agreement with Chevron Corporation covering Block 2. Seismic surveys were carried out and drilling started in 1999. Chevron also holds offshore Block 1 jointly with Hungary's Mol.



Figure 12.4:
Operating a minilab
on Rig 54 in 1974

Since July 1988, QGPC has been responsible for negotiating contracts with foreign companies and for all exploration and drilling operations in Qatar. The company has undergone considerable streamlining and restructuring, and now has complete control of exploration, production, marketing, and the procurement of all materials and equipment for oilfield operations.

Recent developments

By January 1991, Qatar's oil reserves stood at 4.5 billion barrels, while production was running at 480,000 B/D (see Figure 12.5). In September 1991, the \$1.3-billion first stage of the North field gas project, believed to be the world's largest natural gas reserve, was inaugurated by the Emir. On January 31,

1993, Mobil purchased a 10% stake in the Qatar Liquefied Gas Company that further boosted the gas project.

One of Qatar's newer oil fields is the Al-Rayyan field that lies in offshore Block 11 at the western edge of the North field near Ras Laffan. This field was operated by Atlantic Richfield Corporation (Arco), which began exploration in 1995. Arco was recently acquired by BP. Wintershall, British Gas and Gulfstream Petroleum also have significant shares in Al-Rayyan. The field came onstream in November 1996, producing 20,000 B/D of heavy oil from four wells. The consortium is investing in further development and is aiming to reach a production capacity of 60,000 B/D.

The latest offshore field to come onstream is Al-Khaleej, in Block 6 on the maritime border with Iran. This 25-year production-sharing agreement is operated by Elf, with Italy's Agip having a 45% share. Production began in March 1997 at a rate of 6,000 B/D, increasing to 32,000 B/D in 2000. The company intends to raise this further to 50,000–60,000 B/D. The oil is piped to Halul Island for processing and transportation.

Refinery upgrades

Upgrades to the National Oil Distribution Company (Nodco) refinery at Umm Sa'id will increase capacity from 57,500 to 83,000 B/D. A 30,000 B/D condensate refining unit also is being built at the refinery. The projects are expected to be completed by the end of 2001.

In March 1997, QGPC signed a memorandum of understanding with the foreign partners of Qatar Liquefied Natural Gas Company (Qatargas) and Ras Laffan Liquefied Natural Gas

Company (RasGas). This memorandum provides for construction of a 80,000-B/D condensate refinery at Ras Laffan that will be completed in 2002. This refinery will be able to handle the high levels of mercaptan compounds found in condensate streams from the North field that cannot be processed at most refineries.

Natural gas and the future

Most of Qatar's gas is located in the North field, which is the largest known nonassociated gas field in the world, containing 239 Tcf of recoverable reserves. The Dukhan field contains an estimated 5 Tcf of associated and 0.5 Tcf of nonassociated gas, and there are smaller associated gas reserves in the Idd El-Shargi, Maydan Mahzam, Bul Hanine, and Al-Rayyan oil fields.

Currently, Qatar has two liquefied natural gas (LNG) exporters: Qatar LNG Company (Qatargas); and Ras Laffan LNG Company (RasGas).

In December 1996, the first shipment of LNG was delivered to Japan by Qatargas, where the LNG plant consists of three, 2-MMt/yr (97 Bcf) trains. The third train was completed in 1999, with plans to add a fourth train by 2002.

RasGas loaded its first cargo in August 1999 under a supply contract with South Korea's Kogas. The two major shareholders in the project are QGPC and Mobil. RasGas consists of two 2.5-MMt/yr (122 Bcf) trains which came onstream in early 1999 and April 2000. A tender for the planned third and fourth trains was invited for late summer 2000.

In May 2000, ExxonMobil and QGPC signed a final development and production sharing agreement for the North field. The initial phase of the project will produce 500 MMcf/D, eventually rising to 1.75 Bcf/D.

Qatar has added India to its original markets for LNG exports, Japan and South Korea, the world's two largest LNG importers. RasGas signed an agreement in July 1999 to supply

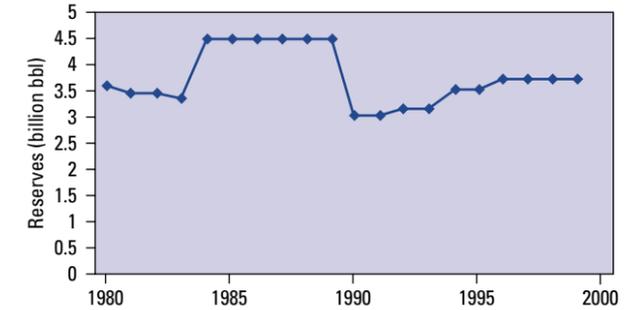
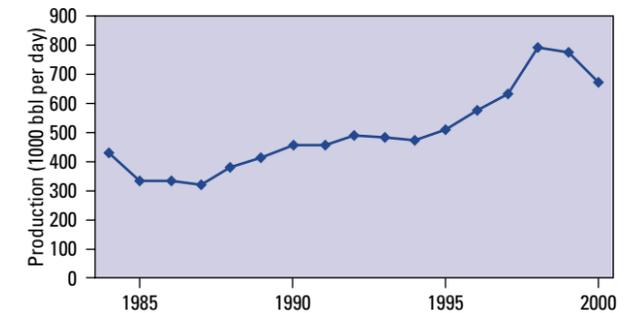


Figure 12.5:
Production and reserves for Qatar

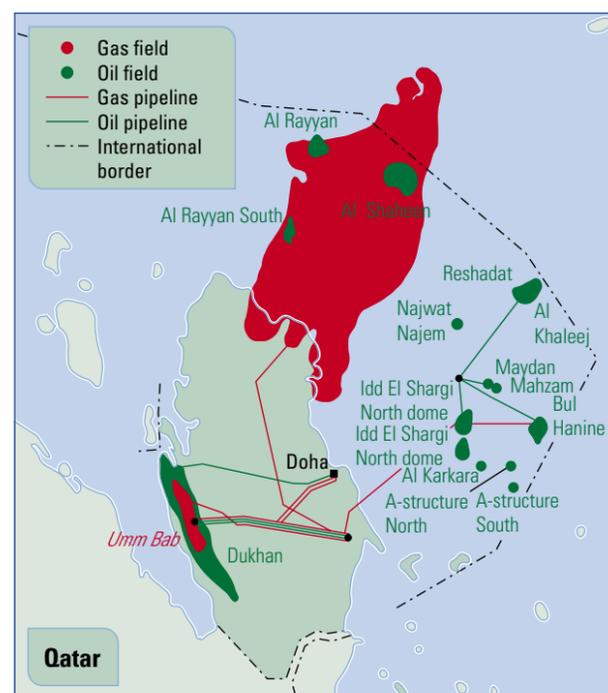


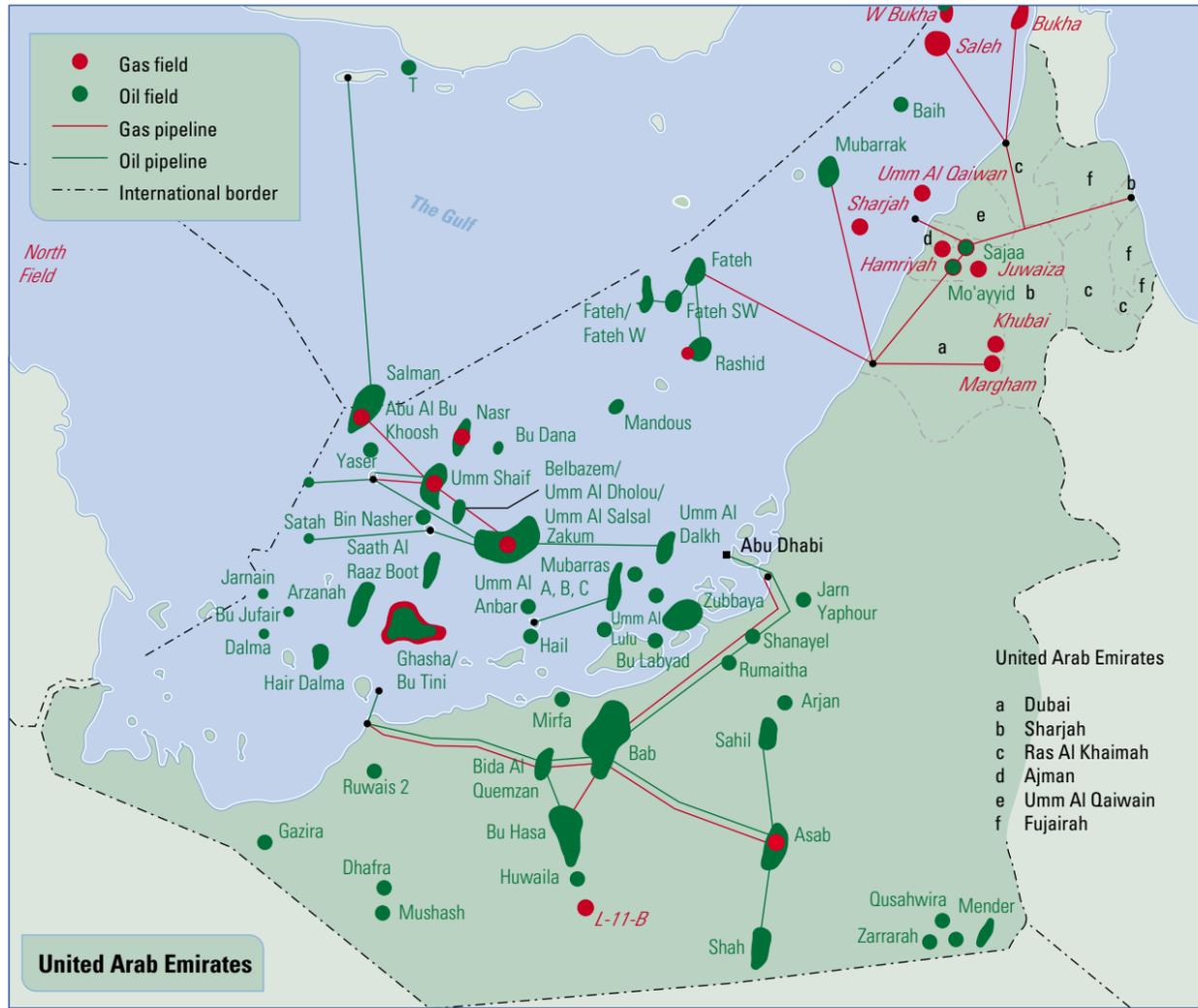
7.5 MMt/yr of LNG to Petronet, a gas distribution consortium in India, beginning in mid-2003.

Another planned project will tie Qatar into an integrated gas pipeline grid for Qatar, Oman and the United Arab Emirates Dolphin Project, with a possible subsea connection linking Oman to Pakistan. Construction is to start in 2001, and links between Abu Dhabi, Dubai, and Oman should be completed by 2003.

Kuwait also has held discussions with Qatar about the purchase of Qatari gas. A preliminary agreement was signed for gas sales in May 2000, which would source the gas from ExxonMobil's North field holdings. Details of the project and volumes are being discussed.

The oil and gas fields of Qatar





The oil and gas fields of the United Arab Emirates

the giant Bab oil and gas field. The project added two 350 MMscf/D trains to treat and process associated gas from Bab's lower Cretaceous Thamama B reservoir and nonassociated gas from the Thamama C reservoir. A 625 MMscf/D train was put in place for nonassociated gas from the Thamama F and compression facilities that could inject up to 830 MMscf/D into this layer.

The second phase of the OGD project increased condensate capacity by 50,000 B/D and added 1 Bcf/D of sales gas by 2000. Sustained economic growth and urbanization will ensure a high and growing demand for gas to use in power generation and water desalination.

While the established industrial sectors typified by operations at Das Island continue into the next millennium (Figures 16.7 and 16.8) there are new directions for business and industry in the UAE.



Figure 16.7: Das Island separators and hydrogen sulfide plant seen from the base of the flow tanks

In recent years, the UAE has undertaken several projects to diversify its economy and to reduce its dependence on oil and gas revenues. According to one Emirates newspaper, the non-oil sector accounted for 69% of the gross domestic product in 1997. The federal government has invested heavily in sectors such as tourism, telecommunications, re-export commerce and aviation. As part of its strategy to further expand its tourism industry, UAE plans to build new hotels, restaurants and shopping centers, and to expand airports and duty-free zones.

Beyond the oil

The United Arab Emirates is a relatively new oil and gas producer with production starting in the 1960s (Figure 16.9) and the country being formally constituted from the seven Emirates in 1970s.

The country has used its oil and gas revenues to establish itself as one of the leading business centers in the Middle East.

Unable to rely on vast oil reserves for continued growth, Dubai has become a central Middle East hub for trade and finance, accounting for about 70% of the Emirates' non-oil trade. In 1996, Dubai unveiled its strategic development plan for the twenty-first century, which focused on the private sector and emphasized capital-intensive industries. It called for a new infrastructure and the loosening of trade and banking rules. For its part, Abu Dhabi planned to develop an offshore financial and commodity trade center on Saadiyat Island. This will include storage facilities, a port, a freight center, and a financial and insurance center to facilitate trading.



Figure 16.8: Das Island tanker terminal. French tanker Saint Remi being moored at the terminal. A head line is being taken on board a work boat

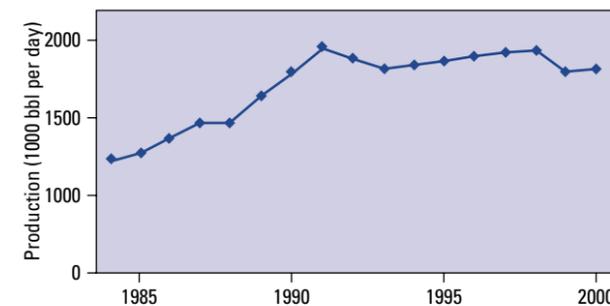
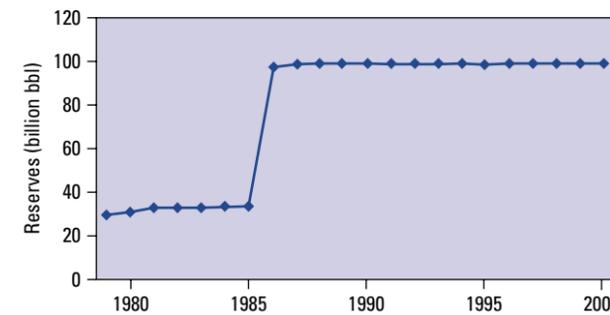


Figure 16.9: From first oil in the 1960s to fully developed fields in the 1990s, production in the United Arab Emirates has grown rapidly. The economic changes which have accompanied this oil boom have made the UAE a major player in the Middle East oil and gas sector

