



2013 Minerals Yearbook

PAKISTAN [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF PAKISTAN

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Pakistan is rich in mineral resources, including clays (china clay and fire clay), copper, dolomite, gypsum, iron ore, limestone, marble (onyx), salt, sand and gravel, and silica sand; energy resources, including coal, natural gas, and oil; and precious and semiprecious stones. The country is among the world's 20 leading producers of cement and 5 leading exporters of cement. Pakistan ranked 3d in world production of iron oxide pigments, 15th in world production of barite, and 16th in world production of cement. Pakistan exported cement to Afghanistan, Djibouti, India, Iraq, Kenya, Mozambique, South Africa, Sri Lanka, Sudan, and Tanzania (Ministry of Finance, 2013c, p. 43; Miller, 2014; van Oss, 2014).

Minerals in the National Economy

Pakistan's real gross domestic product (GDP) increased by 3.6% in 2013 compared with an increase of 4.4% in 2012; the slower growth rate was owing to power outages, gas shortages, heavy rains, increases in power and transportation costs, and political instability in the country. Pakistan's industrial sector accounted for 21.4% of the GDP. Manufacturing output, which accounted for 63% of the overall industrial sector and 13.2% of the GDP, increased by 3.5% compared with that of 2012. The mining and quarrying sector accounted for 14.7% of the industrial sector and 3.1% of the GDP; the rate of growth of the mining and quarrying sector was 7.6% compared with 4.6% in 2012. The electricity generation and distribution and gas distribution sector had a negative growth rate of 3.2% in 2013 compared with a negative growth rate of 2.7% in 2012. The negative growth was owing to outdated technology and limited investment in exploitation of energy resources and in the development of cost-effective and energy-efficient infrastructure (Yusuf, 2012; Mahr, 2013; Ministry of Finance, 2013b, p. 11; 2013d, p. iv-v, vii; Asian Development Bank, 2014, p. 181).

Private investment decreased by 18.7% compared with that of 2012 owing to decreased investment in the manufacturing sector because of the power shortages and low investor confidence in the country's economic prospects. Foreign direct investment (FDI) increased to \$1.31 billion¹ in 2013 from \$859 million in 2012. Oil and gas exploration was of major interest to foreign investors (Ministry of Finance, 2013b, p. 13; Asian Development Bank, 2014, p. 181; United Nations Conference on Trade and Development, 2014, p. 206).

Government Policies and Programs

The National Mineral Policy of 1995 (NMP) was amended and implemented by the Ministry of Petroleum and Natural Resources in February. Minerals, not including nuclear

minerals (uranium), are located in special federated units, such as federally administrated tribal areas, the Islamabad Capital Territory, and the International Offshore Water Territory. The NMP states that Provincial governments and federated units are responsible for the regulation, detailed exploration, mineral development, and safety of these operations and for making decisions related to the activities mentioned above. Federal responsibilities include geologic and geophysical surveying and mapping as well as national and international coordination and formulation of national policies and plans. The Federal Government provides support and advice to the Provinces. The royalties on mineral commodities produced are determined and regularly updated by the respective government, and the updated royalty is sent to the Provincial governments and federated units and to the Federal Government (Ministry of Petroleum and Natural Resources, 2013, p. 8, 18).

In 2012, the Home Department within the government of Sindh Province had imposed a ban on illegal excavation of sand and gravel and precious stones within Thatta District under section 144 of the Criminal Procedure Code. Police were directed to take strict action against violators and were authorized to register complaints under section 188 of the Pakistan Penal Code for violations of section 144 of the Criminal Procedure Code (OnePakistan News, 2012; Pakistan Newswire, 2012).

In January 2013, the Mines and Minerals Department of Punjab Province awarded 110 fireclay exploration licenses. The license awardees used modern equipment to dig for and identify new areas of fireclay resources (Associated Press of Pakistan, 2013).

Mineral Trade

Pakistan's total exports increased by 3.6% to \$24.46 billion in 2013 from \$23.62 billion in 2012. Pakistan's major export partners were, in order of value, the European Union (21.8%), the United States (14.4%), China (10.7%), the United Arab Emirates (8.75%), and Afghanistan (8.45%). The decrease in economic growth and demand for goods in Europe and the United States had a substantial effect on Pakistan's economic growth. Exports of manufactured marble (onyx) accounted for 9.7% of all exports; chemicals and chemical products, 3.57%; and cement, 2.36%. The value of exports of gem and jewels increased to \$1.3 billion in 2013 from that in 2012 (Ministry of Finance, 2013d, p. ii, x; 2013e; Pakistan Bureau of Statistics, 2013; Ministry of Commerce, 2014).

Imports were nearly unchanged at \$44.91 billion in 2013 compared with \$44.95 billion in 2012. The main import categories were, in order of value, manufactured iron and steel (\$319 million), fertilizer (\$245 million), iron and steel scrap (\$175 million), gold (\$28 million), petroleum products (\$2.7 million), and refined petroleum (\$1.3 million) (Ministry of Finance, 2013d, p. ii, iii, x, iv; Pakistan Bureau

¹Where necessary, values have been converted from Pakistani rupees (PKR) to U.S. dollars (US\$) at an average rate of PKR105.15=US\$1.00 for 2013 and PKR97.2=US\$1.00 for 2012.

of Statistics, 2013; Ministry of Commerce, 2014; Trade Development Authority of Pakistan, 2014, p. 23, 28, 31–33, 39).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Production

Production of barite increased by 141%; aragonite and marble, 31% bentonite, 58%; silica sand, 50%; fire clay, 15%; crude steel, 13%; dolomite and limestone, 11%; and cement, 5%. Production of lead decreased by 65%; fuller's earth, 38%; feldspar, 28%; copper, 25%; chromium, 24%; pig iron, 19%; bauxite and zinc, 16% each; talc, 15%; and coal, 12% (Ministry of Finance, 2013c, p. 45–46; State Bank of Pakistan, 2013, p. 13). Data on mineral production are in table 1.

Commodity Review

Metals

Copper and Gold.—In 2013, gold was produced at the Saindak copper and gold mine, which was the only producing gold mine in Pakistan; however, the Government had no information on the exact volume of gold being produced. The Saindak copper and gold mine, which is located in the Chagai Hills in Balochistan Province, also produced copper. In 2013, despite having to suspend production of blister copper owing to repair work on the reverberatory furnace in the smelting plant, Metallurgical Corp. of China Ltd. (MCC) reported production of 13,500 metric tons (t) of copper content. The agreement on mining licenses between MCC and the Government for the Saindak copper and gold mine was extended until October 2017 (Metallurgical Corp. of China Ltd., 2013, p. 18; Bullion Street, 2014).

FDI in the Reko Diq copper and gold mining project was estimated to be \$3.3 billion; the project was expected to receive the largest influx of FDI of any project in Pakistan. The Reko Diq deposit is located in northwestern Balochistan Province. The joint venture of Antofagasta plc of the United Kingdom and Barrick Gold Corp. of Canada owned 75% of the Reko Diq project, and the government of Balochistan owned the remaining 25%. The total mineral resource at the deposit was estimated to be 5.81 million metric tons (Mt) at a grade of 0.41% copper and 0.22 gram per metric ton (g/t) gold. Reserves were estimated to be 2.17 Mt at an average grade of 0.53% copper and 0.30 g/t gold. Reko Diq's production capacity was expected to be 196,800 metric tons per year (t/yr) of copper and 8,040 kilograms per year (kg/yr) of gold from 560,500 t/yr of concentrate (Tethyan Copper Co., 2010a, b; Mining Weekly, 2011; Balochistan Development Authority, 2014).

Tethyan Copper Corp. (Pvt.) Ltd., which was a 50–50 joint venture of Antofagasta and Barrick Gold, conducted a feasibility study in August 2010. In February 2011, Tethyan had submitted a mining lease application, including an environmental and social impact assessment. The application was rejected by the government of Balochistan in November 2011 for unknown reasons. In 2013, Tethyan decided to seek monetary damages from the Government of Pakistan under the auspices of the

International Center for the Settlement of Investment Disputes (ICSID) and the government of Balochistan under the auspices of the International Chamber of Commerce (ICC). The hearing for the ICC was scheduled for June 23, 2014, and the hearing for the ICSID was scheduled for October 6, 2014 (Antofagasta plc, 2013, p. 159; MacDonald, 2013).

Everest Gold Inc. of Canada owned 100% of the Chagai Hills project, which is located in the western part of Balochistan Province. The Chagai Hills project consists of four subprojects—the Kabul Koh (Sard Ab) project, the Ziarat Pir Sultan and Ziarat Malik Karkam project, the Dasht-e-Kain project, and the Gajoi project. In 2008, Everest Gold started exploration at the Kabul Koh and Dasht-e-Kain projects. The company conducted drilling, sampling, and mapping of the Kabul Koh porphyry copper mineralization area. The sampling yielded resources with a copper content of 1.8%. The diamond drilling of a copper soil anomaly of 1,400 meters (m) by 500 m at the western mineralized zone of the Dasht-e-Kain property yielded a copper content of 0.29% (SlideServe, 2012, p. 11–13).

Iron Ore.—Bolan Mining Enterprise (BME), which was one of the leading barite-producing enterprises in Pakistan, was a joint venture of the government of Balochistan (50%) and Pakistan Petroleum Ltd. (PPL) (50%) and had two iron ore mining licenses. The iron ore mines are located northwest of the Nokkundi region in Balochistan Province. BME planned to set up a beneficiation plant with production capacity of 1 million metric tons per year (Mt/yr) of iron ore concentrates. The beneficiation plant was expected to begin production by 2015 or 2016. POSCO of the Republic of Korea and Al-Ittifaq Steel Production Co. (ISPC) of Saudi Arabia signed a memorandum of agreement with the Government of Pakistan for the development of the Nokkundi iron ore deposit (Pakistan Petroleum Ltd., 2013, p. 60).

Lead and Zinc.—In 2013, production at the Duddar lead and zinc mine, which is located in the Lasbella District in Balochistan Province, was suspended owing to maintenance at the site and underground mine. Therefore, production of lead at the Duddar lead and zinc mine in 2013 decreased by 65% to 12,000 t from 34,000 t in 2012, and zinc, by 16% to 10,024 t from 12,000 t in 2012. The Duddar lead and zinc mine was a joint-venture project between MCC (75%) and Pakistan Mineral Development Corp. (PMDC) and the government of Balochistan (25%) (Metallurgical Corp. of China Ltd., 2013, p. 19).

Iron and Steel.—According to the Ministry of Industries and Production, Pakistan Steel Mills Corp. (Pvt.) Ltd. (PSM) was the country's leading state-owned industrial complex in Pakistan in terms of output. PSM's capacity utilization decreased by 25% in May 2012 and by 19% in May 2013; by July 2013, PSM's capacity utilization had decreased by a further 12% owing to the shortage of coke feedstock, raw materials, and capital. PSM had shown a loss of \$834.7 million (PKR86.27 billion) by June 2013, and the loss increased to \$956.7 million (PKR98.57 billion). The Government decided to privatize PSM and sell 26% of its stake. The Government also planned to introduce a voluntary separation scheme at PSM to reduce the number of employees. PSM had about 4,800 employees in 2013; after layoffs, the total number would be 4,000 employees. In 2013, the Government approved a plan for the reconstruction of PSM. The Government of Russia

expressed interest in investing \$1 billion to modernize and increase PSM's capacity. After modernization, the production capacity was expected to increase to 1.5 Mt/yr or possibly 3 Mt/yr from the current 1.1 Mt/yr (Kiani, 2013; Ministry of Finance, 2013c, p. 35; Salman, 2013; Siddiqui, 2013).

Industrial Minerals

Cement.—Cement played an important role in the manufacturing sector of Pakistan. In 2013, 25 cement plants were operating in Pakistan. Owing to natural gas shortages, some cement plants transferred from using natural gas to using coal to fuel operations. Some of the cement plants increased their production in response to an increase in cement demand on local markets because of the construction of various infrastructure projects by the Government (Ministry of Finance, 2013c, p. 43).

Cherat Cement Co. Ltd. of Pakistan increased clinker production by 7% to 958,135 t in 2013 from 893,600 t in 2012, and cement production by 4% to 1 Mt in 2013 from 993,505 t in 2012. Kohat Cement Company Ltd. of Pakistan switched its plant to a coal-fueled operation, which helped to increase its production capacity. Flying Cement Company Ltd. (formerly Zaman Cement Ltd.), which was a one-kiln plant with a production capacity of 1.3 Mt/yr of cement, was shut down in 2013 so that outdated machinery and equipment could be replaced (Cherat Cement Co. Ltd., 2013; Flying Cement Company Ltd., 2013, p. 7; Kohat Cement Company Ltd., 2013, p. 13).

In 2013, Dandot Cement Co. Ltd. used only 9% of its clinker capacity owing to a complete stoppage of production at the plant for 8 months from November 2012 through June 2013. Cement production at the plant decreased by 88% to 24,131 t in 2013 from 203,558 t in 2012, and clinker production decreased by 78% to 42,212 t in 2013 from 193,924 t in 2012. Dandot Cement Co., was facing financial problems, and the company's facilities were in disrepair (Dandot Cement Co. Ltd., 2013, p. 49; Rahman Sarfaraz Rahim Iqbal Rafiq Chartered Accountants, 2013, p. 3).

The merger of Farooqia of Pakistan (formerly Mustehkam Cement Ltd.) and Bestway Cement Ltd. of the United Kingdom was approved on May 6. The purpose of the merger was to reduce administrative, marketing, and procurement costs. Bestway Cement owned two cement plants with production capacities of 1.23 Mt/yr and 3.6 Mt/yr, respectively, near Tatal village in the Chakwal District of Punjab Province. The Farooqia plant's production capacity was 1.09 Mt/yr. As a result of the merger with Farooqia, the combined production capacity of Bestway Cement increased to 6 Mt/yr (Bestway Cement Ltd., 2013, p. 1–2; Cemnet, 2013).

Mineral Fuels

Coal.—According to the Lahore Chamber of Commerce and Industry, coal resources in Pakistan were estimated to be 186 billion metric tons (Gt), including 175 Gt of resources at the Thar coalfields. In 2013, production of coal in Pakistan decreased by 12%. Pakistan's output of coal was 97% lignite and 3% subbituminous-to-bituminous coals. In 2013, the major

consumers of coal in the country were the cement sector, which accounted for 58% of total coal consumption (an increase from that in 2012), and brick kilns, which accounted for 41% of total coal consumption. The increase in consumption of coal by cement plants was attributed to transformation of cement plants to coal fueled operations. The exploration for new coal deposits in Pakistan was underway (Ministry of Finance, 2013a, p. 193; Daily Times, 2014).

Coal was produced by Lakhra Coal Fields, Lakhra Coal Development Co. (LCDC), and PMDC. Lakhra Power Co. discontinued a contract with LCDC to supply the company with coal because the quality of the coal was no longer suitable for power generation. Lakhra Power was trying to either import coal or purchase coal from private contractors in Pakistan. The president of the Lakhra Employees Union said that the powerplant was built based on the specific type of coal found at the Lakhra site. The director of LCDC submitted a letter to the Water and Power Development Authority and the Ministry of Petroleum and Natural Resources requesting a review of the issue (Tunio, 2013).

Oracle Coalfields plc of the United Kingdom acquired Block IV of the Thar lignite coalfield; the block covers an area of 66.1 square kilometers and is located in Sindh Province in southeastern Pakistan. The drilling of Block IV yielded 1.4 Mt of in-situ coal. The Joint Ore Reserve Committee (JORC)-compliant resources (including measured, indicated, and inferred) were estimated to be 529 Mt, and proven reserves were estimated to be 113 Mt. The open pit mine production capacity in Block IV was expected to be 5 Mt/yr. In September, Oracle Coalfields signed a joint development agreement with China Engineering Co. for the development of the proposed mine in Block IV. In November, Oracle Coalfields signed a memorandum of understanding with SEPCO Electric Power Company of China for the development of a 600-megawatt (MW)-capacity powerplant and with Lucky Cement Ltd. of Pakistan and Thatta Cement Comp. Ltd. of Pakistan for coal supply (Oracle Coalfields plc, 2013, p. 2, 6).

In May 2012, United Coal Holdings Ltd. of Canada (formerly Copper Minerals Inc. of Canada), through its subsidiary AJK Mining Company (Pvt.) Ltd., had acquired an experimental coal property in the Kotli coal district in the Pakistani-administered portion of the disputed Azad Jammu and Kashmir region. United Coal Holdings held a 60% interest in the coal property. The property is located within the Navel and Planna areas and the Karjai village in the Tehsil and Kotli Districts of the Azad Jammu and Kashmir region. By October 2012, the company had extracted 492 t of coal as a trial and sold it to local cement companies. In November 2013, the company slowed down its exploration drilling owing to limited funding. Reserves had not been estimated for the property (InfoMine, 2013, p. 1–3; United Coal Holdings Ltd., 2014).

Natural Gas and Crude Oil.—Pakistan's power sector and industries were heavily dependent on natural gas. Despite the increase in natural gas production by 7%, the country was experiencing a natural gas shortage owing to low growth in the natural gas supply. Petroleum production increased by 12% in 2013 compared with that of 2012. Natural gas and petroleum were produced by Pakistan Petroleum Ltd., Oil and

Gas Development Co. Ltd., Pakistan Oilfield Ltd., and Ocean Pakistan Ltd. (Ministry of Finance, 2013a).

Oil and Gas Development Co. Ltd. (OGDC) was the leading crude oil- and natural gas-producing and -exploring company in Pakistan. In 2013, the company contributed 54% to Pakistan's total oil production and 26% to the country's total natural gas production. In November, the joint-venture operation at the Nim Block, which was owned by OGDC (95%) and Government Holdings (Pvt.) Ltd. (5%), discovered natural gas and gas condensate during exploration of the Saand Well #01. The well is located in the Tando Allah Yar District in Sindh Province. The test for hydrocarbon potential of the Low Gory Formation at Saand Well #01 yielded 1.7 million cubic meters per day of natural gas and 65 barrels per day of condensate (Oil and Gas Development Co. Ltd., 2013a; 2013b, p. x).

Outlook

The Government was actively trying to increase its mineral production by amending the NMP, awarding exploration licenses, and working towards privatizing industries. According to the Ministry of Finance (2013d), mineral production and exports are likely to increase and jobs are likely to be created if the infrastructure, electricity generation, technologies for processing ores to extract products of high value, and technical capacity of the mining workforce are improved. With increases in construction and improvement of infrastructure, cement production are likely to increase. The development of the Thar coalfield is expected to increase coal production. The power sector and industries in Pakistan are heavily dependent on natural gas, and new natural gas field development is likely to increase production (Ministry of Finance, 2013d, p. v).

References Cited

- Antofagasta plc, 2013, Annual report and financial statement 2013: London, United Kingdom, Antofagasta plc, 184 p. (Accessed September 9, 2014, at <http://www.antofagasta.co.uk/~media/Files/A/Antofagasta/pdf/annual-reports/ar-2013.pdf>.)
- Asian Development Bank, 2014, Pakistan, *in* Asian development outlook 2014—Fiscal policy for inclusive growth: Mandaluyong City, Philippines, Asian Development Bank, p. 181–186. (Accessed September 9, 2014, at http://www.adb.org/sites/default/files/publication/31241/ado-2014_0.pdf.)
- Associated Press of Pakistan, 2013, M&M Deptt [sic] issues 110 licences to explore fireclay: Associated Press of Pakistan. (Accessed September 9, 2014, at http://www.app.com.pk/en/_index.php?option=com_content&task=view&id=25258&Itemid=2.)
- Balochistan Development Authority, 2014, Exploration of gold and copper at Reko: Balochistan Development Authority Web site. (Accessed October 6, 2014, at http://www.balochistan.gov.pk/index.php?option=com_content&view=article&id=711&Itemid=1056.)
- Bestway Cement Ltd., 2013, Annual report 2012–2013: Islamabad, Pakistan, Bestway Cement Ltd., 8 p. (Accessed October 6, 2014, at http://www.bestway.com.pk/reports/Bestway_annual_2012-13.pdf.)
- Bullion Street, 2014, Pakistan remain clueless over Saindak gold production: Bullion Street, March 20. (Accessed October 6, 2014, at <http://www.bullionstreet.com/news/pakistan-remain-clueless-over-saindak-gold-production/4323>.)
- Cemnet, 2013, Mustehkam Cement and Bestway Cement to merge, Pakistan: Cemnet, April 24. (Accessed September 30, 2014, at <http://www.cemnet.com/News/story/152020/mustehkam-cement-and-bestway-cement-to-merge-pakistan.html>.)
- Cherat Cement Co. Ltd., 2013, Tools of the trade: Karachi, Pakistan, Cherat Cement Co. Ltd. annual report 2013, 72 p. (Accessed September 30, 2014, at http://www.gfg.com.pk/uploads/files/cecl-2012-2013annual_report.pdf.)
- Daily Times, 2014, Pakistan world's 7th largest in coal reserves: Daily Times [Lahore, Pakistan], December 4. (Accessed December 4, 2014, at <http://www.dailytimes.com.pk/business/14-Nov-2013/pakistan-world-s-7th-largest-in-coal-reserves>.)
- Dandot Cement Co. Ltd., 2013, Annual report 2013: Lahore, Pakistan, Dandot Cement Co. Ltd., 50 p. (Accessed September 30, 2014, at <http://www.dandotcement.com/AnnualReports/2013/Annual2013.pdf>.)
- Flying Cement Co. Ltd., 2013, Annual report 2013: Lahore, Pakistan, Flying Cement Co. Ltd., June 30, 50 p. (Accessed September 19, 2014, at http://www.flyingcement.com/pdf/2012-2013/annual_report2013.pdf.)
- InfoMine, 2013, United Coal Holdings Limited management's discussion and analysis for the year ended November 30, 2013: InfoMine Form 51–102FI, 10 p. (Accessed September 29, 2014, at <http://www.infomine.com/index/pr/PB/42/63/PB426316.PDF>.)
- Kiani, Khaleed, 2013, Pakistan steel production cycle comes to a halt: Dawn [Karachi, Pakistan], September 17. (Accessed June 30, 2014, at <http://www.dawn.com/news/1043438>.)
- Kohat Cement Co. Ltd., 2013, Where strength meets substance: Kohat, Pakistan, Kohat Cement Co. Ltd. annual report 2013, 62 p. (Accessed September 29, 2014, at http://www.kohatcement.com/pdf_files/reports/635169811031234126_30_June_2013.pdf.)
- MacDonald, Alex, 2013, Tethyan drops Pakistan project, will seek damages: The Wall Street Journal, May 8. (Accessed September 29, 2014, at <http://online.wsj.com/news/articles/SB10001424127887324244304578471132363025400>.)
- Mahr, Krista, 2013, Pakistan's struggle for power: Time Inc., October 9. (Accessed February 21, 2015, at <http://world.time.com/2013/10/09/pakistans-struggle-for-power/>.)
- Metallurgical Corp. of China Ltd., 2013, Focus on MCC's principal business for a better future—2013 annual report: Beijing, China, Metallurgical Corp. of China Ltd., 276 p. (Accessed September 29, 2014, at http://www.mccchina.com/ENGLISH/UploadFiles_5945/201404/2014040721333497.pdf.)
- Miller, M.M., 2014, Barite: U.S. Geological Survey Mineral Commodity Summaries 2014, p. 24–25. (Accessed November 24, 2014, at <http://minerals.usgs.gov/minerals/pubs/commodity/barite/mcs-2014-barit.pdf>.)
- Mining Weekly, 2011, Pakistan says no to Antofagasta-Barrick Gold mine: Creamer Media's Mining Weekly, November 16. (Accessed September 19, 2014, at <http://www.miningweekly.com/print-version/pakistan-says-no-to-antofagasta-barrick-gold-mine-2011-11-16>.)
- Ministry of Commerce, 2014, Complete statistics (July–June 2012–2013): Ministry of Commerce Web page. (Accessed September 25, 2014, at http://www.commerce.gov.pk/?page_id=3908.)
- Ministry of Finance, 2013a, Energy, *in* Pakistan economic survey 2012–2013: Islamabad, Pakistan, Ministry of Finance, p. 187–202. (Accessed September 25, 2014, at http://www.finance.gov.pk/survey/chapters_13/14-Energy.pdf.)
- Ministry of Finance, 2013b, Growth and investments, *in* Pakistan economic survey 2012–2013: Islamabad, Pakistan, Ministry of Pakistan, p. 1–5. (Accessed September 25, 2014, at http://www.finance.gov.pk/survey/chapters_13/01-Growth%20and%20Investment.pdf.)
- Ministry of Finance, 2013c, Manufacturing and mining, *in* Pakistan economic survey 2012–2013: Islamabad, Pakistan, Ministry of Finance, p. 35–46. (Accessed September 25, 2014, at http://www.finance.gov.pk/survey/chapters_13/03-Manufacturing%20and%20Mining.pdf.)
- Ministry of Finance, 2013d, Overview of the economy, *in* Pakistan economic survey 2012–2013: Islamabad, Pakistan, Ministry of Finance, p. i–xvi. (Accessed September 25, 2014, at http://www.finance.gov.pk/survey/chapters_13/executive%20summary.pdf.)
- Ministry of Finance, 2013e, Trade and payments, *in* Pakistan economic survey 2012–2013: Islamabad, Pakistan, Ministry of Pakistan, p. 101–114. (Accessed September 25, 2014, at http://www.finance.gov.pk/survey/chapters_13/08-Trade%20and%20Payments.pdf.)
- Ministry of Petroleum and Natural Resources, 2013, National mineral policy 2013: Islamabad, Pakistan, Ministry of Petroleum and Natural Resources, February, 25 p. (Accessed September 25, 2014, at <http://www.khyberpakhtunkhwa.gov.pk/cms/downloads/kp.gov.pk-downloads-%20cea579d506909f6dad4e41b8ea4a3c10.pdf>.)
- Oil and Gas Development Company Ltd., 2013a, Discovery of oil and gas at Saand well #01: Islamabad, Pakistan, Oil and Gas Development Company Ltd., 1 p. (Accessed September 19, 2014, at <http://www.ogdcl.com/news/Saandh1DiscoveryNotice.pdf>.)

- Oil and Gas Development Company Ltd., 2013b, Annual report 2013—Moving forward: Islamabad, Pakistan, Oil and Gas Development Company Ltd., 128 p. (Accessed September 19, 2014, at http://www.ogdcl.com/UploadFolder/financial/Annual_Report_2013.pdf.)
- OnePakistan News, 2012, Ban under section 144 imposed on excavations of sand and gravel: OnePakistan News. (Accessed September 19, 2014, at <http://pakistan.onepakistan.com.pk/news/city/karachi/216313-ban-under-section-144-imposed-on-excavation-of-sand-and-gravel.html>.)
- Oracle Coalfields plc, 2013, Energy for Pakistan—Annual review 2013: London, United Kingdom, Oracle Coalfields plc, 20 p. (Accessed October 9, 2014, at <http://www.oraclecoalfields.com/reports/oracle-annual-review-2013.pdf>.)
- Pakistan Bureau of Statistics, 2013, 14.8—Exports & imports of Pakistan: Islamabad, Pakistan, Pakistan Bureau of Statistics, 2 p. (Accessed February 21, 2015, at <http://www.pbs.gov.pk/sites/default/files//tables/Web%20site%20T-14.8.pdf>.)
- Pakistan Newswire, 2012, Section 144 imposed in District Thatta: Pakistan Newswire, December 10. (Accessed October 9, 2014, at <http://pakistannewswire.net/section-144-imposed-in-district-thatta/>.)
- Pakistan Petroleum Ltd., 2013, Venturing for value—Annual report 2013: Karachi, Pakistan, Pakistan Petroleum Ltd., 228 p. (Accessed October 6, 2014, at http://www.ppl.com.pk/sites/default/files/annual_reports/PPL%20Annual%20Report%202013.pdf.)
- Rahman Sarfaraz Rahim Iqbal Rafiq Chartered Accountants, 2013, Cost audit report, Dandot Cement Company Limited for the year ended 30 June 2013: Lahore, Pakistan, Rahman Sarfaraz Rahim Iqbal Rafiq Chartered Accountants, 17 p. (Accessed October 3, 2014, at <http://www.dandotcement.com/AnnualReports/2013/cost2013.pdf>.)
- Salman, Ali, 2013, Negative equity—Pakistan Steel Mills—Why it should be sold at Rs1: The Express Tribune [Karachi, Pakistan], November 17. (Accessed October 3, 2014, at <http://tribune.com.pk/story/632896/negative-equity-pakistan-steel-mills-why-it-should-be-sold-at-rs1/>.)
- Siddiqui, H.A., 2013, Sinking Pakistan Steel's long wait for a bailout: Dawn [Karachi, Pakistan], September 9. (Accessed October 3, 2014, at <http://www.dawn.com/news/1041488>.)
- SlideServe, 2012, Exploring the Tethyan copper gold belt—The world's next major copper belt: SlideServe, February, 24 p. (Accessed September 18, 2014, at <http://www.slideserve.com/walden/exploring-the-tethyan-copper-gold-belt-the-world-s-next-major-copper-belt-february-2012>.)
- State Bank of Pakistan, 2013, Economic growth, saving, and investment, chap. 2 of SBP annual report—Statistical supplement FY13: Karachi, Pakistan, State Bank of Pakistan, p. 8–18. (Accessed October 3, 2014, at <http://www.sbp.org.pk/reports/annual/arFY13/Stats/Eng/Chapter-2.pdf>.)
- Tethyan Copper Co., 2010a, Redko Diq resource: Tethyan Copper Co. Web page. (Accessed October 3, 2014, at <http://www.tethyan.com/TheRekoDiqProject/RekoDiqResource.aspx>.)
- Tethyan Copper Co., 2010b, The Reko Diq project: Tethyan Copper Co. Web page. (Accessed October 3, 2014, at <http://www.tethyan.com/TheRekoDiqProject.aspx>.)
- Trade Development Authority of Pakistan, 2014, Exports from Pakistan—Final statistics (July–June 2013–2014): Karachi, Pakistan, Trade Development Authority of Pakistan. (Accessed September 26, 2014, at <http://www.tdap.gov.pk/tdap-statistics.php>.)
- Tunio, Hafeez, 2013, Lakhra power company revokes coal supply contract: The Express Tribune [Karachi, Pakistan], February 5. (Accessed September 26, 2014, at <http://tribune.com.pk/story/503076/lakhra-power-company-revokes-coal-supply-contract/>.)
- United Coal Holding Ltd., 2014, United Coal Holding Ltd.: Vancouver, British Columbia, Canada, United Coal Holding Ltd. brochure, 2 p. (Accessed September 26, 2014, at <http://www.unitedcoal.ca/pdf/uclbrochure.pdf>.)
- United Nations Conference on Trade and Development, 2014, World investment report 2014: Geneva, Switzerland, United Nations Conference on Trade and Development, 228 p. (Accessed November 24, 2014, at http://unctad.org/en/PublicationsLibrary/wir2014_en.pdf.)
- Van Oss, H.G., 2014, Cement: U.S. Geological Survey Mineral Commodity Summaries 2014, p. 38–39. (Accessed November 24, 2014, at <http://minerals.usgs.gov/minerals/pubs/commodity/cement/mcs-2014-cemen.pdf>.)
- Yusuf, Huma, 2012, When the lights go out: The New York Times, June 29. (Accessed February 21, 2015, at http://latitude.blogs.nytimes.com/2012/06/29/when-the-lights-go-out-in-pakistan/?_r=0.)

TABLE 1
PAKISTAN: PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity	2009	2010	2011	2012	2013
METALS					
Antimony	75	25	--	12	89
Bauxite, gross weight	13,618 ^r	9,031 ^r	9,033 ^r	30,223 ^r	25,288
Chromium ore:					
Gross weight	90,000 ^r	257,000 ^r	148,000 ^r	179,000 ^r	136,000
Cr ₂ O ₃ content	40,534 ^r	115,746 ^r	66,655 ^r	80,617 ^r	61,251
Copper, mine output, Cu content ^c	19,500 ^r	19,500 ^r	19,500 ^r	17,931 ^{r,3}	13,500 ^{r,3}
Iron and steel:					
Iron ore, gross weight					thousand metric tons
Iron ore, gross weight	333	418	430	384	412
Fe content, 32%	107	134	138	123	132
Pig iron	791 ^r	483	433 ^r	249 ^r	201
Steel, crude ^c	1,100	1,100	1,200	1,200	1,359 ³
Lead: ^c					
Pb content in concentrate	26,000	26,000	27,000	34,000 ^r	12,000
Refined, secondary	85	2,900	919	2,900	2,000
Zinc, mine output, Zn content	1,000	10,000 ^r	15,000 ^r	12,000 ^r	10,024 ^r

See footnotes at end of table

TABLE 1—Continued
PAKISTAN: PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity	2009	2010	2011	2012	2013	
INDUSTRIAL MINERALS						
Abrasives, natural, emery	2,150 ^{r,e}	-- ^r	-- ^r	-- ^r	--	
Barite	63,000 ^r	57,000 ^r	32,000 ^r	49,000 ^r	118,000	
Cement, hydraulic	thousand metric tons	28,380 ^r	31,358 ^r	28,716 ^r	29,557 ^r	31,098
Chalk	8,343	1,322	1,422 ^r	1,500	1,600	
Clays:						
Bentonite	33,300	42,100	44,500 ^r	16,520 ^r	26,077	
Fire clay	389,493 ^r	329,055 ^r	274,042 ^r	340,000	390,000	
Fuller's earth	11,055	6,370	4,761	6,906 ^r	4,259	
Kaolin, china clay	17,000 ^r	23,000 ^r	16,000 ^r	22,000 ^r	23,000	
Feldspar	46,000	102,000	107,000 ^r	53,235 ^r	38,218	
Fluorspar ^c	1,400	1,500	1,600	1,700	1,800	
Gypsum, crude	800,000 ^r	854,000 ^r	885,000 ^r	1,260,000 ^r	1,249,967	
Magnesite, crude	2,639 ^r	5,159 ^r	4,908 ^r	5,444 ^r	6,705	
Nitrogen, N content of ammonia ^c	2,700 ^r	2,800 ^r	2,700 ^r	2,300 ^r	2,700	
Phosphate rock:						
Gross weight	30,467	87,807	30,950 ^r	69,400 ^r	58,204	
P ₂ O ₅ content	5,480	15,800	5,567 ^r	12,484 ^r	10,469	
Pigments, mineral, natural, ocher	56,617 ^r	55,352 ^r	36,517 ^r	81,884 ^r	68,673	
Salt:						
Rock	thousand metric tons	1,917 ^r	1,944 ^r	1,954 ^r	2,136 ^r	2,160 ^r
Marine	do.	93	190	315	292	297
Total	do.	2,010 ^r	2,134 ^r	2,269 ^r	2,428 ^r	2,457 ^r
Sand and gravel	17,780	37,604	38,215	--	--	
Silica sand	369,773	411,262	300,501	270,000	406,000	
Sodium compounds, n.e.s. ^c :						
Caustic soda	245 ^r	182 ^{r,3}	172 ^{r,3}	179 ^r	183	
Soda ash, manufactured	365 ^r	410 ^{r,3}	378 ^{r,3}	371 ^r	366	
Stone:						
Aragonite and marble	1,223,387	1,471,014	1,816,254 ^r	1,800,000	2,360,114	
Dolomite	250,000 ^r	130,000 ^r	240 ^r	198 ^r	219	
Limestone	thousand metric tons	33,186 ^r	37,137 ^r	32,021 ^r	35,016 ^r	38,932
Strontium minerals, celestite	470 ^r	160 ^r	-- ^r	-- ^r	--	
Sulfur, native ^c	26,200	27,100 ^r	28,000 ^r	26,000	21,000	
Talc and related materials, soapstone	40,792	121,800	114,100	110,000	93,214	
MINERAL FUELS AND RELATED MATERIALS						
Coal, lignite, bituminous	thousand metric tons	3,697 ^r	3,536 ^r	3,292 ^r	3,179 ^r	2,813
Coke	do.	424 ^r	343 ^r	302 ^r	193 ^r	203
Gas, natural:						
Gross production	million cubic meters	51,600 ^r	52,400 ^r	52,000 ^r	50,400 ^r	53,900
Marketed production, sales ^c	do.	49,200 ^r	49,400 ^r	49,600 ^r	48,040 ^r	51,400
Natural gas liquids ^c	thousand 42-gallon barrels	2,016 ^{r,3}	2,020 ^r	2,020 ^r	2,020 ^r	2,020
Petroleum, crude	do.	23,870 ³	24,000 ^r	24,000 ^r	25,000 ^r	28,000
Refinery products: ^c						
Gasoline	do.	11,161 ³	11,000	12,000	12,000	12,000
Jet fuel	do.	7,584 ³	6,631 ^{r,3}	5,204 ^{r,2}	5,500	6,000
Kerosene	do.	1,217 ³	903 ^{r,3}	912 ^{r,2}	1,000	1,210
Distillate fuel oil	do.	31,000	32,000	31,000	32,000	32,000
Residual fuel oil	do.	18,615 ³	20,000	21,000	22,000	23,000
Lubricants	do.	3,689 ³	1,393 ^{r,2}	1,358 ^{r,3}	1,500	1,150
Other	do.	16,000	17,000	18,000	19,000	20,000
Total	do.	89,266	88,927 ^r	89,474 ^r	93,000	95,360
Uranium, processed:						
U ₃ O ₈ content	50	45	45	45	45	
U content	42	38	38	38	38	

^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 12, 2014.

²In addition to the commodities listed, secondary aluminum was produced, and the Saindak copper mine produced gold, and silver, but available information is inadequate to make reliable estimates of output

³Reported figure.

TABLE 2
PAKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^{6, 1}
Aluminum smelters, secondary	Alcop	Karachi	1,500
Do.	do.	Lahore	1,200
Do.	Alpha Aluminium Co.	do.	1,100
Do.	Canon Metal Works	Gujranwala	NA
Do.	Chauhan Industries	Lahore	120
Do.	Chawala Chemical & Metal Industries	do.	NA
Do.	China Industries	do.	150
Do.	Craft Aluminium	do.	300
Do.	H. Gulam Qadir & Sons	Gujranwala	NA
Do.	Hyder Industries	Sahiwal	NA
Do.	Japan Metal Industries	Karachi	1,500
Do.	Jilani Industries	do.	NA
Do.	Khan Aluminum Industries	Karachi	2,700
Do.	Khuram Industry	Lahore	300
Do.	Kruddson Pvt Ltd.	Karachi	1,200
Do.	Lucky Industries	do.	1,200
Do.	M. Siraj Din Mohammed Shafi	Gujranwala	NA
Do.	Noor Aluminium Co.	Karachi	NA
Do.	Pakistan Alco Products	Lahore	NA
Do.	Pakistan Cabled Ltd.	Karachi	2,500
Do.	Pakistan Metal Industries	do.	4,000
Do.	Punjab Metal Works	Gujranwala	NA
Do.	Sana Aluminium Industries	Peshawar	NA
Do.	Shaheen Industries	Lahore	NA
Do.	Standard Aluminium	Karachi	NA
Antimony	MTEQ Pakistan (Pvt.) Ltd. (mining and manufacturing)	Vashouk and Dalbadin, Balauchistan Chitral	12,000
Barite	Bolan Mining Enterprises (Government of Balochistan, 50%, and Pakistan Petroleum Ltd., 50%)	Khuzdar, Balochistan Province	437,000
Do.	Razvi Mining (Pvt.) Ltd.	Gandori, Kalan, and Retri	30,000
Bauxite	MTEQ Pakistan (Pvt.) Ltd. (mining and manufacturing)	Warehouses in Karachi	12,000
Cement	A.C. Rohi Cement Ltd.	Den Nando Kohistan, Sindh District	NA
Do.	Askari Cement Co. Ltd.	Nizampur and Wah	8,925
Do.	Bestway Cement Co. Ltd.	Chakwal and two plants in Hattar	6,000,000
Do.	Cherat Cement Co. Ltd.	Nowshera	912,500
Do.	D.G. Khan Cement Co. Ltd.	Dera Ghazi Khan and Khairpur Districts	4,221,000
Do.	Dadabhoi Cement Industries Ltd. (M.H. Dadabhoi Group)	Dadu, Sindh District, Karachi	2,800,000
Do.	Dandot Cement Co. Ltd.	Dandot	42,890
Do.	Dewan Cement Ltd. (A Yousuf Dewan Co.)	Hattar and Dhabeji	750,000
Do.	Falcon Cement/Attock Cement Pakistan Ltd.	Hub Chowki, Karachi	1,710,000
Do.	Fauji Cement Co. Ltd.	Jhang Bahtar, Attock District	3,434,000
Do.	Fecto Cement Ltd.	Sangjani	819,000
Do.	Flying Cement	Lilla, Mangowal, Khushab District, Punjab Province	1,260,000
Do.	Gharibwal Cement Ltd.	Jhelum	2,446,000
Do.	Javedan Cement Ltd.	Karachi	600,000
Do.	Kohat Cement Co. Ltd.	Kohat District	2,950,000
Do.	Lafarge Pakistan Cement Ltd.	Chakwal	2,500,000
Do.	Lucky Cement Ltd.	Indus Highway, Karachi	7,628,000
Do.	do.	Pezu	4,000,000
Do.	Maple Leaf Cement Factory Ltd.	Daudkhel	3,360,000
Do.	Pioneer Cement Ltd.	Chenki	1,300,000
Do.	Power Cement Ltd. (Arif Habib Group)	Arif Habib Centre, Karachi	577,160
Do.	Thatta Cement Co. Ltd. (Arif Habib Group)	Thatta	450,000
Do.	Zeal Pak Cement Factory Ltd.	Hyderabad	1,080,000
Chromite	Pakistan Chrome Mines Ltd.	Gwal, Khanozai, Muslim Bagh, and Nisai, Balochistan Province	20,000
Do.	Ghani Corp. (Ghani Mines (Pvt.) Ltd.)	NA	NA

See footnotes at end of table

TABLE 2—Continued
PAKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^{e, 1}	
Chromite—Continued	Svah Resources Inc.	Muslim Bagh and Khanozai	180,000	
Do.	MTEQ Pakistan (Pvt.) Ltd. (mining and manufacturing)	Dargai and Malakand	120,000	
Coal	Sindh Coal Authority	Dadu, Sindh Province	4,000	
Do.	do.	Tharparkar, Sindh Province	NA	
Do.	Lakhra coalfields [Pakistan Mineral Development Corp. (PMDC), 50%; Government of Sidh, 25%; Water and Power Development Authority, 25%]	Latifabad, Hyderabad	201,000	
Do.	Lakhra Coal Development Co. (LCDC)	Khanot near Lakhra	NA	
Do.	Degari-Sor-Range [Pakistan Mineral Development Corp. (PMDC)] (Government-owned)	35 km southeast of Quetta	3,000	
Do.	do.	16 km east of Quetta	29,000	
Do.	Shahrig-Khost-Harnai coalfield [Pakistan Mineral Development Corp. (PMDC)] (Government-owned)	160 km northeast of Quetta	159,000	
Do.	Progressive Mining Enterprise (Ghani Mines Ltd.)	Takwan, Chakwal District	NA	
Do.	Ghani Corp. (Ghani Mines Ltd.)	NA	NA	
Do.	Al-Muhandus Corp. (Ghani Mines Ltd.)	Balman and Chukki, Quaidabad, Khushb District	NA	
Do.	Nara Minerals	Patala Formation, Jhelum District	NA	
Copper, mine	Saindak Metals Ltd. [Metallurgical Corp. of China Ltd. (MCC)]	Chagai Hills, Balochistan Province	22,000	
Copper, manufacturing	MTEQ Pakistan (Pvt.) Ltd.	Gilgit and Balistan	NA	
Fertilizer	Engro Fertilizer Ltd.	Daharki	2,000	
Do.	Fatima Fertilizer Company Ltd.	Sadiqabadm Rahim Yar Khan	500,000	
Do.	Pakarab Fertilizer Ltd.	Khanewal Road, Multan	NA	
Do.	Fauji Fertilizer Bin Qasim Ltd.	Bin Qasim, Karachi	1,000	
Gold, Au content	Saindak Metals Ltd. [Metallurgical Corp. of China Ltd. (MCC)]	Chagain Hills, Balochistan Province	NA	
Iron ore	Mines and Minerals Enterprises Pakistan	Punjab Province	NA	
Lead and zinc, ore	Duddar lead-zinc mine project [Metallurgical Corp. of China Ltd. (MCC)]	Duddar, Balochistan Province	131,000	
Marble (onyx)	Azeem Marble & Onyx Industries	Karachi	NA	
Natural gas	million cubic meters Pakistan Petroleum Ltd. (PPL)	Adhi, Punjab Province; Kandhkot and Mazarani, Sindh Province; and Sui, Balochistan Province	8,760	
Do.	do.	Oil and Gas Development Co. Ltd. (OGDC)	Balochistan, Punjab, and Sindh Provinces	11,500
Do.	do.	Pakistan Oilfields Ltd.	Balochistan Province	8,000
Do.	do.	Mari Petroleum Co. Ltd.	Sindh Province	6,000
Do.	do.	Ocean Pakistan Ltd.	Punjab, Balochistan, Khyber, Pakhtoonkhawa and Ratana	NA
Petroleum:				
Crude	thousand 42-gallon barrels Pakistan Petroleum Ltd.	Adhi, Punjab Province (additional 10 blocks)	576	
Do.	do.	Oil and Gas Development Co. Ltd. (OGDC)	37 oilfields and gasfields (additional 29 blocks)	16,600
Do.	do.	Pakistan Oilfields Ltd.	15 oilfields and gasfields	71,300
Do.	do.	Ocean Pakistan Ltd.	Punjab, Balochistan, Khyber, Pakhtoonkhawa and Ratana	NA
Refined	thousand 42-gallon barrels Bosicor Pakistan Ltd.	Karachi	10,800	
Do.	do.	Pak-Arab Refinery Co. Ltd. (joint venture of the Governments of Pakistan and the Emirate of Abu Dhabi in the United Arab Emirates)	Mahmood Kot, Punjab Province	360,000
Do.	do.	National Refinery Ltd.	NA	NA
Do.	thousand 42-gallon barrels Attock Refinery Ltd.	Rawalpindi	15,800	
Do.	do.	Pakistan Refinery Ltd.	Karachi	16,900
Phosphate rock	Pakistan Mining Co. Ltd.	NA	90,000	

See footnotes at end of table

TABLE 2—Continued
PAKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^{e, 1}
Salt	Khewra Salt Mines [Pakistan Mineral Development Corp. (PMDC)] (Government-owned)	Salt Range, south of Islamabad	435,000
Do.	Warcha Salt Mines [Pakistan Mineral Development Corp. (PMDC)] (Government-owned)	276 km from Islamabad	613,000
Do.	Kalabagh Salt Mines [Pakistan Mineral Development Corp. (PMDC)] (Government-owned)	296 km from Islamabad or 50 km from Mainwali	80,000
Do.	Jatta Salt Mines [Pakistan Mineral Development Corp. (PMDC)] (Government-owned)	217 km from Islamabad or from Kohat	73,000
Do.	Bahadur Khel Salt Mines [Pakistan Mineral Development Corp. (PMDC)] (Government-owned)	265 km from Islamabad or 112 km from Kohat	NA
Do.	Ghani Corp. (Ghani Mines Ltd.)	Banda Daud Shah, Karak District	NA
Do.	Nara Minerals (Chani Mines (Pvt.) Ltd.)	Central part of Salt Range	NA
Do.	Ghani Mines	Korrian	NA
Do.	Al-Muhandus Corp. (Chani Mines (Pvt.) Ltd.)	Salt Range, near village Choa, Warcha, Qaidabad, Khushab District	NA
Silica sand	Ghani Corp. (Ghani Mines (Pvt.) Ltd.)	NA	NA
Do.	MTEQ Pakistan (Pvt.) Ltd.	NA	120,000
Steel, crude	Pakistan Steel Mills Corp. (Pvt) Ltd. (PSM)	Karachi	1,000
Sulfur	Pakistan Oilfields Ltd.	15 oilfields and gasfields	1,537,000
Talc	CapriCorn Minerals	Bandi Sadique	20,000

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

¹Abbreviations used for units of measure in this table are as follows: km, kilometer.