USGS
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2009 Minerals Yearbook

QATAR

U.S. Department of the Interior
U.S. Geological Survey

September 2011

The Mineral Industry of Qatar

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In 2009, Qatar was a significant producer of crude oil, direct-reduced iron (DRI), helium, natural gas, and nitrogen fertilizer. Qatar had been the world's leading exporter of liquefied natural gas (LNG) after overtaking Indonesia, which had dominated the market for 30 years, in 2006. Qatar was the eighth ranked producer of natural gas and accounted for 2.5% of the world's output. The country's natural gas reserves at the end of 2009 were reportedly estimated to be 25.4 trillion cubic meters, which was smaller in volume only than those of Russia and Iran in order of reserve volume, and accounted for 13.5% of the world's total reserves. In 2009, Doha (the capital of Qatar) became the permanent headquarters for the Secretariat of the Gas Exporting Countries Forum, which included 14 member countries and was established in 2001. Qatar contributed 1.5% of the world's crude oil production and about 1.4% of the world's ammonia production. As of yearend 2009, Qatar's crude oil reserves were reportedly estimated to be 26.8 billion barrels, or 2.0% of the world's total reserves. Qatar also produced aluminum (as of December 2009), crude steel, refined petroleum products, semimanufactured billet and concrete-reinforcing bar, and urea fertilizer (Apodaca, 2010; BP p.l.c., 2010, p. 8, 10, 22, 24; Pacheco, 2010; Qatar Petroleum, 2010, p. 9).

Minerals in the National Economy

Qatar's nominal gross domestic product (GDP) decreased by 11.2% to $98.3 billion[1] in 2009 from $110.7 billion in 2008. The economy, however, grew by 8.7%, in real terms, in 2009 compared with a 25.4% real growth rate in 2008. The average real economic growth rate in the period 2005-09 was 17.4%, which was one of the fastest economic growth rates in the world. In 2009, the natural gas sector, which accounted for 24.5% of the country's GDP, overtook the oil sector, which accounted for 21.7% of the GDP, as the single largest contributor to the economy. The real value of industrial sector activity, which included cement, fertilizer, refined petroleum products, and steel production, decreased by 10.2% in 2009 compared with that of 2008, and the industrial sector's contribution to the GDP decreased by 1% compared with that of 2008. Similarly, the value of the building and construction sector decreased by 21.8%, and the sector's contribution to the GDP decreased by 2.6% compared with that of 2008. The value of foreign direct investment increased by 30% to $8.7 billion in 2009 from $6.7 billion in 2008 (Arab Investment and Export Credit Guarantee Corp., 2010; QNB Capital L.L.C., 2010, p. 10).

Production

Notable increases in the production volumes of some mineral commodities included those of DRI and rolled-steel bar by 28% each; helium, by 18%; dry gas, by 16%; washed sand, by 15%; cast billet, by 14%; and methanol, by 9% compared with their respective production levels in 2008. Notable decreases in the production volumes of mineral commodities included those of crude steel, by 28%; and lime and sulfur, by 12% each compared with their respective production levels in 2008 (table 1).

Structure of the Mineral Industry

State-owned Qatar Petroleum was the Government agency responsible for managing all aspects of natural gas and crude oil development, exploration, production, and transportation in the country through its subsidiaries and joint ventures. The company's operations were located mainly in onshore sites at Doha, Dukhan, Mesaieed Industrial City, and e Ras Laffan Industrial City, and offshore locations at Halul Island and the North gasfield. Qatar Petroleum had signed several production-sharing agreements with international oil companies to operate and produce LNG from the North field. These companies included ConocoPhillips Co., Exxon Mobil Corp. (both of the United States); LNG Japan Corp. and Mitsui & Co. Ltd. (both of Japan); and Royal Dutch Shell plc of the Netherlands. Qatar Petroleum had a 100% interest in Qatar Petroleum Qatar Gas (3) Ltd. (Qatargas 3) and Qatar Petroleum Qatar Gas (4) Co. Ltd. (Qatargas 4); a 70% interest in Industries Qatar Q.S.C., QatarGas Operating Co. Ltd., RasGas Co. Ltd., Ras Laffan Liquefied Natural Gas Co. Ltd. II (Rasgas II), and Ras Laffan Liquefied Natural Gas Co. Ltd. 3 (Rasgas 3); a 67.5% interest in Qatar Liquefied Gas Co. Ltd. (II) Q.S.C (Qatargas II); a 65% interest in Qatar Liquefied Gas Co. Ltd. Q.S.C. (Qatargas) and Qatargas Upstream Joint Venture Co.; and a 63% interest in Ras Laffan Liquefied Natural Gas Co. Ltd. (Rasgas) (Qatar Petroleum, 2010, p. 2).

Industries Qatar Q.S.C. held a majority interest in Qatar Fertilizer Co. S.A.Q (QAFCO), Qatar Fuel Additives Co. Ltd. Q.S.C (Qafac), Qatar Nitrogen Co., Qatar Petrochemical Co. Ltd. (Qapco), Qatar Steel Co. Q.S.C. (QASCO), and Qatar Petroleum International (Qatar Petroleum, 2010, p. 2). Qatar Aluminium Ltd. (Qatalum) was a 50-50 joint venture of Qatar Petroleum Ltd. and Norsk Hydro A.S.A of Norway. Qatar Petroleum provided the gas supply and plant site and Hydro contributed its technology, metal marketing experience, and project management expertise (Qatar Aluminium Ltd., 2010; Qatar Petroleum, 2010, p. 2).

Mineral Trade

In 2009, the value of Qatar's goods and services exports decreased by 26.7% to $52.2 billion from $71.2 billion in 2008. The value of LNG and related commodities exports decreased by 23.4% to $23.6 billion from $30.8 billion, and the value of crude oil and refined petroleum products exports

[1]Where necessary, values have been converted from Qatari riyals (QR) to U.S. dollars (US$) at the rate of QR3.640=US$1.00 for 2009.

decreased by 38.8% to $17.2 billion from $28.1 billion in 2008. Oil prices for Qatar averaged $62.10 per barrel in 2009 compared with $95.20 per barrel in 2008. The volume of LNG exports increased by 22% to about 81.6 million cubic meters [37.1 million metric tons (Mt)] compared with 66.7 million cubic meters (30.4 Mt) of LNG in 2008. Qatar exported LNG to countries in Asia and Europe. Japan was the leading importer of Qatari LNG exports in 2009. It accounted for about 21% of Qatar's total LNG exports followed by the Republic of Korea (19%), India (about 17%), Belgium (12%), Spain and the United Kingdom (about 10% each), Italy and Taiwan (3% each), and other countries (5%) (QNB Capital L.L.C., 2010, p. 10, 18-21).

Commodity Review

Metals

Aluminum.—Qatalum produced the first aluminum ever made in Qatar in December from its $5.7 billion investment in the 585,000-metric-ton-per-year (t/yr)-capacity smelter at Mesaieed, which is located 40 kilometers south of Doha. Qatalum's smelter was expected to operate at capacity beginning in April 2010 and to produce 240,000 metric tons (t) in 2010. The plant was designed to have its own 1,370-megawatt powerplant and the option to increase capacity to 1.2 million metric tons per year (Mt/yr). Qatalum's smelter consumed 1.3 Mt/yr of alumina, which was shipped in 42,000-t shipments from alumina refineries in Australia and Brazil that were partially owned by Norsk Hyrdo (Bains, 2010, p. 5, 9, 13).

Iron and Steel.—In 2009, QASCO was one of the top DRI producers in the world and the sole producer of steel in Qatar. In addition to its production and processing facility at Mesaieed, QASCO operated a steel bar and coil processing plant in the Emirate of Dubai in the United Arab Emirates. QASCO produced about 2.1 Mt of DRI from its two-module plant at Mesaieed. Steel production in two electric arc furnaces was stopped between November 2008 and May 2009 because of the global financial crisis, and was resumed in the beginning of June. In 2009, the company exported about 400,000 t of DRI, 282,000 t of hot-briquetted iron, 51,000 t of iron oxide fines, 46,000 t of processed iron ore fines, and 46,000 t of mill scale. QASCO imported about 2.7 Mt of iron ore, 71,000 t of lime, 32,000 t of scrap steel, and about 12,000 t of ferroalloys, and obtained about 110,000 t of scrap from the local market. The company planned to increase production capacity by 30%, which was expected to increase production by between 1 and 3.1 Mt by 2012 (Arab Steel, 2010; Qatar Steel Co. Q.S.C., 2010, p. 17, 20, 22).

Industrial Minerals

Cement.—The fast pace of economic growth in Qatar in recent years has elevated Qatar's per capita cement consumption of 4,710 kilograms per year (kg/yr) to one of the highest cement consumption levels in the world. Qatar National Cement Co. Q.S.C. was the leading cement production and marketing company in the country. In 2009, Qatar National Cement, which completed an expansion plan that added a new 1.5-Mt/yr-capacity production line in 2009, increased its production of ordinary and sulfate-resistant portland cement to 4.1 Mt from 3.8 Mt in 2008. The company also produced 7.5 Mt of washed sand and 22,200 t of calcined and hydrated lime. The sales volume of all types of cement in Qatar, which included ordinary portland cement, sulfate-resistant portland cement, slag-blended cement, and fly-ash-blended cement, was 5.2 Mt in 2009 compared with 4.8 Mt in 2008. Clinker was imported mainly from Saudi Arabia, but also from India, Indonesia, and Thailand, whereas cement was imported from China and India (Qatar National Cement Co. Q.S.C., 2010, p. 4; World Cement, 2010, p. 33).

Mineral Fuels

Natural Gas.—Qatar Petroleum and its joint-venture partners had been developing several gas production, transportation, and distribution projects, including the Al Khalij gasfield, the Barzan gasfield, the Dolphin gas pipeline, the Qatargas and Rasgas LNG production projects, and projects for producing natural gas liquids (NGL), gas-to-liquids, and Pearl gas-to-liquids products. Qatar Petroleum was also a partner in such gas-based industries as the production of chemicals, fuel additives, nitrogen fertilizer, and petrochemicals.

In 2009, Qatar Petroleum inaugurated three of the world's largest LNG liquefaction trains—Qatargas train 4, Qatargas train 5, and Ras Laffan train 6—each of which had the capacity to produce 17.2 million cubic meters per year (7.8 Mt/yr) of LNG. Qatargas and Rasgas venture companies signed several sales and purchase agreements with companies in Belgium, India, Italy, Japan, the Republic of Korea, Spain, the United Kingdom, and the United States to export a total of 169.4 Mt of LNG by 2012 using dedicated LNG tankers owned by Qatar Gas Transport Co. (Nakilat). Nakilat was expected to have 54 LNG carriers by yearend 2010 that would have the capacity to supply 169.4 million cubic meters per year of LNG to consumers. The company was building a 1.1-square-kilometer shipyard at Ras Laffan to ensure access to essential services. Qatar Petroleum also invested, through its subsidiary Qatar Petroleum International, in building receiving terminals at South Hook in western Wales, United Kingdom, on the Adriatic Sea coast in northwestern Italy, and at Golden Pass in Texas (QNB Capital L.L.C., 2010, p. 18-22; Thomas, 2010, p. 6, 8).

Petroleum.— Qatar Petroleum produced 42% of the country's total crude oil output from the Dukhan oilfield [245,000 barrels per day (bbl/d)], the Bul Hanine (54,000 bbl/d), and the Maydan Mahzam offshore field (30,300 bbl/d), and the Al Karkara oilfield (7.300 bbl/d); the remaining 58% was produced by Maersk Oil of Denmark, Occidental Petroleum Corp. of the United States, and Total E&P Qatar Ltd. of France. Maersk produced 297,000 bbl/d from the Al Shaheen field, which was the highest yielding oilfield in Qatar in 2009. Occidental produced 105,500 bbl/d from the Idd Al Shargi North Dome offshore oilfield, 1,100 bbl/d from the Idd Al Shargi South Dome offshore oilfield, and 86,00 bbl/d from the Al Rayyan oilfield. Total produced 34,000 bbl/d from the Al Khalij oilfield (QNB Capital L.L.C., 2010, p. 14).

In September, production began at the new $800 million Laffan condensate refinery at Ras Laffan. The 146,000-bbl/d-capacity refinery was operated by Rasgas and controlled by a group of investors that included Qatar Petroleum (51%); Cosmo Oil Co. of Japan, ExxonMobil, Idemitsu Kosan Co. Ltd. of Japan, and Total (10% each); and Mitsui & Co. and Marubeni Corp. of Japan (4.5% each). Qatar's refining capacity at Mesaieed Industrial City was 200,000 bbl/d. By the end of 2009, Qatar's total refining capacity was about 350,000 bbl/d. The plan to build a third petroleum refinery in Qatar was put on hold because of the global economic downturn and the subsequent decrease in demand for petroleum products by world markets. The proposed $11 billion, 250,000-bbl/d Al Shaheen refinery at Mesaieed Industrial City was also put on hold (U.S. Energy Information Administration, 2009; Mirza, 2010b).

Outlook

The Qatari economy, which grew by 8.7% in 2009 despite the global financial crisis, is likely to continue to expand in the next 5 years because of the Government investment in infrastructure projects and its economic diversification efforts. The Government aims to increase the contributions of non-oil sectors to 80% of the country's economic activity by 2015. Qatar is on track to increase its LNG production capacity to 153.8 million cubic meters in 2010 and 170.9 million cubic meters by 2012. Output from the helium, iron and steel, and nitrogen fertilizer industries is likely to increase because of expansion projects currently under construction. In May 2010, Rasgas awarded Air Liquid S.A. of France a contract to build a new 38-million-cubic-meter-per-year-capacity helium extraction, purification, and liquefaction plant at Ras Laffan. The combined helium production from the existing Qatargas plant and the plant that was contracted for construction at Rasgas is expected to be 58 Mt/yr, or 25% of total world production, and to make Qatar the world's leading producer of helium (Liquid Air, S.A., 2010; Mirza, 2010a, p. 20).

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TABLE 1

QATAR: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Iron and steel:						
Direct-reduced iron		815	877	1,296	1,638	2,100
Steel, crude		1,057	1,003	1,175	1,434	1,028
Semimanufactures:						
Billet, cast		1,020	1,013	1,147	1,405	1,600
Bars, rolled		791	730	958	1,150	1,468
INDUSTRIAL MINERALS						
Cement, all types		1,400	1,568	2,400	3,800 r	4,100
Gypsum		NA	NA	NA	135	135
Lime		NA	NA	NA	25	22
Nitrogen:						
N content of ammonia		1,754	1,784	1,800	1,900 r	2,035
N content of urea		1,388	1,356	1,381	1,380 r	1,380
Sand, washed		NA	NA	NA	6,500	7,500
Stone, limestone[e]		1,000	1,100	1,100	1,100	1,100
Sulfur		45 r	40 r	32 r	52 r	46
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross	million cubic meters	57,600	64,200	77,200	90,887	102,800
Dry	do.	45,800	50,700	63,200	77,000	89,300
Helium	thousand cubic meters	200	4,400	7,100	12,700 r	15,000
Methanol		900	903	884	960	1,045
Natural gas liquids	thousand 42-gallon barrels	76,650	73,000	76,650	80,300	80,300
Petroleum:						
Crude	do.	284,000	296,000	299,000	305,500	291,270
Refinery products:						
Liquified petroleum gas	42-gallon barrels	26,024	40,077	43,508	47,888	70,482
Gasoline	do.	14,235	14,856	17,702	17,228 r	15,038
Kerosene and jet fuel	do.	7,774	9,198	10,877	9,417 r	7,957
Distillate fuel oil	do.	7,410	7,957	9,088	10,877 r	10,877
Residual fuel oil	do.	2,518	5,037	3,468	2,920 r	1,934
Other	do.	7,995 r	7,299 r	9,271	8,103 r	7,118
Total	do.	65,956 r	84,424 r	93,914	96,433 r	113,406

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

[1]Table includes data available through August 31, 2010.

[2]In addition to the commodities listed, clays, dolomite, sand and gravel, and shale are produced, but available information is inadequate to make estimates of output.

TABLE 2
QATAR: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Qatar Aluminium Ltd. (Qatalum) (Qatar Petroleum, 50%, and Hydro ASA, 50%)	Mesaieed	585
Cement:				
Portland		Qatar National Cement Co. (Government, 43%, and private Qatari investors, 57%)	Kilns and mills at Umm Bab	5,650
Do.		Al-Jabor Cement Industries Co.	Clinker grinding mill at Mesaieed	165
White		Qatari Saudi Company for Industrial Transformation	do.	165
Gypsum		Qatari Saudi Company for Gypsum (Qatar Industrial Manufacturing Co., 33.375%; Qatar National Cement Co., 33.250%; National Gypsum Co., 33.375%)	Salwa Industrial Area	135
Helium		Joint venture of Qatar Liquefied Gas Co. Ltd. (Qatargas), Ras Laffan Liquefied Natural Gas Co. Ltd. (Rasgas), and Ras Laffan Liquefied Natural Gas Co. (II) Ltd. (Rasgas II)	Ras Laffan	12,500
Iron and steel:				
Iron, direct reduced		Qatar Steel Co. Q.S.C. (Qasco) (Industries Qatar Q.S.C., 100%)	Mesaieed	2,400
Steel, crude		do.	Plant at Mesaieed	1,470
Steel, rolled		do.	Rolling mill at Mesaieed	1,440
Lime		Qatar National Cement Co. (Government, 43%, and private Qatari investors, 57%)	Kilns at Umm Bab	28
Methanol		Qatar Fuel Additives Co. Ltd. Q.S.C. (Qafac) (Industries Qatar Q.S.C., 50%; OPIC Netherlands Antilles N.V., 20%; Lee Chang Yung Chemical Industry Corp., 15%; International Octane Ltd., 15%)	Mesaieed	913
Natural gas:				
Extracted	billion cubic meters	Qatar Liquefied Gas Co. (1) Ltd. (Qatargas 1) (Qatar Petroleum, 65%; Total S.A., 20%; ExxonMobil Qatargas Inc., 10%; Mitsui & Co., Ltd., 2.5%; Marubeni Corp., 2.5%)	North field, offshore	20
Do.	do.	Ras Laffan Liquefied Natural Gas Co. Ltd. (Rasgas) (Qatar Petroleum, 63%; ExxonMobil Rasgas, Inc., 25%; Korea Gas Corp., 5%; Itochu Corp., 4%; LNG Japan Corp., 3%)	do.	11
Do.	do.	Qatar Petroleum Qatar Gas (3) Ltd. (Qatargas 3)	do.	1
Liquefied		Qatar Liquefied Gas Co. Ltd. (Qatargas 1) (Qatar Petroleum, 65%; Total S.A., 10%; ExxonMobil Qatargas Inc., 10%; Mitsui & Co., Ltd., 7.5%; Marubeni Corp., 7.5%)	Three trains at Ras Laffan	10,200
Do.		Qatar Liquefied Gas Co. Ltd. 2 (Qatargas 2) (Qatar Petroleum, 70%, and ExxonMobil Qatargas Inc., 30%)	Train 4 at Ras Laffan	7,800
Do.		Qatar Liquefied Gas Co. Ltd. (II) (Qatargas II) (Qatar Petroleum, 65%; Exxon Mobil Corp., 18.3%; Total S.A., 16.7%)	Train 5 at Ras Laffan	7,800
Do.		Qatar Liquefied Gas Co. Ltd. 3 (Qatargas 3) (Qatar Petroleum, 68.5%; ConocoPhillips Co., 30%; Mitsui & Co. Ltd., 1.5%)	Train 6 at Ras Laffan	7,800
Do.		Qatar Petroleum Qatar Gas (4) Co. Ltd. (Qatargas 4) (Qatar Petroleum, 70%, and Royal Dutch Shell plc, 30%)	Train 7 at Ras Laffan	7,800
Do.		Ras Laffan Liquefied Natural Gas Co. Ltd. (Rasgas) (Qatar Petroleum, 63%; ExxonMobil Rasgas, Inc., 25%; Korea Gas Corp., 5%; Itochu Corp., 4%; LNG Japan Corp., 3%)	Trains 1 and 2 at Ras Laffan	6,600
Do.		Ras Laffan Liquefied Natural Gas Co. Ltd. II (Rasgas II) (Qatar Petroleum, 70%, and ExxonMobil Rasgas Inc., 30%)	Trains 3, 4, and 5 at Ras Laffan	14,300
Do.		Ras Laffan Liquefied Natural Gas Co. Ltd. 3 (Rasgas 3) (Qatar Petroleum, 70%, and ExxonMobil Rasgas, Inc., 30%)	Trains 6 and 7 at Ras Laffan	15,600
Nitrogen:				
Ammonia		Qatar Fertilizer Co. S.A.Q. (Qafco) (Industries Qatar Q.S.C., 75%; Yara Nederland BV, 15%; Fertilizer Holdings AS, 10%)	QAFCO 1, Mesaieed	420
Do.		do.	QAFCO 2, Mesaieed	440
Do.		do.	QAFCO 3, Mesaieed	650

See footnotes at end of table.

TABLE 2—Continued
QATAR: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Nitrogen—Continued:				
Ammonia		Qatar Fertilizer Co. S.A.Q. (Qafco) (Industries Qatar Q.S.C., 75%; Yara Nederland BV, 15%; Fertilizer Holdings AS, 10%)	QAFCO 4, Mesaieed	740
Urea		do.	QAFCO 1, Mesaieed	470
Do.		do.	QAFCO 2, Mesaieed	530
Do.		do.	QAFCO 3, Mesaieed	890
Do.		do.	QAFCO 4, Mesaieed	1,300
Petroleum:				
Crude	42-gallon barrels per day	Maersk Oil Qatar A.S., operator[1]	Al Shaheen field, offshore	330,000
Do.	do.	Qatar Petroleum (Government, 100%)	Dukhan field, onshore	256,000
Do.	do.	do.	Bul Hanine field, offshore	37,000
Do.	do.	Occidental Petroleum Corp., operator[1]	Idd Al Sharqi, North Dome and South Dome, offshore	113,000
Do.	do.	do.	Al Rayyan, offshore	8,600
Do.	do.	Bunduq Co., Ltd., operator[1] (BP Exploration, 33.3%; Total S.A., 33.3%; United Petroleum Development Co., 33.3%)	El Bunduq[2]	7,300
Do.	do.	Total E&P Qatar Ltd., operator[1]	Al Khaleej, offshore	37,500
Do.	do.	do.	Maydan Mahzam field, offshore	36,000
Do.	do.	Qatar Petroleum Development Co., operator (Cosmo Oil Co., Nissho Iwai Corp., United Petroleum Development Co.)	Al Karkara and A Structure	6,200
Refined	do.	Oryx GTL Ltd. (Qatar Petroleum, 51%, and Sasol Ltd., 49%)	Ras Laffan	12,400
Do.	do.	Qatar Petroleum Petroleum Refinery (Qatar Petroleum, 100%)	Mesaieed Industrial City	200,000
Do.	do.	The Laffan Refinery Co. Ltd. (Qatar Petroleum, 51%; Cosmo Oil Co., 10%; Exxon Mobil Corp., 10%; Idemitsu Kosan Co. Ltd., 10%; Mitsui and Co., 4.5%; Marubeni Corp. 4.5%)	do.	146,000
Sulfur		Ras Laffan Liquefied Natural Gas Co. Ltd. (Rasgas)	Ras Laffan	110
Do.		Qatar Petroleum (Government, 100%)	Mesaieed	95
Do.		Qatar Petrochemical Co. Ltd. (Qapco)	Umm Said	70
Do.		Qatar Liquefied Gas Co. Ltd. (Qatargas)	Ras Laffan	66

Do., do. Ditto.

[1]Operated under a development and production-sharing agreement with Qatar Petroleum.

[2]El Bunduq field is located on the border between Qatar and the United Arab Emirates. Royalties are shared by the Governments.