

THE MINERAL INDUSTRY OF SAUDI ARABIA

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As the mainstay of the crude oil price support program of the Organization of Petroleum Exporting Countries (OPEC), the Kingdom of Saudi Arabia decreased oil production by 2.95% in 2001 compared with that of 2000. Despite the production reduction, Saudi Arabia accounted for about 12% of the world's output of crude oil (BP plc, 2002a¹).

The Kingdom's population was estimated to be about 23 million. In 2001, the estimated gross domestic product (GDP) at current prices published by the Saudi Arabian Monetary Agency (2002²) was \$186 billion², compared with a revised estimate of \$189 billion in 2000. Real GDP increased by 1.2% from 2000 to 2001 compared with a 4.9% increase from 1999 to 2000 (International Monetary Fund, 2002²). Production of crude oil and natural gas was valued at \$64 billion, down from a revised \$69 billion in 2000. In 2001, crude oil and natural gas production accounted for about 34% of the GDP, petroleum refining accounted for about 3%, and about 0.4% was attributed to other mineral production (Saudi Arabian Monetary Agency, 2002²).

In 2001, exports of crude oil and products from Saudi Arabia to the United States were reported to be about 1.66 million barrels per day (Mbbbl/d) compared with 1.57 Mbbbl/d in 2000. Saudi Arabia was the second leading source of total U.S. crude oil and petroleum product imports, accounting for about 14% of imports in 2001 compared with 17% in 2000. Canada was the leading source of U.S. crude oil and petroleum products imports in 2001 with an average of 1.83 Mbbbl/d (15.4% of the total import volume). Venezuela was third largest supplier with 1.55 Mbbbl/d, and Mexico fourth with 1.44 Mbbbl/d (U.S. Energy Information Administration, 2002).

Production

Mineral and mineral-based commodity production in Saudi Arabia included barite, cement and other industrial minerals and construction materials, copper, nitrogenous and phosphatic fertilizers, gold, natural gas, oil, petrochemicals, refined petroleum products, salt, silver, sulfur, and zinc. Steel was produced from scrap and imported iron ore pellets.

In 2001, the crude oil production decline was partially offset by a 2.59% increase in natural gas liquids production for a 2.44% decline in combined crude oil and natural gas liquids production. The drop in oil production was attributed to a reduction in the OPEC production quota assigned to Saudi Arabia. The OPEC constrained allowable production to 7.1 Mbbbl/d at yearend from 8.7 Mbbbl/d at the beginning of the year (Arab Petroleum Research Center, 2002, p. 364). Actual sustainable production capacity was about 10.5 Mbbbl/d (U.S.

Energy Information Administration, 2001). Saudi Arabian Oil Co. (Saudi Aramco) was expected to continue to shut in less profitable heavy-crude fields as new fields with lighter premium crudes were developed.

Structure of the Mineral Industry

All minerals and mineral fuels were owned by the Government. State-owned Saudi Arabian Mining Co. (Ma'aden) participated in and promoted mineral exploration and mining activities throughout the Kingdom. In 2001, Saudi Aramco and its subsidiaries were the only companies authorized to engage in oil and gas exploration and field development within Saudi Arabia, although many industrial projects in the petrochemical and petroleum-refining sectors were joint ventures between Saudi firms and international companies.

Affiliated companies of state-controlled Saudi Basic Industries Corp. included Saudi Iron and Steel Co. (100% equity interest), National Chemical Fertilizer Co. (71.5%), Al-Jubail Fertilizer Co. (50%), National Methanol Co. (50%), Saudi Petrochemical Co. (50%), Saudi Methanol Co. (50%), and Saudi Arabian Fertilizer Co. (42.99%).

Commodity Review

Metals

Gold.—Ma'aden's production was from the open pit Al-Amar Mine and the underground Mahd Adh Dhahab Mine. A gold mine at Al-Hajar was under construction. Saudi Company for Precious Metals (a subsidiary of Ma'aden) operated the Sukhaybirat open pit mine and continued to develop the Bulghah open pit project.

Steel.—In September, commercial production began at the 180,000-metric-ton-per-year (t/yr)-capacity large diameter pipe mill operated by National Pipe Co. (NPC), which was a privately owned Saudi Arabian-Japanese joint venture. The \$50 million expansion of NPC's Dhahran works had been initiated in 1999. Much of the large (610- to 1,524-millimeter-outside-diameter) pipe production was expected to be used for natural gas pipeline projects in Saudi Arabia (Sumitomo Metal Industries, Ltd., 2001³).

Industrial Minerals

Magnesite.—In 2001, the management of Ma'aden proceeded with the proposed 20,000-t/yr Zarghat fused magnesia project. Ma'aden's joint venture with Saudi Dolomite Co. Ltd. was to develop the Zarghat magnesite deposit about 100 kilometers (km) from Al-Ghazalah. The estimated cost of the mine and associated facilities was about \$27 million (Saudi Arabian Mining Co., 2001).

¹References that include a section twist (§) are found in the Internet References Cited section.

²Where necessary, values have been converted from Saudi riyals (SRI) to U.S. dollars (US\$) at the rate of SRI3.75=US\$1.00.

Phosphate.—The probability that the Al Jalamid phosphate deposit would be developed increased when the Government authorized a feasibility study of the proposed \$1.9 billion, 2,400-km expansion of the national rail network. The planned expansion included a rail line to Al Jalamid (Middle East Economic Digest, 2001; Washington Post, 2001).

Sulfur.—The increase in sulfur output during 2001 was attributed to the recovery of sulfur from 44 nonassociated gas wells that Saudi Aramco's brought online to supply the Hawiyah natural gas plant.

Mineral Fuels

In June, the Government signed agreements for the Gas Initiative project with the consortium of Exxon Mobil Corp. (35% interest), BP plc (25%), Royal Dutch/Shell Group (25%), and Phillips Petroleum Co. (15%) for the development of Core Venture I—the Haradh (South Ghawar area) project; with the consortium of Exxon Mobil Corp. (60%), Occidental Petroleum Corp. (20%), and Marathon Oil Corp. (20%) for the development of Core Venture II—the Rabigh/Midyan (Red Sea area) project; and with the consortium of Royal Dutch/Shell Group (40%), Conoco Inc. (30%), and TotalFinaElf Group (30%) for the development of Core Venture III—the Kidan/Shaybah project. Negotiations between the Government and the consortia continued through yearend.

In September, the Hawiyah natural-gas-processing plant was added to the Kingdom's master gas system. The plant had reached its 40-million-cubic-meter-per-day capacity by yearend (Saudi Arabian Oil Co., 2002, p. 12).

Reserves

The U.S. Energy Information Administration (2002§) estimated that Saudi Arabia's proven crude oil reserves were 264.2 billion barrels. This represented about 25% of the total proven world reserves compared with the underexplored Iraq (10.7% of world crude oil reserves), the United Arab Emirates (9.3%), Kuwait (9.2%), and Iran (8.5%) (BP plc, 2002b§). The bulk of the Kingdom's reserves were contained in a few fields in the northeast. These included the onshore Ghawar Field and the Safaniya Field, which was the world's largest offshore oilfield.

Most Saudi Arabian natural gas reserves were associated with the country's oilfields. The Ghawar Field accounted for about 35% of the total gas reserves, which were reported to be 6.35 trillion cubic meters (Saudi Arabian Oil Co., 2002, p. 42). In 2001, the Jufayn-1 exploration well (about 14 km east of the Ghawar Field), delineation drilling (especially the Al-Ghazal-4 well), and reservoir studies allowed Saudi Aramco to add about 156 billion cubic meters to the country's gas reserves (Saudi Arabian Oil Co., 2002, p. 10).

Outlook

Despite diversification efforts, most Saudi Arabian income remained dependent upon the international oil markets. The Kingdom's economy remained vulnerable to sudden changes in volume and pattern of worldwide trade in crude, petrochemicals, and refined petroleum.

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Major Sources of Information

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Major Publications

- Arab Petroleum Research Center. Arab Oil & Gas Directory, annual.
- Saudi Arabia Directorate General of Mineral Resources:
Atlas of Industrial Minerals, 1993.
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TABLE 1
SAUDI ARABIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/ METALS	1997	1998	1999	2000	2001 e/
Ore, mine output:					
Gross weight e/	1,600,000	1,700,000	1,680,000	1,700,000	2,000,000
Copper content of concentrate and bullion 3/	703	782	821	900 e/	800
Gold content of concentrate and bullion 3/ kilograms	7,260	5,100	4,570	3,800 e/	5,000
Lead content of concentrate e/ 3/	50	60	50	50	60
Silver content of concentrate and bullion 3/ kilograms	17,200	13,840	10,470	9,300 e/	15,000
Zinc content of concentrate 3/	619 e/	3,550	3,161	3,000 e/	3,300
Iron and steel:					
Direct-reduced iron thousand tons	2,110	2,268	2,343	3,090	2,880 4/
Steel, crude do.	2,539	2,356	2,610	2,973	3,400
Ferrous alloys e/	83,000	83,000	83,000	83,000	78,000
INDUSTRIAL MINERALS					
Barite e/	8,000	8,000	7,000	8,000	9,000
Cement, hydraulic thousand tons	15,400	15,786 r/	16,313	18,107	20,608
Fertilizer, phosphatic, P2O5 content do.	112	130	145	147 e/	150
Gypsum, crude e/	365,000	330,000	380,000 4/	400,000	450,000
Lime e/	180,000	200,000	340,000 4/	350,000	350,000
Nitrogen:					
N content of ammonia thousand tons	1,405	1,418	1,402	1,743	1,774 4/
N content of urea do.	930	1,024	1,002	1,214	1,260 4/
Pozzolan e/	145,000	145,000	140,000	150,000	150,000
Salt e/	140,000	140,000	200,000 4/	200,000	200,000
Sand and gravel e/ thousand tons	110,000	100,000	120,000	120,000	120,000
Scoria e/ do.	2,000	2,000	2,000 4/	2,000	2,000
Sulfur, byproduct, hydrocarbon processing	1,750,000 r/	2,050,000 r/	1,939,758	2,101,391	2,350,000
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural: 5/					
Gross million cubic meters	81,900	83,000	89,000 e/	96,000 e/	91,500
Dry do.	45,300	46,700	46,200 e/	58,870	54,900
Natural gas liquids: e/					
Propane thousand 42-gallon barrels	159,000	159,000	153,000	163,000	166,000
Butane do.	69,000	69,000	66,200	69,000	72,000
Natural gasoline and other do.	52,000	51,000	50,000	53,000	54,000
Total do.	280,119 4/	279,163 4/	269,134 4/	285,008 4/	292,385 4/
Petroleum:					
Crude oil million 42-gallon barrels	2,829 r/ 4/	2,922 r/	2,651 r/	2,847 r/	2,763 4/
Refinery products:					
Liquefied petroleum gases thousand 42-gallon barrels	14,447	11,929	12,533	9,634	10,200
Gasoline and naptha do.	138,740	142,606	148,853	155,556	74,600
Jet fuel and kerosene do.	60,844	53,243	60,638	66,920	17,500
Distillate fuel oil do.	191,948	193,328	188,848	198,176	132,000
Residual fuel oil do.	165,375	176,460	164,032	163,941	121,000
Unspecified 5/ do.	6,934	6,533	6,625	8,083	8,650
Total do.	578,288	584,099	581,529	602,310	364,000

e/ Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. r/ Revised.

1/ Table includes data available through October 18, 2002.

2/ In addition to commodities listed, the following were produced: basalt, clays, granite, limestone, marble, methanol, and silica sand; but available information is inadequate to estimate output.

3/ Mahd Adh Dhahab Mine produced a bulk flotation concentrate that contains copper, gold, lead, silver, and zinc and a crude bullion that contains copper, gold, and silver.

4/ Reported figure.

5/ Includes asphalt.