



2006 Minerals Yearbook

UNITED ARAB EMIRATES

THE MINERAL INDUSTRY OF THE UNITED ARAB EMIRATES

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The production of hydrocarbons and international and regional trade were significant facets of the diversified economy of the United Arab Emirates¹ (U.A.E.). Of the seven Emirates, Abu Dhabi accounted for most of the country's crude oil production. Dubai Aluminium Co. Ltd. (Dubal) accounted for about 2% of the world's primary aluminum supply (Bray, 2007, p. 5.17).

All mineral resources were controlled by the individual Emirates and administered by the Federal Government's Ministry of Petroleum and Mineral Resources. The Federal Environmental Agency and local authorities in each Emirate administered Federal law No. (24) of 1999 for the Protection and Development of the Environment.

In 2006, the value of the U.A.E.'s total exports (freight-on-board), which included reexports, was estimated to be \$142.6 billion, which was up significantly from a revised \$117.2 billion in 2005. The U.A.E. was a significant regional transshipment point, and reexports were estimated to account for about 32% of total exports. The value of crude oil and condensate exports from the U.A.E. was estimated to be \$58.1 billion in 2006 (about 41% of total exports) compared with \$43.5 billion in 2005 (about 37% of total exports). Much of the increase in the value of crude oil exports could be attributed to an increase in the average price received per barrel of crude, which was \$63.53 in 2006 compared with \$53.56 per barrel in 2005. Natural gas exports were valued at \$7.1 billion, and refined petroleum products, \$4.9 billion. Reexports of rough diamond were valued at \$2.4 billion. In 2006, the value of total imports (cost, insurance, and freight) was estimated to be \$86.1 billion, of which the import of about 43 million carats of rough diamond accounted for about \$1.6 billion (Jbili and others, 2007, p. 8, 28; Kimberley Process, 2007).

Minerals in the National Economy

In 2006, crude oil and natural gas, accounted for about 26% of the gross domestic product; the manufacturing sector (which included the production of processed mineral-based commodities), about 14%; the construction sector, about 9%; and other mineral production, 0.3%. Of the country's labor force of about 2.8 million, about 647,000 worked in the construction sector, about 362,000 in the manufacturing sector, about 30,000 in the crude oil and natural gas sector, and about 6,000 in mining and quarrying (Jbili and others, 2007, p. 2, 9).

Production

In 2006, significant increases were noted in the estimated production of aluminum, gasoline, and lime. Data on mineral production are provided in table 1.

¹Comprises the following Emirates: Abu Dhabi, Ajman, Dubai, Fujairah, Ras Al Khaimah, Sharjah, and Umm al-Qaywayn.

Structure of the Mineral Industry

The governments of the Emirates maintained significant interest in the country's mineral industry. In 2006, the country's sole primary aluminum producer was owned by a Dubai government investment organization. Owners of cement companies included both government and private investors. Hydrocarbons were produced primarily by companies in which the governments held majority interest.

In 2006, Dubai Metals and Commodities Centre changed its name to Dubai Multi Commodities Centre (DMCC). The Government designated that the Dubai Diamond Exchange, which was a unit of the DMCC, was to be the sole importer and exporter of diamond.

Commodity Review

Metals

The Environmental Agency, Abu Dhabi and GRM International (Pty.) Ltd. of Australia started phase 2 of a soil survey of Abu Dhabi. The Environmental Agency, Abu Dhabi projected that the soil survey could be used as basic background information for mineral exploration in the Emirate. The United Arab Emirates University signed an agreement with the National Key Centre for Geochemical Evolution and Metallogeny of Continents of Macquarie University of Australia to prospect for gold and platinum-group metals in the Hajar Mountains.

Aluminum.—In November, Dubal officially started potline 7B at its Dubai aluminum smelter, which added 128 pots to potline 7, and started potline 9B, which added 36 pots to potline 9. By yearend, the aluminum smelter's total hot-metal capacity had reached 861,000 metric tons per year (t/yr). In 2006, Dubal was adding 32 pots to potline 5 (as potline 5B) and 40 pots to potline 6 (as potline 6B). The addition of potlines 5B and 6B, which would expand Dubal's capacity by 60,000 t/yr, was expected to be completed in late 2007. Dubal also was considering a 600,000-t/yr-capacity expansion with the addition of two new potlines (10 and 11) (Dubai Aluminium Co. Ltd., 2006b; Middle East Economic Digest, 2006f).

Emirates Aluminium, which was a joint venture of Dubal and Mubadala Development Corp. (the Emirate of Abu Dhabi's investment organization) that was formed in February 2006, fast-tracked plans for a proposed aluminum smelter in Abu Dhabi. By November, Emirates Aluminum had completed a feasibility study of the proposed 1.4-million-metric-ton-per-year (Mt/yr)-capacity smelter, which was to be located in the Khalifa Port and Industrial Zone at Taweelah. The \$5 billion 700,000-t/yr-capacity phase 1 of the project was expected to be operational in 2010 (Dubai Aluminium Co. Ltd., 2006a).

Abu Dhabi Aluminium Co. (a joint venture of the General Holding Co. of Abu Dhabi and Rio Tinto Group's Comalco Aluminium division) proposed to build a 550,000-t/yr-capacity aluminum smelter at Ruwais in Abu Dhabi by 2011. The proposed project would encompass the possible expansion of smelter capacity to 2 Mt/yr and the potential construction of a 2-Mt/yr-capacity alumina refinery. General Holding Co. was the industrial diversification organization of the Emirate of Abu Dhabi. In November, Comalco Aluminum became Rio Tinto Aluminum (Middle East Economic Digest, 2006a).

Copper.—Emirates Link Group of the U.A.E. and the Kembla Rod and Wire division of MM Kembla of Australia proposed to build a copper rod plant in Abu Dhabi. The plant's cast house and rolling mill were to be built at Mussafah.

Industrial Minerals

Nitrogen.—Ruwais Fertilizer Industries proposed to add a 2,500-metric-ton-per-day (t/d)-capacity granulation unit to its 1,700-t/d-capacity urea plant. In 2006, actual urea production, which was prilled, exceeded nameplate capacity (Middle East Economic Digest, 2006b).

Green Dome Petrochemicals imported and began the refurbishment of a 1,180-t/d-capacity ammonia plant. The plant, which formerly was operated by Cooperative Farm Chemicals Association of Kansas, was being rebuilt in the Hamriya free zone in Sharjah and was expected to begin production in late 2007 (Middle East Economic Digest, 2007).

Salt.—Al Ghaith Holding PJSC of the U.A.E. and the Geology Department of the United Arab Emirates University began a study of the production of salt from coastal evaporation ponds along the Khor al Bazam, which was located west of Abu Dhabi. Domestically produced solar salt could be substituted for industrial salt imported by the U.A.E.'s chemical industries.

Silica.—The regional construction boom significantly increased the demand for glass in the region. Silica sand accounts for about 70% of the raw materials used to manufacture glass. In 2006, construction started on a 600-t/d-capacity float glass plant at Industrial City Abu Dhabi at Mussafah for Emirates Float Glass, which was a subsidiary of Dubai Investments PSJC of the U.A.E., and a 700-t/d-capacity plant in Ras al-Khaimah for a joint venture of Saudi Guardian International Float Glass Co., Ltd. of Saudi Arabia and partners Guardian Industries Corp. of the United States, National Co. for Glass Industries Ltd. of Saudi Arabia, and Al Zamil Group of Saudi Arabia. Al Hamed Enterprises of the U.A.E. and the Pilkington Group Ltd. of the United Kingdom proposed to build a 550-t/d-capacity float glass plant in the Industrial City Abu Dhabi. At yearend, Dubai Investments announced the transfer of its glassmaking subsidiaries in the U.A.E., which included Emirates Float Glass, Emirates Glass LLC, and Lumiglass Industries, to the newly formed corporate division, Glass LLC (Guardian Industries Corp., 2006; Middle East Economic Digest, 2006d; Securities and Commodities Authority of the United Arab Emirates, 2007).

Sulfur.—Abu Dhabi Oil Refining Co. (TAKREER) proceeded with plans to expand the handling capacity of the Ruwais Sulphur Handling Terminal to nearly 10,100 t/d by 2008 from

7,650 t/d. The expansion would include a new loading dock, sulfur granulation units, and storage tanks for liquid and solid sulfur (Middle East Economic Digest, 2006e).

The Camberley, United Kingdom, office of Fluor Corp. was building 1,600-t/d-capacity sulfur recovery units for Abu Dhabi Gas Industries Co.'s Habshan complex, which processed associated natural gas from the Bab and the Bu Hasa oilfields. The project was expected to be commissioned in 2008. Abu Dhabi Gas Industries Co. also proposed to build a 400,000-metric-ton-capacity sulfur storage facility at Habshan (Gulf Oil & Gas.com, 2005; Middle East Economic Digest, 2006c).

Mineral Fuels

Petroleum.—In January, construction of a 12,000-barrel-per-day (bbl/d)-capacity catalytic reformer plant and a 19,000-bbl/d-capacity isomerization plant was completed for TAKREER. The new plants, which were located at the Ruwais refinery, allowed TAKREER to increase gasoline production (Abu Dhabi Oil Refining Co., 2006).

Outlook

The U.A.E. has significant natural gas reserves to draw upon, but relatively little locally produced natural gas is liquefied and exported; the volume of locally produced liquefied natural gas (LNG) is not expected to increase significantly, although the DMCC proposed to build a \$1 billion 1.8-million- to 3-million-metric-ton-capacity LNG storage and trading facility in Dubai. The storage facility would allow traders to purchase LNG during off peak (lower cost) periods (Dutta, 2006a).

To meet partially the anticipated increased demand from the industrial sector, natural gas production is projected to increase by 20% by 2010. Domestic production will be supplemented by gas imported from Qatar by the Dolphin pipeline, which is expected to begin flowing in 2007. Most of the natural gas will be processed and reinjected to maintain oilfield reservoir pressure. Electricity-generating powerplants and proposed aluminum production and steel-processing facilities also would depend on the availability of natural gas to power their facilities (Dutta, 2006b).

Most of the U.A.E.'s natural gas output is produced as a coproduct of crude oil production and is "sour"; that is, it has a highly-corrosive hydrogen sulfide content ranging from 2% [20,000 parts per million (ppm)] to 10%. Abu Dhabi National Oil Co. projects that it eventually would need to develop reservoirs with hydrogen sulfide contents of as high as 30%. Handling costs associated with the production of such sour gas reserves are significant. In addition to the deterioration of downhole and surface equipment, natural gas that subsequently is reinjected into oil reservoirs to maintain reservoir pressure typically is processed to reduce hydrogen sulfide content to about 50 ppm.

References Cited

Abu Dhabi Oil Refining Co., 2006, TAKREER successfully commissioned a project to increase gasoline production and produce low sulphur gas oil: Abu Dhabi Oil Refining Co. press release, January, 1 p.

- Bray, E.L., 2007, Aluminum, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2006, v. I, p. 5.1-5.17. (Accessed February 6, 2008, at <http://minerals.usgs.gov/minerals/pubs/commodity/aluminum/myb1-2006-alumi.pdf>.)
- Dubai Aluminium Co. Ltd., 2006a, Emirates Aluminium (EMAL) project gets on fast track: Dubai Aluminium Co. Ltd. press release, November 8, 2 p. (Accessed November 30, 2007, at <http://www.dubal.ae/mediacentre/Article.asp?id=291>.)
- Dubai Aluminium Co. Ltd., 2006b, H.H. Sheikh Hamdan officially inaugurates Potlines 7B & 9B at Dubai Aluminium Company: Dubai Aluminium Co. Ltd. press release, November 20, 2 p. (Accessed November 30, 2007, at <http://www.dubal.ae/mediacentre/Article.asp?id=294>.)
- Dutta, Ashok, 2006a, Billion-dollar baby: Middle East Economic Digest, v. 50, no. 48, December 1, p. 80-83.
- Dutta, Ashok, 2006b, The dash for gas: Middle East Economic Digest, v. 50, no. 25, June 23, p. 4.
- Guardian Industries Corp., 2006, Gulfguard breaks round in U.A.E.: Guardian Industries Corp., press release, February 12, 1 p.
- Gulf Oil & Gas.com, 2005, Fluor wins Habshan gas processing work in Abu Dhabi: Gulf Oil & Gas.com. (Accessed February 7, 2008, at <http://www.fulfoilandgas.com/webpro1/MAIN/Mainnews.asp?id=2087>.)
- Jbili, Abdelali, Jaber, Mohamed, Çakir, Selim, Singh, Manmohan, and Hakura, Dalia, 2007, United Arab Emirates—Statistical appendix: Washington DC, International Monetary Fund Country Report No. 07/348, October, 35 p.
- Kimberley Process, 2007, Annual global summary—2006 production, imports, exports, and KPC counts: Ottawa, Ontario, Canada, Kimberley Process, 1 p. (Accessed February 6, 2008, at https://mmsd.mms.nrcan.gc.ca/kimberleystats/Global_Summary_-_2006_data.pdf.)
- Middle East Economic Digest, 2006a, Bechtel tipped for Abu Dhabi smelter contract: Middle East Economic Digest, v. 50, no. 41, October 13, p. 19.
- Middle East Economic Digest, 2006b, Fertil invites five bids for urea plant: Middle East Economic Digest, v. 50, no. 51, December 22, p. 16.
- Middle East Economic Digest, 2006c, Gasco prepares for sulphur stockpiling: Middle East Economic Digest, v. 50, no. 25, June 23, p. 17.
- Middle East Economic Digest, 2006d, Glass plant planned: Middle East Economic Digest, v. 50, no. 47, November 24, p. 33.
- Middle East Economic Digest, 2006e, Ruwais sulphur expansion goes for bid: Middle East Economic Digest, v. 50, no. 21, May 26, p. 13.
- Middle East Economic Digest, 2006f, SNC Lavalin takes more Dubai work: Middle East Economic Digest, v. 50, no. 25, June 23, p. 30.
- Middle East Economic Digest, 2007, Sharjah to begin fertilizer production by year-end: Middle East Economic Digest, v. 51, no. 10, March 9, p. 16.
- Securities and Commodities Authority of the United Arab Emirates, 2007, Emirates Float Glass signs agreement with Air Products & Chemicals and Saudi's Abdullah Hashim Gases & Equipment to supply nitrogen and hydrogen: Securities and Commodities Authority of the United Arab Emirates news update, February 14, 1 p.

TABLE 1
THE UNITED ARAB EMIRATES: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2002	2003	2004	2005	2006
Aluminum, primary	536,000	560,000	683,000	722,000	861,000
Cement, hydraulic	7,000,000	8,000,000	9,000,000 ^r	9,800,000 ^r	9,800,000
Chromium, gross weight	(4)	(4)	7,089 ⁵	(4)	(4)
Gas, natural:					
Gross million cubic meters	55,000	60,000	61,000	62,000	63,000
Dry do.	42,000	44,400 ⁵	45,400 ⁵	46,400 ⁵	47,000 ⁵
Gypsum	90,000	100,000	110,000 ^r	120,000 ^r	130,000
Lime	50,000	50,000	50,000	50,000	60,000
Natural gas plant liquids thousand 42-gallon barrels	115,000	115,000	115,000	105,000 ^r	100,000
Nitrogen:					
N content of ammonia	363,700 ⁵	421,000	380,400 ⁵	360,000	380,000
N content of urea	260,000	300,000 ^r	270,000 ^r	260,000	270,000
Petroleum:					
Crude thousand 42-gallon barrels	675,000	790,000	820,000	830,000	900,000
Refinery products: ⁶					
Gasoline do.	11,400	11,000	20,000	20,000	30,000
Kerosene do.	39,000	40,000	50,000	50,000	50,000
Distillate fuels do.	34,900	33,800	45,000	45,000	48,000
Residual fuels do.	11,300	7,800	20,000	20,000	19,000
Other do.	58,300	38,400	65,000	65,000	60,000
Total do.	155,000	131,000	200,000	200,000	207,000
Steel	70,000	50,000	70,000	70,000	70,000
Sulfur, byproduct of petroleum refining and natural gas processing	1,900,000	1,900,000	1,930,000	1,950,000	1,950,000

^rRevised.

¹Estimated; estimated data and totals are rounded to no more than three significant digits.

²Table includes data available through November 14, 2007.

³In addition to the commodities listed, crude industrial minerals, such as common clays, diabase, gravel, limestone, marble, sand, and shale presumably are produced, but output is not reported, and information is inadequate to make estimates of output.

⁴Negligible or no production.

⁵Reported figure.

⁶Average daily production data converted assuming a 350-day operating year and rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
UNITED ARAB EMIRATES: 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
Aluminum		Dubai Aluminum Co. Ltd. (Investment Corp. of Dubai, 100%)	Jebel Ali, Dubai	861
Cement:				
Portland		Gulf Cement Co. (National Investments Co. of Kuwait, 27%, and Government of Ras Al Khaimah, 8%)	Khor Khuwair, Ras Al Khaimah	2,700
Do.		Sharjah Cement and Industrial Development Co. (private, 70%, and Government of Sharjah, 30%)	Sharjah	2,000
Do.		National Cement Co. P.S.C.	Dubai	1,500
Do.		Union Cement Co. (Government of Ras Al Khaimah, 41%, and Abu Dhabi Investment Authority, 20%)	Khor Khuwair, Ras Al Khaimah	1,400
Do.		Fujairah Cement Industries	Dibba, Fujairah	1,200
Do.		Emirates Cement Factory (General Holding Corp.)	Al-Ain, Abu Dhabi	1,000
Do.		Ras Al Khaimah Cement Co.	Khor Khuwair, Ras Al Khaimah	1,000
Do.		Arabian Gulf Cement Co. L.L.C.	Ajman	900
Do.		Jebel Ali Cement Co. (Sharaf Industries, 100%)	Jebel Ali, Dubai	800
Do.		Umm al-Qaywayn Cement Industries Co.	Umm al-Qaywayn	500
White		Ras Al Khaimah Co. for White Cement and Construction Materials	Ras Al Khaimah	450
Gold, refined	metric tons	Emirates Gold (private, 100%)	Dubai	200
Do.	do.	Al Ghurair Giga Gold (private, 100%)	Dubai	100
Do.	do.	ARY Aurum Plus (private, 100%)	Sharjah	25
Natural gas, liquefied		Abu Dhabi Gas Liquefaction Co. Ltd.	Das Island	5,149
Petroleum:				
Crude	thousand barrels per day	Abu Dhabi Company for Onshore Oil Operations (Abu Dhabi National Oil Co., 60%; BP p.l.c., 9.5%; ExxonMobil Corp., 9.5%; Royal Dutch Shell Group, 9.5%; Total S.A., 9.5%; Participations and Explorations Corp., 2%)	Onshore Abu Dhabi oilfields included the Asab, the Bab, the Bu Hasa, the Jarn Yaphour, the Sahil, and the Shah Fields	1,400
Do.	do.	Abu Dhabi Marine Operating Co. (Abu Dhabi National Oil Co., 60%; BP p.l.c., 14.67%; Total S.A., 13.33%; Japan Oil Development Corp., 12%)	Offshore Abu Dhabi oilfields included the Umm Sharif and the Zakum Fields	600
Do.	do.	Zakum Development Co. (Abu Dhabi National Oil Co., 63.36%; ExxonMobil Abu Dhabi Offshore Petroleum Co. Ltd., 24.64%; Japan Oil Development Corp., 12%)	Offshore Abu Dhabi oilfields included the Satah, the Umm Al-Dalkh, and the Upper Zakum Fields	500
Do.	do.	Dubai Petroleum Co. (ConocoPhillips Co. of the United States, 100%), and Dubai Marine Areas Ltd. (ownership interest includes Repsol YPF, RWE Dea AG, Total S.A., and Wintershall AG) ¹	Offshore Dubai oilfields	90
Refined products	barrels per day	Abu Dhabi Oil Refining Co. (Abu Dhabi National Oil Co., 100%)	Ruwais Refinery, Ruwais, Abu Dhabi	460,000
Do.	do.	Emirates National Oil Co. (Investment Corp. of Dubai, 100%)	Jebel Ali Refinery, Jebel Ali, Dubai	120,000
Do.	do.	Abu Dhabi Oil Refining Co. (Abu Dhabi National Oil Co., 100%)	Abu Dhabi Refinery, Umm Al Nar, Abu Dhabi	90,000
Do.	do.	Sharjah Oil Refining Co. Fzc (FAL Group, 100%)	Sharjah Refinery, Hamriyah Free Trade Zone, Sharjah	85,000
Do.	do.	Inactive refinery, formerly operated by Metro Oil Corp.	Fujairah	82,000
Silver, refined	metric tons	Emirates Gold (private, 100%)	Dubai	100

¹Dubai Petroleum Establishment, which is a newly formed entity owned by the government of Dubai, will assume operatorship of the oilfields in April 2007.