



2010 Minerals Yearbook

PAKISTAN

THE MINERAL INDUSTRY OF PAKISTAN

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In 2010, Pakistan's economy was dominated by the services, industrial, and agriculture sectors, which accounted for 53%, 25%, and 22% of the gross domestic product (GDP), respectively. Industrial output grew at a rate of 4.6%. Mining and quarrying accounted for 11% of the industrial production. Pakistan is rich in such mineral resources as coal, copper, iron ore, limestone, and salt, and the identified resources of copper and iron ore are large. Pakistan also has extensive energy resources and is known to have moderate oil reserves, sizable gas reserves, the potential for coal, and large hydropower potential. Gas and oil production met only about one-half of the country's energy needs, but exploitation of energy resources continued to be slow owing to a shortage of capital and to political instability. Foreign investment accounted for 0.5% of the GDP (State Bank of Pakistan, 2010).

Minerals in the National Economy

The value of output from the mineral industry accounted for 2.5% of the GDP, which posted a growth rate of 4.8% in 2010. Total mining and quarrying output was about the same in terms of tonnage as that of 2009. 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. Energy imports, such as crude oil and petroleum products, accounted for about 30% of the country's total imports in 2010. 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).

Government Policies and Programs

Owing to an expanding economy, Pakistan's imports of mineral-based products continued to increase in recent years. To encourage indigenous production of minerals for domestic use, the Government was looking for foreign direct investment in exploration and development in the mining sector. Under the Government's investment incentives, foreign equity of up to 100% is allowed. Remittance of capital and profits are permitted, and expatriate facilitation is offered. The exploration for and development of minerals are under the authority of the Provinces in accordance with the Constitution of Pakistan. The Government, through the Department of Geological Survey, generates basic geologic data to the extent of identifying exploration targets. The Provinces translate exploration targets into mineral development projects. Thus, the National Mineral Policy (1995) was developed by the Government and the Provinces jointly. Each Province develops its own mining code, which is based on the model set forth in the National Mineral Policy (Australia's Paydirt, 2010). The mineral policy is

intended to provide the institutional and regulatory framework for ensuring an equitable and internationally competitive fiscal regime for the mineral sector. The goal of the policy is to expand mineral sector activities and attract foreign investment.

Production

Pakistan produced a variety of industrial minerals, including aragonite, barite, clays, dolomite, gypsum, limestone, and salt. Indigenous limestone was used mainly in the cement industry. Production of dolomite was estimated to have increased by 32% in 2010 compared with that of 2009, and production of some clays, such as fuller's earth and kaolin, were also estimated to have increased. Output of feldspar was estimated to have decreased by 13%. Metallic minerals mined included bauxite, chromite, copper, and iron ore. Production of bauxite was estimated to have resumed at a slightly higher level than in previous years after a 54% decline in 2009. Chromite was mined by Pakistan Chrome Mines Ltd. in Balochistan Province, but the output was 31% less than in 2010. The country produced lead and zinc concentrates for the first time in 2009; production was from the Duddar Mine. Zinc in concentrate from the mine was reported to be only 10 metric tons in 2010. Pakistan's oil production of 24 million barrels (Mbbbl) was not sufficient to meet its domestic demand. Output of 42 billion cubic meters of natural gas came from large fields at Mari in Sindh Province and Sui in Balochistan Province (table 1).

Structure of the Mineral Industry

The Mineral Department of the Ministry of Petroleum and Natural Resources is responsible for Pakistan's exploration, planning, development, and operation of mining ventures controlled by the state-owned companies. 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 is a list of major mineral producers in the country.

Commodity Review

Metals

Copper and Gold.—Tethyan Copper Co. Pty. Ltd. (TCC) submitted its feasibility study for the \$3.3 billion Reko Diq copper-gold project to the government of Balochistan Province.

TCC was a joint venture between Barrick Gold Corp. of Canada and Antofagasta plc of Chile, which together held a 75% interest, and the government of Balochistan, which held a 25% stake. The feasibility study reported that the project would require the development of basic infrastructure, such as a concentrate pipeline, a water supply pipeline, a port, an electricity-generating facility, and roads prior to mine development. The study also outlined the estimated life of the mine and the annual production rates. Since 2006, TCC had spent more than \$200 million in exploration. Movable reserves at Reko Diq were estimated to be 2,220 million metric tons (Mt) of ore at average grades of 0.5% copper and 0.3 gram per metric ton gold. The Reko Diq project included the Western Porphyry and the H4 deposits (Mineweb.com, 2010a).

The government of Balochistan Province was considering establishing a new public sector company to take over the Reko Diq copper-gold project and revoking the exploration license for the site. Opponents of foreign ownership claimed that the wealth from the project could enable Pakistan to retire its external debt and liabilities and Balochistan to attain fiscal health to finance its other social-sector development projects. The raw ore extracted from the site could garner between \$40 billion and \$50 billion in the next 25 years. The joint-venture partners continued their baseline environmental and social impact assessment, however, which was expected to be completed in the first half of 2010. Despite the opposition by the government of Balochistan, Antofagasta was confident that it would start producing copper at the mine in 2015 and planned to apply for a mining license in the middle of 2010 (Mineweb.com, 2010b).

Iron and Steel.—Pakistan Steel Mills Corp. (Pvt) Ltd. (PSM) asked the Government to introduce a law banning the use of substandard mild rods in the country. The demand for mild rods in Pakistan was 2.5 million metric tons per year (Mt/yr) and scrap from broken ships made up about 70% of the requirement, or 1.7 Mt/yr. PSM together with a few other mills also made mild rods by using billets, but billets were costlier and scarce. Quality mild rods were used in high-rise buildings, and scrap from ship-breaking was used in the construction of smaller buildings only after the rods made from the scrap were properly tested (News, The, 2010b).

The Government did not privatize PSM in 2010 even though its stated policy of deregulation, economic liberalization, and privatization was implemented. The company was a public enterprise that suffered losses and failed to achieve its objective of developing the engineering sector. PSM suffered huge financial losses because of corruption, massive financial irregularities, and overstaffing (News, The, 2010a). Economists in Pakistan argued that it was not the Government's job to run industries and that the management control of PSM should be handed over to efficient professionals in the private sector. The Government planned to sell off 26% of its share in PSM along with the management rights but to continue to hold a majority share. The bid to privatize PSM had failed in 2006.

Industrial Minerals

Cement.—Pakistan was expected to export 13 to 14 Mt of cement in 2010 mainly to African countries and to Iraq and Qatar. The cost of coal and electricity and delivery charges

made Pakistani cement more expensive than cement from Iran and Saudi Arabia. The cement industry played a key role in the development of the country's infrastructure. The industry had integrated production facilities that used locally available raw materials and modern dry-process technology. Lucky Cement Ltd. had a production capacity of 25,000 metric tons per day (t/d) of cement, of which 13,000 t/d came from the Pezu plant and 12,000 t/d came from the Karachi plant. To meet the increasing demand for cement, Fauji Cement Co. Ltd. installed a new production line with a capacity of 7,200 t/d of clinker. Fauji Cement issued contracts for the construction of another new production line to ThyssenKrupp AG of Germany and ABB Group of Switzerland. In addition, a 16.3-megawatt (MW) dual-fired (gas and oil) Wartsilla powerplant was commissioned by the company in May 2010 to provide additional electricity for cement production (World Cement, 2010).

Mineral Fuels

Coal.—The World Bank did not approve the financing for the Thar coal project in the Tharparkar District of Sindh Province, which had one of the world's largest coal reserves of more than 185,000 Mt. In the next few years, Pakistan could face an energy shortage of 96,000 megawatt-hours per day in the wake of depleting gasfields and increasing dependence on imported oil. Natural gas (33%) and hydropower (33%) provided more than one-half of the country's energy requirement (Steelguru.com, 2010).

The Government planned to start generating electricity through tar coal gasification in 2011. The plants would be installed onsite near the tar coal deposits to produce gas. Pakistan had one of the five leading tar coal reserves in the world and had the potential to generate 5,000 MW of electricity from them (Alexander's Gas & Oil Connections, 2010f).

Natural Gas.—The Tight gas reserves at the upper and middle Indus and Kirthar areas in Sindh Province were estimated to be more than 934 billion cubic meters, which was 120% of Pakistan's existing reserves. The Government planned to adjust its policies to accelerate the pace of development of domestic gas resources to meet the growing demand for energy in the country. The Government was reviewing its policies regarding gas prices and early production incentives. Companies with gas production concentrated in Sindh, such as Oil and Gas Development Co. Ltd. (OGDC) and Pakistan Petroleum Ltd., could benefit most from the development policies. OMV Aktiengesellschaft of Austria also operated the Miano and Sawan producing fields; each of the fields had an output of 11.3 million cubic meters per day (Alexander's Gas & Oil Connections, 2010d).

Iran and Pakistan signed an export deal for 25 years for Iran to supply Pakistan with 21.2 million cubic meters per day of natural gas beginning at the end of 2014. The new source of supply would equal nearly 20% of Pakistan's current gas production. A provision in the agreement was set to increase Iran's supply of gas to Pakistan to 28.3 million cubic meters per day. A \$7.5 billion 1,150-kilometer (km) gas pipeline between the two countries would be completed in the next 4 years. The capital cost of the 780-km Pakistani section of the pipeline (in the Provinces of Balochistan and Sindh) was estimated to be \$1.65 billion. The natural gas would come from Iran's South Pars

gasfield. Iran planned to increase gas output to 900 million cubic meters per day in the next 3 years with the expansion of South Pars. Pakistan planned to use the purchased gas for its power sector to generate 5,000 MW of electricity (Alexander's Gas & Oil Connections, 2010a).

Petroleum.—Pakistan imported about 80% of its oil requirements. A new petroleum policy to speed up the exploration process and attract more investment in upstream operation was implemented in 2009. The Government planned to offer 50 concessions (both onshore and offshore) for oil and gas exploration through bidding in June 2010. The country's unexplored oil reserves were estimated to be 3.5 billion barrels and the unexplored gas reserves were 1.76 trillion cubic meters (Alexander's Gas & Oil Connections, 2010e).

National Iran Oil Co. was exploring possibilities for joint ventures in oil and gas exploration and development in Pakistan. In addition, OMV signed a deal to buy the Pakistani exploration and production business of Petronas International Corp. Ltd. of Malaysia. The transaction included the exploration licenses for the Daphro, the Meher, and the Mubarak exploration blocks and the Meher and the Mubarak development and production licenses. The Pakistani Government needed to approve the acquisition. OMV owned seven exploration licenses and two production licenses and was the leading foreign gas producer in Pakistan with a production of 14,000 barrels per day (bbl/d) of oil equivalent. After the acquisition, OMV planned to increase production to 25,000 bbl/d by 2014 (Rigzone.com, 2010).

Pakistan had drilled 59 onshore and offshore exploration wells since January 2008, resulting in 22 oil and gas discoveries. Of these, 18 were under appraisal. The other four discoveries were initially appraised as having a combined reserve of 3.27 Mbbbl of oil and 11.4 billion cubic meters of gas. The Government granted 126 licenses to different companies for exploration in Pakistan (Alexander's Gas & Oil Connections, 2010c).

OGDC found new oil and gas deposits at the Rajian oilfield, which is located 50 km south of Islamabad. The discovery resulted in a 100% increase in oil production to 2,400 bbl/d from 1,200 bbl/d from the old field, which was discovered in 1993. An earlier (2006) estimate of recoverable reserves was 8.1 Mbbbl of oil (Alexander's Gas & Oil Connections, 2010b).

In 2010, devastating floods forced Pak-Arab Refinery Co. Ltd. to shut down its 100,000-bbl/d Multan refinery, which was located 900 km northeast of Karachi. The refinery sustained no damage, but flooded roads disrupted access to it. Flooding also disrupted the production and processing of natural gas in parts of the country. Pak-Arab Refinery was a joint venture between the Governments of Pakistan and the Emirate of Abu Dhabi (Oil & Gas Journal, 2010). The Government proposed to set up the Khalifa Coastal Oil refinery with a capacity of 250,000 bbl/d and the Byco Petroleum Pakistan refinery with a capacity of 115,000 bbl/d in Balochistan Province.

Outlook

Pakistan's Reko Diq project is still being developed and is expected to produce copper and gold by 2015 despite the issue of foreign ownership and the opposition of the Provincial government. The privatization of PSM is not expected to be completed soon because the Government continues to hold

the majority shares and is involved in management control. The country's production of lead and zinc concentrates 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 is more efficient and environmentally friendly. The supply of natural gas is expected to decline from domestic sources, however, and imports of liquefied natural gas, natural gas, and petroleum are expected to increase to meet the country's energy requirements. A planned gas pipeline would facilitate the import of gas from Iran. Another source for power generation is expected to be tar coal gas, which the country has in abundance.

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TABLE 1
 PAKISTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2006	2007	2008	2009	2010 ^c
METALS					
Bauxite, gross weight	12,917	27,382	25,000 ^r	11,500 ^r	32,000
Chromium ore: ^e					
Gross weight	98,000	108,000	104,000 ^{r,2}	174,000 ^{r,2}	120,000
Cr ₂ O ₃ content	44,100	48,600	46,800 ^{r,2}	78,300 ^{r,2}	54,000
Copper, mine, Cu content ^e	19,100	18,800	18,700	18,500	18,000
Iron and steel:					
Iron ore, gross weight ^e thousand metric tons	130 ²	207	250	270 ^r	290
Pig iron do.	500	1,001	1,000	1,000	1,000
Steel, crude do.	933	1,090 ^{r,2}	1,100	1,100	1,100
Lead:					
Pb content in concentrate	--	--	--	26,000	26,000
Refined, secondary ^e	3,100	3,000	3,000	2,900	2,900
Zinc, Zn content in concentrate	--	--	--	1 ^r	10
INDUSTRIAL MINERALS					
Abrasives, natural, emery ^e	150	150	150	150	150
Barite	45,169	48,044	56,500 ^r	60,000 ^r	55,000
Cement, hydraulic ^e thousand metric tons	20,652 ²	25,745 ²	26,000	28,000 ^r	30,000
Chalk	6,039	2,892	5,000 ^r	5,500 ^r	6,000
Clays:					
Bentonite	23,773	32,382	31,500 ^r	33,500 ^r	35,000
Fire clay	332,136	337,071	359,500 ^r	359,000 ^r	360,000
Fuller's earth	15,848	12,884	10,500 ^r	10,500 ^r	15,000
Kaolin, china clay	443,402	256,536 ^r	24,500 ^r	20,000 ^r	25,000
Other ^e	216,000	218,000	220,000	250,000	240,000
Feldspar	15,085	13,236	28,500 ^r	46,000 ^r	40,000
Fluorspar ^e	2,839 ²	2,082 ²	1,700	1,400	1,500
Gypsum, crude	649,944	703,137	730,000 ^r	827,000 ^r	800,000
Magnesite, crude	1,884	2,370	3,500 ^r	4,000 ^r	4,000
Nitrogen, N content of ammonia ^e	2,200,000	2,250,000	2,300,000	2,350,000	2,400,000
Phosphate rock:					
Gross weight	2,048	3,840	3,900	4,000	4,100
P ₂ O ₅ content ^e	370	690	700	720	740
Pigments, mineral, natural, ocher ^e	5,500	6,000	6,000	6,200	6,000
Salt:					
Rock thousand metric tons	2,008	1,833 ^r	1,883 ^r	1,931 ^r	2,000
Marine ^e do.	13	18	18	19	20
Total ^e do.	2,020	1,850 ^r	1,900 ^r	1,950 ^r	2,020
Sodium compounds, n.e.s.: ^{e,3}					
Caustic soda	240,000	230,000	240,000	250,000	260,000
Soda ash, manufactured	250,000	260,000	250,000	260,000	250,000
Stone:					
Aragonite and marble	1,416,373	1,581,369	1,341,000 ^r	1,105,000 ^r	1,200,000
Dolomite	252,390	333,082	305,000 ^r	190,000 ^r	250,000
Limestone thousand metric tons	22,420	31,046	32,488 ^r	35,162 ^r	36,000
Other, as "ordinary stone" do.	5	5	6 ^r	7 ^r	7
Strontium minerals, celestite	1,466	1,476	1,000 ^r	-- ^r	--
Sulfur, native ^e	23,000	22,000	28,000 ^r	29,000 ^r	30,000
Talc and related materials, soapstone	24,529	32,675	26,000 ^r	34,000 ^r	35,000

See footnotes at end of table.

TABLE 1—Continued
PAKISTAN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2006	2007	2008	2009	2010 ^e	
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades	thousand metric tons	4,313	3,926	3,691 ^r	3,608 ^r	3,600
Coke	do.	242	308	310	320	330
Gas, natural:						
Gross production	million cubic meters	39,813	40,579	41,261 ^r	41,658 ^r	42,000
Marketed production, sales ^c	do.	36,000	37,000	38,000	39,000	40,000
Natural gas liquids ^e	thousand 42-gallon barrels	700	750	750	750	760
Petroleum:						
Crude	do.	24,275	25,109	24,818 ^r	23,870 ^r	24,000
Refinery products: ^e						
Gasoline	do.	10,000	11,000	11,152 ^{r,2}	11,161 ^{r,2}	11,000
Jet fuel	do.	9,000	9,800	7,868 ^{r,2}	7,584 ^{r,2}	7,500
Kerosene	do.	1,300	1,100	1,527 ^{r,2}	1,217 ^{r,2}	1,300
Distillate fuel oil	do.	28,000	30,000	32,000	31,000	32,000
Residual fuel oil	do.	23,000	23,500	21,369 ^{r,2}	18,615 ^{r,2}	20,000
Lubricants	do.	1,500	1,500	3,759 ^{r,2}	3,689 ^{r,2}	3,700
Other	do.	12,000	14,000	15,000	16,000	17,000
Total	do.	84,800	90,900	92,700 ^r	89,300 ^r	92,500

^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 22, 2011.

²Reported figure.

³Not elsewhere specified.

TABLE 2
PAKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^e
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, Balochistan Province	20
Coal		Sindh Coal Authority	Dadu, Sindh Province	4,000
Do.		do.	Tharparkar, 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. (OGDC)	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. (OGDC)	37 oilfields and gasfields	46,000
Refined	do.	Bosicor Pakistan Ltd.	Karachi	30,000
Do.	do.	Pak-Arab Refinery Co. Ltd. (joint venture of the Governments of Pakistan and the Emirate of Abu Dhabi)	Mahmood Kot, Punjab Province	100,000
Steel, crude		Pakistan Steel Mills Corp. (Pvt) Ltd. (PSM)	Karachi	1,100

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