



2009 Minerals Yearbook

PAKISTAN

THE MINERAL INDUSTRY OF PAKISTAN

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Pakistan is rich in such mineral resources as coal, copper, iron ore, limestone, and salt. Copper and iron ore resources are large and significant in terms of deposits already discovered. New high-grade iron ore deposits were estimated to contain 400 million metric tons (Mt) of ore in Balochistan and Northwest Frontier Provinces. The country has extensive energy resources and is known to have moderate oil and sizable gas reserves estimated to be 289 million barrels (Mbbl) and 792 billion cubic meters, respectively (U.S. Energy Information Administration, 2009). In addition, there was large hydropower potential. In 2009, Pakistan's economy was dominated by the services, industrial, and agriculture sectors, which accounted for 55%, 24%, and 21% of the gross domestic product (GDP), respectively. Industrial output grew at a rate of 14%. Mining and quarrying accounted for 12% of the industrial production (State Bank of Pakistan, 2010).

Minerals in the National Economy

The value of output from the mineral industry accounted for 2.9% of the GDP, which posted a growth rate of 2.7% in 2009. Mining and quarrying output increased by 18% in terms of tonnage. Weak demand in the world market for Pakistan's mineral products and raw materials and uncertain domestic policies contributed to the country's decreased exports and high trade deficit. Exploitation of energy resources had been slow owing to a shortage of capital and to political instability. As a result, energy imports, such as crude oil and petroleum products, accounted for about 30% of the country's total imports of \$28.4 billion in 2009. Energy imports came mainly from Kuwait, Saudi Arabia, and the United Arab Emirates. Dependence on imported oil also contributed to Pakistan's trade deficit and shortage of foreign exchange. In addition, the country imported iron and steel products (U.S. Central Intelligence Agency, 2010).

Production

Pakistan produced a variety of industrial minerals, including aragonite, barite, celestite, clays, gypsum, limestone, and salt. Indigenous limestone was used mainly in the cement industry. Output of limestone increased at a slower pace in 2009 compared with that of previous years and cement production remained the same owing to low capacity utilization because of weaker demand. Metallic minerals mined included bauxite, chromite, copper, and iron ore. Production of bauxite and iron ore increased by an estimated 15.6% and 4%, respectively, in 2009. Chromite was mined by Pakistan Chrome Mines Ltd. in Balochistan, and its metallurgical-grade ore (45% Cr₂O₃) was exported to China. Copper ore was mined in the Chaghi District by Saindak Metals Ltd., and output of mined copper decreased slightly. In 2009, the country produced lead and zinc concentrate for the first time from the Duddar Mine. Pakistan's oil

production of 80 Mbbl was not sufficient to meet its domestic demand. Output of 77 billion cubic meters of natural gas came from large fields at Mari and Sui. Data on mineral production are in table 1.

Structure of the Mineral Industry

The National Mineral Policy (1995) was intended to provide the institutional and regulatory framework for ensuring an equitable and internationally competitive fiscal regime. The goal of the policy is to expand mining sector activities and attract foreign investment. The Mineral Department of the Ministry of Petroleum and Natural Resources is responsible for Pakistan's exploration, planning, development, and operation of mining ventures. The Ministry itself is responsible for the exploration and production of hydrocarbons and for the transmission and distribution of natural gas. State-owned companies control the production and marketing of chromite, coal, copper, iron ore, and steel. Private-sector companies are allowed to own and produce nonfuel minerals—mainly industrial minerals, including cement. Despite the Government's efforts to privatize large-scale state-owned companies, the public sector companies continued to account for a significant amount of mineral production (table 2). Employment in the mineral industry accounted for 1.6% of the labor force of 50 million.

Commodity Review

Metals

Copper and Gold.—The \$100 billion Reko Diq project in the Chagai District in Balochistan Province was a copper/gold porphyry deposit that contained 12.3 Mt of copper and 650 metric tons (t) of gold in indicated and inferred resources. The mine was being explored and developed by Tethyan Copper Co. Pty. Ltd. of Australia which held a 75% interest and was jointly owned by Barrick Gold Corp. of Canada and Antofagasta Minerals of Chile, and the Balochistan Development Authority, which held the remaining 25% interest. The deposit was located in the neighborhood of the Saindak copper deposit, which was leased to Metallurgical Construction Corp. of China for 10 years, and was four times larger in copper ore resources than the Saindak deposit. Initial production of 170,000 metric tons per year (t/yr) of copper and 9.3 t/yr of gold and eventual output of 350,000 t/yr of copper and 28 t/yr of gold were planned (Rupee News, 2009).

Iron and Steel.—The Government decided to set the prices of all the Pakistan Steel Mills Corp. Ltd. products in accordance with the international market and dispose of its stocks by open bidding. The Government also decided to increase the state-owned company's production capacity to 5 million metric tons per year (Mt/yr) from 1.1 Mt/yr by awarding the contract through international tenders. The country's steel

industry had an installed capacity of 2 Mt/yr but produced only 1.1 Mt in 2009, of which Pakistan Steel Mills produced 1 Mt. Pakistan consumed 5.6 Mt of steel in 2009. Per capita steel consumption was only 30 kilograms per year (Steel Guru, 2009).

Lead and Zinc.—The Duddar lead and zinc mine, which was located in the Lasbela District in Balochistan Province and operated by MCC Duddar Minerals Development Co. Pvt., initially produced 5,000 t/yr of zinc and between 25,000 t/yr and 30,000 t/yr of lead in concentrate. In September 2009, the mine shipped between 3,000 t and 4,000 t of concentrate to the Zhuzhou zinc smelter in China. Duddar Minerals Development was a joint venture of China Metallurgical Group Corp., Hunan Huangshaping Lead and Zinc Mine Co., and Hunan Zhuzhou Nonferrous Metals Smelter Co. Ltd., all of China. The mine had a processing capacity of 660,000 t/yr of ore (China Metallurgical Group Corp., 2009).

Industrial Minerals

Cement.—The cement industry played a key role in the development of the country's infrastructure. The industry has integrated production facilities that use locally available raw materials and modern dry-process technology. The cement manufacturers added 8 Mt/yr of new capacity, and the total production capacity was expected to be 45 Mt/yr by the end of 2009. Lucky Cement Ltd. had a 4-Mt/yr-capacity cement plant at Pezu in Northwest Frontier Province and a 3.75-Mt/yr-capacity plant in Karachi. The company accounted for one-third of Pakistan's overseas sales and exported 57% of its production to Afghanistan, Africa, Egypt, India, the Middle East, and Sri Lanka. In another development, Fauji Cement Co. Ltd. was installing a cement plant with the capacity to produce 7,560 metric tons per day of clinker at Jhang-Bahtar in Punjab Province, which would increase the company's total capacity to 3.27 Mt/yr from 1.17 Mt/yr of cement. The new plant was scheduled to begin production by May 2010 (World Cement, 2009).

Mineral Fuels

Coal.—Pan Energy Development Co. (PEDCO) of the Republic of Korea and Bin Din Group of the United Arab Emirates signed an agreement with the Government for a stake in coal blocks in the Thar desert region in Sindh Province, which had 100 billion metric tons (Gt) of estimated coal resources. The coal blocks (Blocks 4 and 8) had an estimated coal resource of 2.56 Gt. PEDCO expected 2 Mt/yr of coal production by 2011 from the Blocks and 10 Mt/yr beginning in 2015 (Mining Exploration News, 2009). An investment of \$700 million would be required to build a coal-fired powerplant at Sondha Jheruk, which would generate 250 megawatts (MW) to 300 MW of electricity initially and increase to 1,000 MW gradually. The powerplant would be Pakistan's first and largest coal-fired plant, which would generate job opportunities for an estimated 90,000 skilled and nonskilled workers (News, The, 2009).

Natural Gas.—OMV AG started gas production from the extended Latif-1 well, which is located 100 kilometers (km) from Sukkur in southern Sindh Province. The project produced

1,000 barrels per day (bbl/d) of oil equivalent during the first three quarters of 2009 and increased to 4,000 bbl/d of oil equivalent after the Latif-2 well was drilled in the fourth quarter. Natural gas was transported through a 23-km pipeline to the OMV-operated Kadanwari gas plant and was sold to Karachi Utility and Sui Southern Gas Co. Ltd. OMV's gas production in Pakistan was 17,000 bbl/d of oil equivalent, and the company operated the block with a 33.4% stake. Eni S.p.A. of Italy and Pakistan Petroleum Ltd. (PPL) each held a 33.3% interest (Oil & Gas Journal, 2009a).

The Government was considering importing liquefied natural gas (LNG) from Qatar and authorizing Royal Dutch Shell plc and a consortium that included 4Gas of the Netherlands to initiate a deal with Qatar. Shell and the consortium had an agreement with Sui Southern Gas Co. Ltd. regarding the importation of LNG from Qatar. Pakistan would have a gas shortfall of 293 million cubic meters per day by the year 2015 as the domestic gas supply was projected to decline to 61 million cubic meters per day from 2009 owing to the depletion of indigenous reserves, against a gas demand of 354 million cubic meters per day. In 2008, the country's gas supply was 122 million cubic meters per day (Oil & Gas Journal, 2009b).

The Government approved a plan to import natural gas from Iran through the \$7.4 billion Iran-Pakistan-India pipeline and signed a gas deal with Iran in May 2009. The gas sale purchase agreement was signed by Pakistan Interstate Gas System and National Iranian Oil Co. The 2,100-km pipeline, of which 1,100 km would be laid in Iran and 1,000 km in Pakistan, would transmit 21.2 million cubic meters per day of gas and was expected to be completed in 5 years. Pakistan would take 73.6 million cubic meters per day from Iran's South Pars gasfield during the next 25 years (Oil & Gas Journal, 2009c).

Petroleum.—Eni, in joint venture with PPL and Shell, won a bid tender for the exploration license of the onshore Sukhpur Block in Sindh Province. The block lies in the vicinity of the Eni-operated producing areas of Badhra and Bhit. The company held 22 exploration and production licenses in Pakistan, including 15 exploration licenses (3 offshore and 12 onshore) and 7 production or development licenses (3 operated) (Rigzone.com, 2009).

The Government planned three oil refineries with a total capacity of 465,000 bbl/d. They were the 250,000-bbl/d Khalifa Coastal Refinery and the 115,000-bbl/d Bosicor Oil Pakistan Ltd. refinery, both at Hub in Balochistan Province, and the 100,000-bbl/d Trans-Asia Refinery Ltd. project at Port Qasim in Karachi. The refineries were free to sell their petroleum products to any marketing companies or to set up their own marketing firms. All new refinery projects of at least 100,000 bbl/d installed along the coastal Balochistan Province could enjoy a 20-year income tax holiday. The terms and conditions of the trade policy would be applied to the import from second-hand refineries (Oil & Gas Journal, 2009d).

Outlook

Pakistan's Reko Diq project is still being developed and is expected to produce copper and gold in 2010 in addition to copper output from Saindak Metals' mine in Chaghi. The newly

discovered iron ore deposits and increased production of iron ore are expected to reduce the imports of iron ore for blending and provide sufficient supply of iron ore for the expansion of Pakistan Steel Mills' steel plant and possibly a second steel mill that was planned to be built in the near future. The country's production of lead and zinc ore is expected to increase gradually as mine operation at Duddar gets underway. The cement industry is expected to add new production capacities in 2010. Abundant lignite found in the Thar District in Sindh Province is expected to be used in coal-fired powerplants being planned or under construction to increase the power-generating capacity in the next 2 to 3 years. The Government encourages the independent power producers to generate electricity by using natural gas, which also is abundant in the country. The supply of natural gas is expected to decline from domestic sources, however, and imported LNG, natural gas, and petroleum will increase to meet the country's energy requirements.

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TABLE 1
PAKISTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2005	2006	2007	2008 ^c	2009 ^c
METALS					
Bauxite, gross weight	6,504	12,917 ^r	27,382 ^r	32,000 ^r	37,000
Chromium ore: ^e					
Gross weight	73,000 ²	98,000	108,000	110,000	112,000
Cr ₂ O ₃ content	32,900	44,100	48,600	49,500	50,000
Copper, mine, Cu content ^c	17,700 ²	19,100	18,800	18,700	18,500
Iron and steel:					
Iron ore, gross weight ^c thousand metric tons	50	130 ²	207	250	260
Pig iron do.	104 ^r	500 ^r	1,001 ^r	1,000 ^r	1,000
Steel, crude do.	825	933 ^r	1,000 ^{r,e}	1,100	1,100
Lead, Pb content in concentrate	--	--	--	--	26,000
Refined, secondary ^c	3,200	3,100	3,000	3,000	2,900
Zinc, Zn content in concentrate	--	--	--	--	5,000
INDUSTRIAL MINERALS					
Abrasives, natural, emery ^c	150	150	150	150	150
Barite	42,087	45,169	48,044 ^r	48,000 ^r	49,000
Cement, hydraulic ^c thousand metric tons	17,000	20,652 ²	25,745 ^{r,2}	26,000 ^r	26,000
Chalk	8,146	6,039	2,892 ^r	2,800 ^r	2,700
Clays:					
Bentonite	15,671	23,773	32,382 ^r	33,000 ^r	34,000
Fire clay	253,501	332,136	337,071 ^r	330,000	335,000
Fuller's earth	17,001	15,848 ^r	12,884 ^r	13,000 ^r	15,000
Kaolin, china clay	37,732	443,402 ^r	756,536 ^r	750,000 ^r	760,000
Other ^c	215,000	216,000	218,000	220,000	250,000
Feldspar	25,032	15,085	13,236 ^r	12,000 ^r	10,000
Fluorspar ^c	1,040	2,839 ²	2,082 ^{r,2}	1,700 ^r	1,400
Gypsum, crude	552,496	649,944	703,137 ^r	700,000 ^r	650,000
Magnesite, crude	3,029	1,884	2,370 ^r	1,600	2,000
Nitrogen, N content of ammonia ^c	2,114,000 ²	2,200,000	2,250,000	2,300,000	2,350,000
Phosphate rock:					
Gross weight	2,687	2,048	3,840 ^r	3,900 ^r	4,000
P ₂ O ₅ content ^c	490	370	690 ^r	700 ^r	720
Pigments, mineral, natural, ocher ^c	5,500	5,500	6,000	6,000	6,200
Salt:					
Rock thousand metric tons	1,648	2,008	10,153 ^r	10,000 ^r	10,500
Marine do.	14	13	18 ^r	18 ^r	19
Total do.	1,662	2,020 ^e	10,200 ^{r,e}	10,000 ^r	10,500
Sodium compounds, n.e.s.: ^{e,3}					
Caustic soda	250,000	240,000	230,000	240,000	250,000
Soda ash, manufactured	260,000	250,000	260,000	250,000	260,000
Stone:					
Aragonite and marble	1,280,304	1,416,373 ^r	1,581,369 ^r	1,600,000 ^r	1,650,000
Dolomite	199,653	252,390	333,082 ^r	340,000 ^r	350,000
Limestone thousand metric tons	14,857	22,420	31,046 ^r	34,000 ^r	36,000
Other, as "ordinary stone" do.	6	5	5	5	5
Strontium minerals, celestite	1,855	1,466	1,476 ^r	1,500 ^r	1,600
Sulfur, native ^c	24,158 ²	23,000	22,000	21,000	20,000
Talc and related materials, soapstone	20,564	24,529	32,675 ^r	33,000 ^r	35,000

See footnotes at end of table.

TABLE 1—Continued
PAKISTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008 ^e	2009 ^e
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades	thousand metric tons	3,367	4,313	3,926 ^r	3,800 ^r	3,600
Coke	do.	--	242	308 ^r	310 ^r	320
Gas, natural:						
Gross production	million cubic meters	38,089	39,813	40,579 ^r	41,000	42,000
Marketed production, sales ^c	do.	34,000	36,000	37,000	38,000	39,000
Natural gas liquids ^c	thousand 42-gallon barrels	700	700	750	750	750
Petroleum:						
Crude	do.	24,119	24,275	25,109 ^r	26,000	27,000
Refinery products: ^c						
Gasoline	do.	9,959 ²	10,000	11,000	12,000	11,000
Jet fuel	do.	8,833 ²	9,000	9,800	9,900	10,000
Kerosene	do.	1,511 ²	1,300	1,100	1,000	1,000
Distillate fuel oil	do.	26,857 ²	28,000	30,000	32,000	31,000
Residual fuel oil	do.	23,346 ²	23,000	23,500	23,000	24,000
Lubricants	do.	1,401 ²	1,500	1,500	1,600	1,600
Other	do.	10,264 ²	12,000	14,000	15,000	16,000
Total	do.	82,171 ²	84,800	90,900	94,500	94,600

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through August 16, 2010.

²Reported figure.

³Not elsewhere specified.

TABLE 2
PAKISTAN: 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 ^c
Barite		Bolan Mining Enterprises	Khuzdar, Balochistan Province	24
Do.		Razvi Mining (Private) Ltd.	Gandori, Kalan, and Retri	30
Cement		Askari Cement Co. Ltd.	Nizampur	1,200
Do.		Attock Cement Pakistan Ltd.	Hub Chowki	800
Do.		Cherat Cement Co. Ltd.	Nowshera	750
Do.		Dandot Cement Co. Ltd.	Dandot	500
Do.		Fauji Cement Co. Ltd.	Jhang Bahtar	1,170
Do.		Gharibwal Cement Ltd.	Jhelom	540
Do.		Javedan Cement Ltd.	Karachi	600
Do.		D.G. Khan Cement Co. Ltd.	Chakwal and Dera Ghazi Khan	1,650
Do.		Kohat Cement Co. Ltd.	Kohat	700
Do.		Lucky Cement Ltd.	Karachi	3,750
Do.		do.	Pezu	4,000
Do.		Maple Leaf Cement Factory Ltd.	Daudkhel	1,500
Do.		Pakistan Cement Co.	Between Islamabad and Lahore, Punjab Province	2,200
Do.		Pioneer Cement Ltd.	Chenki	1,300
Do.		Thatta Cement Co. Ltd.	Thatta	300
Do.		Zeal Pak Cement Factory Ltd.	Hyderabad	1,080
Chromite		Pakistan Chrome Mines Ltd.	Gwal, Khanozai, Muslim Bagh, and Nisai	20
Coal		Sindh Coal Authority	Dadu, Sindh Province	4,000
Do.		do.	Thar, Sindh Province	NA
Copper, metal		Saindak Metals Ltd.	Chaghi, Balochistan Province	22
Gas, natural	million cubic meters per day	Pakistan Petroleum Ltd. (PPL)	Adhi, Punjab Province; Kandhkot and Mazarani, Sindh Province; and Sui, Balochistan Province	24
Do.	do.	Oil and Gas Development Co. Ltd. (OGDCL)	37 oilfields and gasfields, including Mari, Sindh Province	31
Lead and zinc, ore		MCC Duddar Minerals Development Co. Pvt.	Duddar, Balochistan Province	660
Petroleum, crude	42-gallon barrels per day	Pakistan Petroleum Ltd. (PPL)	Adhi, Punjab Province	1,600
Do.	do.	Oil and Gas Development Co. Ltd. (OGDCL)	37 oilfields and gasfields	46,000
Petroleum, refined	do.	Bosicor Pakistan Ltd.	Karachi	30,000
Do.	do.	Pak-Arab Refinery Co. Ltd.	Mahmood Kot, Punjab Province	100,000
Steel, crude		Pakistan Steel Mills Corp. (Pvt) Ltd. (PSM)	Karachi	1,100

^cEstimated. Do., do. Ditto. NA Not available.