



# 2006 Minerals Yearbook

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## SAUDI ARABIA

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# THE MINERAL INDUSTRY OF SAUDI ARABIA

By Philip M. Mobbs

The Kingdom of Saudi Arabia continued to diversify its economy and mineral industry, although the nation's economy remained strongly linked to hydrocarbon production, which accounted for about 55% of the gross domestic product (GDP) at current prices in 2006. The 2005 and 2006 increase in the hydrocarbon sector's contribution to the GDP was attributable to the continued rise in international oil prices. Depending on the source of provisional 2006 crude oil production data, Saudi Arabia either maintained its position as the leading oil producer in the world or was ranked second, after Russia (BP p.l.c., 2007, p. 8; Saudi Arabian Monetary Agency, 2007, p. 116, 144; U.S. Energy Information Administration, 2007b).

All mineral deposits were the exclusive property of the state. The Ministry of Petroleum and Mineral Resources implemented general policy related to minerals, natural gas, and oil. Mining was regulated by Royal Decree No. M/47 (the Mineral Investment Law) of 20 Sha'ban 1425 (October 4, 2004).

## Minerals in the National Economy

In addition to their contribution to the GDP, revenues associated with hydrocarbons accounted for a significant segment of Government income and national exports. Oil, along with natural gas and refined petroleum products, have formed a base for the establishment of other industries, including energy-intensive heavy industries and petrochemicals.

In 2006, the mining and quarrying sector accounted for about 0.2% of the GDP. The mining, quarrying, and natural gas and crude oil production sectors employed 1.5% of the country's labor force of about 5.6 million. The building and construction sector employed 37% of the labor force (Saudi Arabian Monetary Agency, 2007, p. 220, 331).

The hydrocarbon sector dominated Saudi Arabian exports. Despite the slight decline in crude oil production in 2006, the estimated value of crude oil exports was \$160 billion, which was a 17% increase compared with that of 2005. The increase in crude oil export value was attributable to the increase in the average price of crude oil. The average price of the Arabian Light standard-type crude oil increased to \$61.05 in 2006 compared with \$50.15 in 2005 (a 21.7% increase). Crude oil exports accounted for 76% of the value of total exports in 2006; refined petroleum products, 14%; petrochemicals, 5%; and construction materials, 1%. Crude oil export volumes declined slightly in 2006 to about 2.57 billion barrels compared with 2.63 billion barrels in 2005. Exports of refined petroleum products and gas in 2006 totaled 59.9 million metric tons (Mt); chemical products, 18.1 Mt; and construction materials and steel, 10.4 Mt (Saudi Arabian Monetary Agency, 2007, p. 124-125, 132, 144, 350).

## Production

Significant increases in output in 2006 were posted for barite, gypsum, iron ore (for cement), nitrogen (ammonia and

urea), industrial (construction) and silica sand, and most types of stone. Slight, but notable, production declines were posted for crude oil and refined petroleum. The crude oil decline was attributed to a cut in the Organization of the Petroleum Exporting Countries' crude oil production ceiling allocation for Saudi Arabia. Data on mineral production are provided in table 1.

## Structure of the Mineral Industry

The Government maintained ownership interest in most large companies that operated in the mineral sector. The Ministry of Petroleum and Mineral Resources supervised its affiliate companies in the fields of petroleum and minerals; these included Aramco Gulf Operation Ltd., Saudi Arabian Mining Co. (Ma'aden), Saudi Arabian Oil Co. (Saudi Aramco), and Saudi Texaco. The Ministry also supervised the Saudi Geological Survey. Subsidiaries of Saudi Basic Industries Corp., in which the Government held 70% interest and the private sector held 30% interest, included Jubail Fertilizer Co., National Chemical Fertilizer Co., Saudi Arabian Fertilizer Co., Saudi Iron and Steel Co., and several petrochemical companies.

Government plans to sell a 40% equity interest in Ma'aden were ongoing; the initial public offering was expected by late 2007. The Government would retain a 50% interest in Ma'aden, and the social security fund and the public pension agency would each be allowed to purchase up to 5% of Ma'aden's shares.

Privatization of the Saudi Railways Organization was underway, as was the second phase of privatization of management contracts at several docks, terminals, and wharfs of the Saudi Ports Authority. The Government also planned to divest some of its interest in joint-stock companies and reviewed the potential sale of its interest in joint-venture companies that had been formed with Arab and Islamic public investment companies.

## Commodity Review

### Metals

**Aluminum.**—In 2006, Ma'aden continued discussions with potential joint-venture investors concerning the development of a bauxite mine at Az Zabirah and an alumina refinery and an aluminum smelter at Ras al-Zour. Western Way for Industrial Development Co. of Saudi Arabia proposed to build an alumina refinery and aluminum smelter complex in Jizan Economic City on the Red Sea. Bauxite feed for the Jizan alumina facility was to be imported from Greece.

**Copper, Gold, Silver, and Zinc.**—Ma'aden continued the development of Al Amar Mine, which was located about 210 kilometers (km) west of Riyadh, and work on the Ad Duwayhi deposit, which was located about 400 km east of Jeddah. Startup of Al Amar Mine was expected in late 2007, and annual

production was anticipated to be about 6,500 metric tons (t) of zinc, 1,100 t of copper, and 2 t of gold and silver. Gold and silver doré was to be refined by L'Azurde Group for Industrial Investment of Saudi Arabia; copper and zinc concentrates from Al Amar Mine were to be exported for processing. Initial output from the Ad Duwayhi project was expected in 2008 or 2009 (Saudi Arabian Mining Co., 2006).

Bariq Mining Ltd., which was a subsidiary of Vertex Group (Middle East) WLL of Bahrain, and Central Mining Company Investments Ltd. of Saudi Arabia began a drilling program on the Jabal Sayid copper project. In December, ADV Group Ltd. of Australia proposed to acquire the Vertex Group.

**Iron and Steel.**—In 2006, Saudi Iron and Steel Co. (Hadeed) started production from a 500,000-metric-ton-per-year (t/yr)-capacity concrete-reinforcing bar (rebar) and wire rod mill and completed a capacity expansion of the hot-rolling mill at Hadeed's Jubail plant to 2 million metric tons per year (Mt/yr). Midrex Technologies, Inc. of the United States and Voest Alpine Industrieanlagenbau GmbH. & Co. of Austria continued the construction of a 1.76-Mt/yr-capacity direct-reduction iron (DRI) plant. The DRI plant was expected to start production of cold DRI in March 2007, followed by hot DRI. Hadeed, which had the capacity to produce 3.2 Mt/yr of long steel products (such as bars and rods) and 2.2 Mt/yr of flat steel products (such as cold- and hot-rolled coil, plates, and slab), proposed to increase its steel products capacity to 10 Mt/yr by 2015 (James, 2006; Kopfle, McClelland, and Metius, 2007; Saudi Basic Industries Corp., 2007, p. 27).

The Direct Reduction Iron Co., which was a subsidiary of Al Tuwairqi Group of Saudi Arabia, continued the installation and renovation of two DRI plants at Dammam. The capacity of each of the DRI plants was upgraded to 500,000 t/yr from its original 400,000 t/yr capacity. The DRI plants were expected to be commissioned in 2007. The DRI would supplement the scrap steel feed that was used to supply the electric arc furnace of Al Tuwairqi's National Steel Co. Ltd. (GRIPS media GmbH, 2007).

Al-Atoun Steel Industry Co. of Saudi Arabia proposed to start the construction of a 1-Mt/yr-capacity crude steel plant and a 500,000-t/yr-capacity rebar rolling mill at Yanbu in eastern Saudi Arabia in early 2007. Initial steel production was expected in late 2008. A 1.7-Mt/yr-capacity DRI plant was proposed to be built adjacent to the steel plant by 2009. In southwestern Saudi Arabia, Pan Kingdom Investment Co. started construction of the South Steel Factory, which was a 1-Mt/yr-capacity crude steel plant, at Jizan (Middle East Economic Digest, 2006a, b).

**Niobium (Columbium), Tantalum, Yttrium, and Zircon.**—Tertiary Minerals plc of the United Kingdom and Saudi partners A.H. Algosaiiba & Bros. Co. and Al Nahla Trading and Contracting Co. continued their evaluation of the Ghurayyah tantalum prospect. Tertiary completed a 22-hole drilling program on the prospect as part of a prefeasibility study. In addition to tantalum, the prospect contained several other minerals, including niobium (columbium), yttrium, and zircon.

### *Industrial Minerals*

**Aluminum Fluoride.**—In 2006, Al Zamil Holding Co. of Saudi Arabia and Industries Chimiques du Fluor of

Tunisia formed a joint venture to build an aluminum fluoride manufacturing plant in Saudi Arabia. Initial production from the proposed plant was scheduled tentatively for 2008.

**Cement.**—Demand for cement from the Saudi Arabian construction sector resulted in an increase in cement production of nearly 1 Mt in 2006 compared with production in 2005, and a significant increase in gypsum production. A number of capacity expansions or new cement lines were under construction. Total installed domestic capacity was projected to reach about 31 Mt/yr by 2007 and about 39 Mt/yr by 2008 (Irish, 2006).

**Nitrogen.**—Saudi Arabian Fertilizer Co., which was a subsidiary of Saudi Basic Industries Corp., started production at the SAFCO IV plant at Jubail. The facility had a nominal annual capacity of 1.1 million metric tons (Mt) of ammonia and 1.1 Mt of granular urea (Saudi Basic Industries Corp., 2007, p. 24).

### *Mineral Fuels*

**Crude Oil.**—To meet increased domestic and international demand for crude oil and to offset the natural production decline of older fields, Saudi Aramco had several projects underway to increase total production capacity to 12 million barrels per day (Mbbbl/d) by 2009. In 2005 and 2006, production was about 9 Mbbbl/d, and the production capacity was about 10.5 to 11 Mbbbl/d. Projects included the development of the 1.2-Mbbbl/d-capacity Abu Jifan and Mazalij Fields; the redevelopment of the 900,000-barrel-per-day (bbl/d)-capacity Manifa Field; the addition of 500,000 bbl/d of production capacity with the development of the Abu Hadriyah, the Fadhili, and the Khursaniyah Fields; the development of the 100,000-bbl/d-capacity Nuayyim Field; and the expansion of production capacity at the Safaniyah and the Shaybah Fields. The projected increase in crude oil output also would produce a significant volume of associated natural gas (Saudi Arabian Co., 2007, p. 22-25; U.S. Energy Information Administration, 2007a).

### **Outlook**

With its crude oil resources, Saudi Arabia is well placed to meet international demand for petroleum, but historically, any sustained worldwide economic downturn and the resultant decline in demand for hydrocarbons has had a significant negative impact on the national economy. Saudi Aramco expects to continue its program to increase production of premium-priced light and extra light grades of crude oil and to decrease the production of heavy and medium grades of crude oil.

The Kingdom's privatization program and encouragement of private investment in mineral projects is expected to be attractive to international investors. Significant infrastructure development, which could include the establishment of new cities (including Jizan Economic City at Jizan, King Abdullah Economic City at Rabig, Knowledge Economic City at Al-Madinah, and Prince Abdulaziz Bin Mousaed Economic City at Hail) and the expansion of the highway and railroad network, will likely raise the short-term demand for construction minerals and products, such as cement, glass, sand, steel, and stone. Shortages of steel scrap and a constricted supply of natural gas, however, could affect the output of the country's expanding

steel production sector, as could a downturn in the booming regional construction industry. In the event of a downturn in the construction industry, the massive increase in Saudi Arabian cement production capacity could result in a significant oversupply of cement.

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TABLE 1  
SAUDI ARABIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2002 <sup>c</sup>	2003 <sup>c</sup>	2004	2005	2006 <sup>p</sup>
<b>METALS</b>					
Ferroalloys <sup>c</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	85,000
<b>Iron and steel:</b>					
Iron ore, for cement	NA	NA	503,500	582,000 <sup>r</sup>	722,000
Direct-reduced iron	thousand metric tons	3,290 <sup>3</sup>	3,290 <sup>3</sup>	3,410	3,630
Steel, crude	do.	3,570 <sup>3</sup>	3,944 <sup>3</sup>	3,902	4,185
<b>Metal ore, mine output:</b>					
Gross weight <sup>c</sup>	2,000,000	2,000,000	2,200,000	4,683,000 <sup>r</sup>	5,365,000 <sup>3</sup>
Copper content of concentrate and bullion	800	800	652	668	730
Gold content of concentrate and bullion	kilograms	4,192 <sup>3</sup>	8,769 <sup>3</sup>	8,268	7,456
Lead content of concentrate <sup>c</sup>	60	60	30	-- <sup>r</sup>	-- <sup>3</sup>
Silver content of concentrate and bullion <sup>c</sup>	kilograms	14,000	13,000	14,494 <sup>3</sup>	13,501 <sup>3</sup>
Zinc content of concentrate <sup>c</sup>	3,000	3,000	1,500	-- <sup>r</sup>	983 <sup>3</sup>
<b>INDUSTRIAL MINERALS</b>					
Barite	9,000	9,000	15,000	15,000	23,300
Cement, hydraulic	thousand metric tons	22,000	23,000	25,370	26,064
Fertilizer, phosphatic, P <sub>2</sub> O <sub>5</sub> content <sup>c</sup>	do.	150	150	295	300
Gypsum, crude	do.	450	450	641	713
Lime <sup>c</sup>	350,000	350,000	350,000	360,000	360,000
<b>Nitrogen:</b>					
N content of ammonia	thousand metric tons	1,737 <sup>3</sup>	1,743 <sup>3</sup>	1,726	1,780
N content of urea	do.	1,241 <sup>3</sup>	1,247 <sup>3</sup>	1,242	1,250
Salt	do.	1,000 <sup>r</sup>	1,300	1,530	1,738
<b>Sand and stone:</b>					
Aggregate	do.	120,000	120,000	156,300	190,000
Basalt	do.	NA	NA	NA	43
Dolomite	do.	NA	NA	530	498
Granite	do.	NA	NA	716	843
Limestone	do.	NA	NA	32,000	30,600
Marble	do.	NA	NA	82	85
Pozzolana and scoria	do.	152	162	320	372
Sand and gravel	do.	NA	NA	33,100	28,000
Silica sand (glass sand)	do.	NA	NA	625	518
Sulfur, byproduct, hydrocarbon processing	2,363,614 <sup>3</sup>	2,180,000	2,249,295	2,716,823	2,906,911
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
<b>Gas, natural:</b>					
Gross	million cubic meters	63,978 <sup>3</sup>	67,389 <sup>3</sup>	75,967	81,350
Dry	do.	57,314 <sup>3</sup>	60,060 <sup>3</sup>	68,000	68,547 <sup>r,3</sup>
<b>Petroleum:</b>					
Crude oil	million 42-gallon barrels	2,479 <sup>3</sup>	2,958 <sup>r,3</sup>	3,151	3,309
Condensate	do.	NA	44 <sup>3</sup>	82	89
<b>Natural gas liquids:</b>					
Propane	thousand 42-gallon barrels	139,270 <sup>3</sup>	144,837 <sup>3</sup>	148,225	150,588
Butane	do.	91,858 <sup>3</sup>	87,812 <sup>3</sup>	91,060	94,148
Natural gasoline and other	do.	85,810 <sup>3</sup>	68,422 <sup>3</sup>	65,647	66,299
Total	do.	316,938 <sup>3</sup>	301,071 <sup>3</sup>	304,932	311,035
<b>Refinery products:</b>					
Liquefied petroleum gases	do.	10,340 <sup>3</sup>	10,150 <sup>3</sup>	13,400	12,740
Gasoline and naphtha	do.	153,000	171,720 <sup>3</sup>	198,570	198,870
Jet fuel and kerosene	do.	59,700	65,550 <sup>3</sup>	66,980	80,910
Distillate fuel oil	do.	193,000	215,590 <sup>3</sup>	234,890	236,370
Residual fuel oil	do.	158,000	169,380 <sup>3</sup>	172,790	177,970
Unspecified <sup>4</sup>	do.	9,180	10,240 <sup>3</sup>	11,490	13,780
Total	do.	583,000	642,630 <sup>3</sup>	698,120	720,640

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. NA Not available. <sup>p</sup>Preliminary. <sup>r</sup>Revised. --Zero.

<sup>1</sup>Table includes data available through November 13, 2007.

<sup>2</sup>In addition to commodities listed, carbon black, clays, and methanol were produced, but available information is inadequate to make estimates of output.

<sup>3</sup>Reported figure.

<sup>4</sup>Includes asphalt.

TABLE 2  
SAUDI ARABIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of facilities	Annual capacity
Cement <sup>1</sup>	Yanbu Cement Co.	Yanbu	4,300
Do.	Saudi Cement Co.	Ayn Dar, about 120 kilometers southwest of Dammam	1,450
Do.	do.	Al Hofuf, about 120 kilometers southwest of Dammam	2,700
Do.	Southern Province Cement Co. (Government, 40%)	Suq Al Ahad, 10 kilometers northeast of Jizan	1,900
Do.	do.	Bishah, 550 kilometers southeast of Jiddah	1,300
Do.	Arabian Cement Co. Ltd.	Rabigh	3,100
Do.	Eastern Province Cement	Al Khursaniyah	3,500
Do.	Yamama Cement Co.	Riyadh	3,000
Do.	Qasim Cement Co.	Jal al Watah, 18 kilometers north of Buraydah	2,100
Do.	Tabuk Cement Co.	Tabuk	1,500
Do.	Saudi White Cement	About 30 kilometers southwest of Riyadh	200
Copper, Cu content of ore	Saudi Arabian Mining Co. (Ma'aden) (Government, 100%)	Al-Hajar and Mahd Al-Dahab Mines	1,000
Gold kilograms	Saudi Arabian Mining Co. (Ma'aden) (Government, 100%)	Al-Hajar, Bulgah, and Mahd Al-Dahab Mines, and Sukhaybarat plant	8,000
<b>Petroleum:</b>			
Crude million barrels	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)	Eastern Province, Najd Region, and offshore; includes the Ghawar, the Hawtah, the Safaniya, and the Shaybah Fields	3,900
Refined products	do.	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)	Ras Tanura
Do.	do.	Rabigh Petroleum Refining Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]	Rabigh
Do.	do.	Saudi Aramco Mobil Refinery Co. Ltd. [Saudi Arabian Oil Co. (Saudi Aramco), 50%, and Mobil Yanbu Refining Company Inc., 50%]	Yanbu
Do.	do.	Saudi Aramco Shell Refining Co. [Saudi Arabian Oil Co., (Saudi Aramco), 50%, and Shell Saudi Arabia Refining Ltd., 50%]	Al Jubayl
Do.	do.	Saudi Arabian Oil Co. (Saudi Aramco) (Government, 100%)	Yanbu
Do.	do.	Riyadh Oil Refinery Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]	Riyadh
Do.	do.	Jeddah Oil Refinery Co. [Saudi Arabian Oil Co. (Saudi Aramco), 100%]	Jeddah
Steel, crude	Saudi Iron and Steel Co. (Hadeed) (Saudi Basic Industries Corp., 100%)	Al Jubayl	2,700
Do.	National Steel Co. Ltd. (Al Tuwairqi Group, 100%)	Dammam	800
Titanium dioxide	The National Titanium Dioxide Co. Ltd. (Cristal) (Gulf Investment Corp. of Kuwait; National Industrialization Co. of Saudi Arabia; Shairco Trading Industry and Contracting of Saudi Arabia)	Yanbu	100
Zinc, Zn content of ore	Saudi Arabian Mining Co. (Ma'aden) (Government, 100%)	Al-Hajar and Mahd Al-Dahab Mines	2,000

<sup>1</sup>In 2006, production from most cement plants exceeded nominal capacity.