



2008 Minerals Yearbook

GERMANY

THE MINERAL INDUSTRY OF GERMANY

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In 2008, Germany was a leading global exporter of industrial goods and services (including processed and fabricated mineral products). The country's mineral industry, however, depended almost entirely on imported mineral raw materials. Germany was the leading producer of lignite in the world, but domestic use of lignite accounted for only 11.1% of total primary energy consumption in the country. Germany was dependent on imports of other mineral fuels for most of the remainder of its primary energy consumption; renewable energy resources, such as wind power, accounted for about 7.4% of total energy consumption compared with 7.0% in 2007. Germany's metal processing sector relied on imports of metal ores and concentrates and reprocessing of metallic scrap and waste materials (both imported and produced domestically) because no metals were mined in sufficient concentrations for domestic metallurgical use (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 19-20, 25-26, 35-36, 44, 172; Statistik der Kohlenwirtschaft e.V., 2009).

In 2008, Germany accounted for about 18% of the total production of lignite in the world. The country was the third ranked producer of salt (including rock salt) in the world (accounting for about 6.4% of global production) and the fourth ranked producer of kaolin (10%) and potash (9.4%). In addition, Germany either produced or was estimated to have produced greater than 1% of the world's output of aluminum, barite, bentonite, cadmium (secondary), cement, feldspar, gallium, gypsum, indium, crude iron, lime, magnesium compounds (as byproducts of potash mining), nitrogen (ammonia), industrial quartz, silica (industrial sand and gravel), crude steel, and sulfur. With respect to industrial minerals, the country was the leading mine producer in the European Union (EU) of barite, bentonite, feldspar, crude gypsum, kaolin, potash, and salt. With respect to processed metals, the country was the leading producer of aluminum, refined copper, refined lead, and crude steel in the EU and accounted for 1.5%, 3.8%, 4.7%, and 3.4% of the world's production of each of these metal commodities, respectively. Germany was also the EU's third ranked producer of refined zinc and accounted for about 2.5% of global production. Germany's domestic mineral processing sector accounted for at least 5% of the world's total production capacity of alumina, fused aluminum oxide (abrasive), graphite, magnesium metal (secondary), rhenium metal (byproduct), strontium compounds, and titanium dioxide pigments (table 1; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 22, 26, 54, 61-66, 77-84, 172, 178, 183, 185, 187, 189, 193, 199; Statistisches Bundesamt, 2009a, p. 110-111).

The international competitiveness of the country's nonfuel mineral processing and fabrication sectors relied primarily on such factors as a highly skilled labor force, rapid assimilation of new technology (especially metal and other mineral materials recycling technologies), and the development and maintenance of liberal trade relationships both within and outside the EU. There was increased uncertainty in the prices of many minerals

and a substantial decrease in mineral commodity prices, on average, during the second half of 2008 than during the second half of 2007. The downturn in prices for raw mineral material inputs into the processing sector of the mineral industry of Germany could be viewed as a boon to consumers, but the corresponding decrease in demand for the country's production of processed mineral products was expected to cause a substantial decrease in the country's considerable imports of minerals through at least the first quarter of 2009 (U.S. Library of Congress, Federal Research Division, 2008, p. 11-12; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 17-20, 25-27, 213-215).

In response to the decrease in output prices for the global mineral industry, many mines and mineral processing facilities that were ranked in the upper third of operating costs per unit of production were closed (at least temporarily) during the final quarter of 2008 or were expected to be closed sometime in 2009. The operating costs of some metal processing facilities in Germany, including aluminum smelters, were expected to be significantly higher than the price per metric ton of metal output through early 2009 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 25-27; Gesamtverband der Aluminiumindustrie e.V., 2009).

Minerals in the National Economy

According to revised estimates, the output of the metal processing sector (up until the foundry stage of production) was valued at \$141 billion¹ in 2008 compared with \$130 billion in 2007 and about \$108 billion in 2006; these values accounted for 3.8%, 3.9%, and 3.7% of the annual gross domestic product (GDP), respectively. The German Federal Statistics Office (DSTATIS)'s real (based upon prices in 2000) producer's price index for all of the metals and alloys produced in the country increased by about 4% compared with 7% in 2007. Domestic mine production of industrial minerals (excluding coal) was valued at approximately \$11 billion in 2008 compared with \$10 billion in 2007 and \$9.2 billion in 2006; the real producer's price index for industrial minerals in Germany increased by about 3% in 2008 compared with 4% in 2007. According to revised estimates, Germany spent \$41.1 billion on imports of crude (nonprecious) metallic mineral materials in 2008 compared with \$42.5 billion in 2007. This decrease was expected owing to both decreasing demand in the domestic metal processing sector and lower prices for metal commodities during the second half of 2008, but this expenditure still remained far greater than the \$33.7 billion spent during 2006. The country's estimated mineral trade balance in 2008 for all sectors of the mineral industry (including trade in intermediate

¹Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US\$) at an annual average exchange rate of €0.7964=US\$1.00 for 2006, €0.7296=US\$1.00 for 2007, and €0.6795=US\$1.00 for 2008. All values are nominal, at current prices, unless otherwise stated.

mineral products, such as cement) was about –\$152 billion compared with –\$107 billion in 2007, primarily owing to an increase in expenditures on mineral fuels and related materials to \$134 billion compared with about \$93 billion in 2007 (Statistisches Bundesamt, 2008, p. 40-41; 2009a, p. 9-10, 15; 2009b, p. 40-41; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 19-26; International Monetary Fund, 2009).

Although an official value of domestic coal mine production was not readily available, rough estimates suggest that Germany's combined mine production of anthracite and bituminous (hard) coal and lignite accounts for less than 1% of the GDP. Such estimated values of lignite production, however, could be substantially lower than what they would be if one used export values to construct the estimates. Additionally, domestic coal production helped satisfy the country's demand for primary energy (that is, energy generated by the combustion of mineral fuels and related materials, and by other sources, such as wind and water) and helped mitigate the high cost of importing or investing in the development of other primary energy sources. In 2008, combustion of hard coal products accounted for 13.1% of Germany's consumption of primary energy compared with 14.3% in 2007, and that of lignite products accounted for 11.1% compared with 11.6% during the same timeframe. The country spent about \$6.2 billion on imports of hard coal compared with \$3.9 billion in 2007 (Statistisches Bundesamt, 2008, p. 40; 2009b, p. 40; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 11, 25, 35-36, 41-42, 212; International Monetary Fund, 2009).

In addition to any contribution to the GDP, Germany's recycling industry is important to the economy because it reduces the country's reliance on imports of mineral raw materials (especially of metallic minerals for the metal processing sector), helps safeguard the domestic supply, and promotes a sustainable supply of mineral raw materials. The recovery of metallic mineral raw materials exclusively from secondary sources (scrap metal) contributed about \$5.1 billion to the GDP in 2008 compared with about \$4.1 billion in 2007, and that of industrial mineral raw materials (including from mineral-rich slags and residues) was valued at about \$1.4 billion in 2008 compared with \$1.3 billion in 2007. In 2008, DSTATiS's real producer's price index (using 2000 as the base year) for all secondary metals and industrial minerals increased by 7.6% compared with 10.7% in 2007 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 26; International Monetary Fund, 2009; Statistisches Bundesamt, 2009a, p. 10, 17).

According to DSTATiS, approximately 1,190 metal-processing plants were operating in Germany in 2008 (of which about 85 were focused exclusively on the recovery of metals from secondary sources) compared with 1,260 (of which 84 were focused on the recovery of metals from secondary sources) in 2007. However, the Federal Ministry of Economics and Technology (BMWi) estimated that about 4,900 plants were operating in Germany and employed about 450,000 people, on average, compared with about 4,700 plants and 435,000 employees in 2007. The BMWi also reported that 21,524 people were employed in underground mining (15,663 of which mined hard coal), 14,379 people were employed in open pit mining and quarrying (of which 9,616 were employed in mining lignite),

and an additional 43,037 people were employed above ground to provide full-time administrative, clerical, and logistical support for domestic mining operations at yearend 2008 compared with 23,202 people underground (of which 17,447 mined hard coal), 14,733 people in open pit mining and quarrying (of which 9,890 were employed in mining lignite), and 43,083 people above ground at yearend 2007 (Bundesministerium für Wirtschaft und Technologie, 2009, p. 83; undated; Statistisches Bundesamt, 2009a, p. 15, 17).

Government Policies and Programs

Germany's main mining law is the Federal Mining Act (BGBl. IS. 1310), which was approved on August 13, 1980, and revised on December 9, 2006, through slight revision to provisions of Article 11 (BGBl. IS. 2833). In 2008, the Government program to phase out the subsidy for the mining of hard coal was ongoing and continued to adhere to a schedule to completely eliminate the subsidy by 2018. In 2008, the total amount of this subsidy decreased to about 2.4 billion euros (\$3.5 billion) compared with 2.5 billion euros (\$3.4 billion) in 2007, and the subsidy was scheduled to be further reduced to 2.2 billion euros in 2009 and 1.8 billion euros in 2012 (Bundesministerium der Justiz, 2007, p. 1; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 41-42; Bundesministerium für Wirtschaft und Technologie, 2009, p. 11, 37-39, 48-50).

The Environmental Impact Assessment Act (EIA Act) (BGBl. IS. 1757, 2797), which was approved on June 25, 2005, and revised through slight changes to Article 2 (BGBl. IS. 3316) of the Act on December 21, 2006, was the environmental law that was most applicable to the mineral industry during 2008. This act incorporated provisions of an older ordinance concerning the assessment of environmental impacts for mining projects (BGBl. IS. 1420), which was approved on July 13, 1990, and revised through slight changes to Article 8 (BGBl. IS. 2819) on December 9, 2006; the Act also incorporated other older ordinances, such as one for the protection of groundwater against pollution caused by certain dangerous substances (BGBl. IS. 542), which was approved on March 18, 1997, and was still applicable to the use and disposal of many of the chemicals used in mining and mineral processing in Germany. The EIA Act requires environmental impact assessments for all domestic waste repositories created or used by the mineral industry. The Federal Mining Act actually stipulates how these repositories are to be constructed and operated (monitored) (Bundesministerium der Justiz, 2007, p. 30; Bundesministerium für Wirtschaft und Technologie, 2009, p. 36-38, 48-50).

Production

In 2008, the 10% increase in the country's production of primary aluminum compared with that of 2007 was almost entirely owing to a full year of production by Hamburger Aluminium-Werke GmbH (HAW). Production of secondary aluminum in Germany decreased by about 16% during the same timeframe, however, mostly owing to secondary aluminum producers' responses to fewer orders for secondary aluminum and alloys by the automotive industry and a decrease in the

amount of aluminum scrap available from the transportation sector. Information was not available concerning a cause of the 33% increase in production of cobalt matte. Production of secondary (smelter and refined) copper increased by about 7% primarily owing to expansion of processing of copper-containing materials, such as electrical scrap and industrial residues at Norddeutsche Affinerie AG's recycling and secondary copper production facilities in Luenen. It was unclear why smelter production of primary copper increased by about 9% whereas production of primary refined copper decreased slightly (table 1; Norddeutsche Affinerie AG, 2008, p. 67-68; 2009, p. 62-63; Trimet Aluminium AG, 2008, p. 32-36; Aleris Europe, 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 61; Norsk Hydro ASA, 2009, p. 8, 63, 67; Wirtschaftsvereinigung Metalle e.V., 2009, p. 114-116, 120-121).

Information concerning the cause of the 12% decrease in production of direct-reduced iron (DRI) was not available. Information was also not available concerning the 22% increase in production of ferrochromium, and this increase appeared in contrast to a slight decrease in production of specialty steels (including stainless steel) in the country to about 9.8 million metric tons (Mt) compared with about 9.9 Mt in 2007. In 2008, production of secondary refined lead increased significantly compared with that of 2007 but was only slightly greater than that of 2005. The lower production of secondary lead in Germany in 2006 and 2007 could have been partly owing to the refurbishing of Recylex S.A. of France's (primary and secondary) lead smelter and refinery at Nordenham, but detailed information concerning annual levels of secondary lead production realized by producers in Germany was not available. The 18% increase in the annual production of platinum-group metals (PGMs) in the country in 2007 (which appeared to be mostly owing to greater recycling of catalytic converters compared with that of 2006) was somewhat reversed in 2008 (-12%), although the level of production was still about 4.5% greater than that of 2006. Production of primary zinc metal decreased by 11% and that of secondary zinc metal decreased by 17%. The reported decreases in production of zinc metal may reflect activity that actually took place before 2007 or early in 2007 rather than in 2008, and the decrease in secondary production may be mostly owing to decreased production in the country following the apparent halt in production by Sudamin Rohstoffe GmbH sometime in 2006 or 2007. Additionally, production of both primary and secondary zinc metal by Ruhr-Zink GmbH may have waned during the year leading up to the closure of the company's zinc refinery at Dattlen at the end of 2008 (table 1; Recylex S.A., 2008, p. 13, 24; 2009, p. 16-17, 71; ArcelorMittal, 2009, p. 64; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 54-56, 64-66; GEA Group AG, 2009, p. 4, 118; Wirtschaftsvereinigung Stahl, 2010).

In 2008, the production of barite decreased by about 11% compared with that of 2007 mostly owing to the closure of the Wolkenhügel Mine in the summer of 2007; the production of fluor spar also decreased by approximately 11% apparently owing to a decrease in production of fluor spar at the Clara Mine (reportedly the only mine still producing fluor spar in the country in either 2007 or 2008). Information was not

available concerning the causes of either the 11% increase in the production of gypsum or the 10% increase in the production of chalk. The reported decrease of 25% in the production of rock salt in the country could simply be because production from the State of Thuringia may not have been included in the 2008 data. The decrease of about 13% in the production of industrial salt brines was at least partially owing to a company response to decreased demand for salt to be used in deicing compounds during a relatively mild winter across the EU at the beginning of 2008 and a late start to winter in the region near the end of 2008. Marketable production of potash in Germany decreased by about 10% owing to decreased production of potash by K+S Aktiengesellschaft (K+S) despite an increase in international prices to an annual average of about \$666 per metric ton of potash compared with about \$177 per metric ton in 2007 (table 1; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 77-84; Helmer, 2009; K+S Aktiengesellschaft, 2009, p. 36).

Production of anthracite and bituminous coal decreased substantially compared with that of 2007 mostly owing to a stoppage of production at the Saar Mine in the State of Saarland that began on February 23 and the closure of the Walsum Mine at the end of June 2008. Production of crude petroleum decreased by about 11% mostly owing to a decrease in production to about 13.5 million barrels (Mbbbl) of oil from the Mittelplate-Dieksand field in 2008 compared with about 15.6 Mbbbl in 2007. Marketable production of natural gas decreased by about 9% mostly owing to decreases in production at 8 of the 10 leading natural gas fields in the country, which were all located in the State of Lower Saxony. In 2008, the project to clean up and remove radioactive material in and around the uranium mine sites of the former Soviet-German mining company WISMUT SDAG in the States of Saxony and Thuringia did not result in any reported production of uranium (Deutsche Welle, 2008; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 35-43, 46-47, 161; Bundesministerium für Wirtschaft und Technologie, 2009, p. 21-23; Landesamt für Bergbau, Energie und Geologie, 2009, p. 8-9, 31-39; Statistik der Kohlenwirtschaft e.V., 2009; RAG Deutsche Steinkohle AG, 2010).

Structure of the Mineral Industry

Since the closure of the last metal mines in 1992, there had been no mining of metallic minerals in Germany. However, many of the leading companies in the global metals processing sector owned and operated significant facilities in Germany. ArcelorMittal (based in Luxembourg) was the leading producer of crude steel in the world and the second ranked producer in Germany. At the end of 2008, the company reduced its ownership share in AG der Dillinger Hüttenwerke (another steel company in Germany) to about 30% compared with about 51% at the end of 2007. ThyssenKrupp AG (based in Duisburg) was the leading producer of crude steel in Germany and the 18th ranked producer of crude steel in the world. Norddeutsche Affinerie AG (based in Hamburg) was the third ranked producer of marketable copper metal in the world and the leading producer of secondary refined copper. The company

was the leading producer of total refined copper in the EU. By October 9, 2008, Salzgitter AG (the third ranked producer of crude steel in Germany) had increased its ownership interest in Norddeutsche to approximately 20%. Norddeutsche planned to change the company name to Aurubis AG in 2009. Xstrata plc was a globally significant miner and producer of zinc metal, and the company owned the leading zinc smelter in Germany. Trimet Aluminium AG was the leading producer of primary aluminum in Germany, and Recylex was the second ranked producer of lead metal in the country (table 2; ThyssenKrupp Steel AG, 2008, p. 1, 13, 25, 30; ArcelorMittal, 2009, p. 1, 3; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 54, 61, 64-66; Norddeutsche Affinerie AG, 2009, p. 24, 179; Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, 2009, p. 23-24, 34-36; Trimet Aluminium AG, 2008, p. 2; World Steel Association, 2009, p. 8; Xstrata plc, 2009, p. 5, 69-73).

S.C.R.-Sibelco NV of Belgium was the leading producer of plastic (ball) clays, quartz, and silica (industrial) sand in the world. At the end of 2008, Sibelco announced that it would change the name of the company's German subsidiary to SIBELCO Deutschland GmbH (from WBB Fuchs GmbH & Co. KG) and SIBELCO Deutschland was the leading producer of kaolin in the country. Other than this subsidiary of a multinational company, family-owned small and medium-scale enterprises (SMEs) in the Westerwald region of western Germany accounted for almost all of the remainder of production of ceramic, kaolinitic, and plastic (ball) clays in the country. S&B Industrial Minerals S.A. of Greece was the leading producer of bentonite in Germany and the EU and the second ranked producer of bentonite in the world. The company mined the country's leading bentonite deposits in the southeast corner of the country. S&B Industrial Minerals was also the leading producer of fluxes for continuous casting of crude steel in the world. HeidelbergCement AG (based in Heidelberg) was the leading producer of cement in the country and the third ranked producer in the world. Most of the leading private cement companies in the world also produced cement in Germany. K+S was the leading producer of potash and salt (NaCl) in the EU; it was the second ranked producer of salt and the fourth ranked producer of potash in the world (table 2; Westerwälder Zeitung, 2008; Arbeitsgemeinschaft Westerwald-Ton e.V., 2009; HeidelbergCement AG, 2009, p. 3; K+S Aktiengesellschaft, 2009, p. 16-17, 25-28; S&B Industrial Minerals S.A., 2009, p. 11, 16-17, 22-23).

In 2008, RWE Power AG (based in Essen) accounted for about 55% of the total production of lignite in Germany, and about 89% of the company's lignite production was used to generate electricity domestically. RWE was the leading producer of electricity in Germany and the third ranked producer in the United Kingdom. About 91% of all the lignite produced in Germany was used domestically to produce electricity. Reliable information concerning the individual production capacities of the hard coal mines in Germany was not available, especially as production may have been decreasing as these mines continue to get nearer to their expected closure dates (tables 1, 2; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 42-43; Bundesministerium für Wirtschaft und Technologie, 2009, p. 12, 15; Gesamtverband Steinkohle e.V., 2009,

p. 10-11; RWE Aktiengesellschaft, 2009, p. 1, 82; Statistik der Kohlenwirtschaft e.V., 2009).

Commodity Review

Metals

Aluminum.—Trimet Aluminium AG reopened Hamburger Aluminium-Werke (HAW) on May 19, 2007, and restarted production of primary aluminum from the last remaining electrolytic oven in the smelting plant at HAW on December 14, 2007. The automobile industry was the leading consumer of aluminum produced in Germany, and supplies of scrap aluminum were affected by the decrease in sales (and trade-ins) of vehicles and other transportation equipment in the country during 2008. In 2008, Hydro invested more than 25 million euros in new aluminum recycling furnaces in Hamburg and Neuss. Together, these furnaces would have a recycling capacity of 100,000 metric tons per year of aluminum (Trimet Aluminium AG, 2008, p. 32-36; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 61-62; Gesamtverband der Aluminiumindustrie e.V., 2009; Norsk Hydro ASA, 2009, p. 8-10, 63, 67; Wirtschaftsvereinigung Metalle e.V., 2009, p. 114-116, 120-121).

Cobalt.—Any producers of cobalt metal in Germany were believed to rely exclusively on secondary materials as sources of raw materials for production (Doris Homberg, Bundesanstalt für Geowissenschaften und Rohstoffe, written commun., February 26, 2010). Possible producers may have included Aura Metallurgie GmbH, Gesellschaft für Elektrometallurgie mbH, and Nickelhütte Aue GmbH, but information concerning annual levels of production of cobalt by company or their cobalt production capacities was not available (Metal Bulletin plc, 2006, p. 74, 76).

Copper.—The volume of throughput of copper concentrates at Norddeutsche's primary copper production facilities in Hamburg appeared to decrease slightly compared with that of 2007, which corresponded with a slight decrease in the production of primary refined copper in Germany. However, the potential for a slight decrease in throughput of copper concentrates did not appear to agree with the significant increase in the production of primary smelter copper in the country. Norddeutsche's Hamburg plant accounted for the vast majority of the production of primary (smelter and refined) copper in Germany, and production was stopped there for 12 days in October 2008 for scheduled maintenance and preparatory work for eventually expanding the capacity to process copper concentrates at the plant (table 1; Norddeutsche Affinerie AG, 2008, p. 67-68; 2009, p. 62-63; Aurubis AG, 2009, p. 7, 31-32, 56, 65; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 62-63).

Lead.—Recylex's lead smelter and refinery at Nordenham was the second ranked producer of secondary refined lead in the country. Production of secondary lead at Nordenham was primarily from the recycling of batteries at two locations in France and one in Oker, from which the recovered lead was sent to the Nordenham plant to be melted down and used to produce secondary refined lead. Recylex reported that total

production of refined lead at Nordenham increased to about 130,000 t compared with 125,000 t in 2007, but separate figures for production of secondary refined lead there were not available. The leading producer of secondary refined lead in the country was BERZELIUS Metall GmbH, but data on realized annual production by this company were not available (Recylex S.A., 2008, p. 13, 24; 2009, p. 16-17, 71; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 64-65).

Platinum-Group Metals.—Information concerning the annual production of platinum-group metals (PGMs) by individual producers in the country was not available. In 2008, about 45% of the total production of PGMs in Germany was from secondary materials, and primary production as a byproduct of production of primary refined copper accounted for a significant portion of total production of PGMs in the country (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 69-72; Norddeutsche Affinerie AG, 2009, p. 173).

Zinc.—During 2008, GEA Group AG attempted to find a buyer for Ruhr-Zink but ended up closing Ruhr-Zink's plant in Datteln on December 31, citing significant losses by Ruhr-Zink during the year. Recylex processed 32,000 t of zinc scrap compared with 35,000 t in 2007, and claimed that there was less demand from zinc refineries for the zinc oxides that the company produced (from secondary materials) compared with that of 2007. Recylex also produced zinc oxides for refining in Germany by processing steel mill dust in Waëlz rotary kilns at the company's plant at Oker, but these zinc-rich particles were in shorter supply during the second half of the year as production of crude steel in the country began to decrease (Recylex S.A., 2008, p. 7, 12-13, 24; 2009, p. 2, 16-18; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 66; GEA Group AG, 2009, p. 4, 30, 118-119).

Industrial Minerals

Potash.—K+S reported hiring additional workers in 2008 and proposed restarting a potash manufacturing plant near Rossleben, which had been closed since the 1990s. Even if demand in Germany and the EU decreases in 2009, it is possible that the company could sell surplus potash production to China because demand for the fertilizer material in that country reportedly increased during 2008 owing to less rainfall than in 2007 and the other major suppliers of potash to China appeared to still be in negotiations for potash supply contracts through the beginning of 2009 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 77-78, 92; Helmer, 2009; K+S Aktiengesellschaft, 2009, p. 11, 13, 1736, 41, 47, 110).

Mineral Fuels and Related Materials

Coal.—Hard coal mining was centered in the Ibbenbüren, the Ruhr, and the Saar coalfields in Germany and was uneconomical without a subsidy. The lack of production of hard coal at the Walsum Mine during the second half of the year accounted for almost all the decrease in production to 14.2 Mt compared with about 15.9 Mt in 2007 in the Ruhr coal mining district. Production of hard coal at the Saar Mine was stopped because of significant tremors in the area,

and RAG Deutsche Steinkohle AG decided to permanently abandon production from the Schwalbach deposit at the mine owing to ongoing seismic instability. In 2008, the Saar Mine produced about 957,000 t of marketable coal compared with about 3.5 Mt in 2007 (Deutsche Welle, 2008; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 41-44, 161; RWE Aktiengesellschaft, 2009, p. 64; Statistik der Kohlenwirtschaft e.V., 2009; RAG Deutsche Steinkohle AG, 2010).

Natural Gas.—In 2008, Germany's reserves of natural gas were estimated to be about 194 billion cubic meters, which would imply that reserves of natural gas in the country decreased by about 25 billion cubic meters (11%) compared with that of 2007. Production out of the deposit underlying the Rotenburg-Taaken complex of fields led all other fields in production of natural gas in the country (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 39-40; Landesamt für Bergbau, Energie und Geologie, 2009, p. 8-9, 34-39, 42-43).

Petroleum.—The Mittelplate-Dieksand field was the leading oil-producing field in Germany. Total reserves of crude petroleum in the country were estimated to be about 270 Mbbl (converted from a reported estimate of 37 Mt) of oil, which was a decrease of about 8% compared with that of 2007 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 35-38; Landesamt für Bergbau, Energie und Geologie, 2009, p. 8-9, 29-34, 41).

Uranium.—Although the WISMUT cleanup project was in its 18th year in 2008, it was estimated to be only about 80% complete by the end of the year and was not expected to be completed until at least 2017. Some uranium was expected to be recovered there again in 2009, although none was reported as produced in 2008 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 46-47; Bundesministerium für Wirtschaft und Technologie, 2009, p. 21-23; Landesamt für Bergbau, Energie und Geologie, 2009, p. 8-9, 29-39).

Outlook

In sectors of the mineral industry where the downturn in mineral commodity prices is not especially pronounced (or is short lived), there may not be much (if any) increase in the rate of relocation of production capacity to lower-cost regions of the world provided that processing companies in Germany are able to reduce costs (including by reducing production rates). In the long run, however, mineral processing companies in Germany may face increased pressure to reduce energy, labor, and material costs within the country should the uncertainty regarding mineral commodity prices continue beyond 2009 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 25-27).

Owing to decreased demand for most products of the metals processing and manufacturing sector in Germany, production was expected to decrease substantially through at least 2009. Energy costs and costs for raw material inputs into metal processing were expected also to decrease significantly in Germany compared with that of 2008, which could allow producers of processed metals to keep producing (possibly at levels well below capacity) at some of the lower-cost operations in the country. Production of aluminum was expected to

decrease substantially compared with that of 2008; aluminum producers in the country had already begun to reduce staff working hours and production drastically during the final quarter of 2008, and they continued this strategy through the first quarter of 2009 in response to a decrease in orders of aluminum products (mostly from the automotive industry). Norsk Hydro was expected to close the aluminum smelter in Neuss sometime in 2009 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 17-19, 61-62; Bundesministerium für Wirtschaft und Technologie, 2009, p. 30-33; Gesamtverband der Aluminiumindustrie e.V., 2009; Moores, 2009; Wirtschaftsvereinigung Metalle e.V., 2009, p. 114-116, 120-121).

Production of steel was expected to decrease in response to an expected decrease in demand in 2009, and only a gradual recovery in the country's production of crude steel is expected for 2010 and beyond. ThyssenKrupp has reported a decrease of about 40% in the current value of customer orders for crude steel during the fiscal year from September 2008 through September 2009 compared with that of the previous fiscal year. Citing continued uncertainty concerning steel markets, ThyssenKrupp postponed many investment projects and mainly directed capital investment at simply maintaining existing crude steel production facilities. The company expected that demand for crude steel might increase by about 10% in 2010 compared with that of 2009, but that would still not come very close to approaching the level of demand in 2008. Part of the reason for the company's expectation that the recovery in demand for steel would be slower than the decrease in 2008 and 2009 is that the automobile industry was not expected to increase production very rapidly. Automobile production in Germany might even decrease in 2010 compared with that of 2009 because a Government subsidy program to trade in used cars in the country is not expected to continue into 2010. Therefore, the company expected to begin to increase production of crude steel in 2010 but was uncertain how long it might take to attain a level of production on par with that of 2008 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 17-19, 53-55; Bundesministerium für Wirtschaft und Technologie, 2009, p. 30-32; ThyssenKrupp AG, 2009, p. 5, 93-98, 107-117; 166-169; Wirtschaftsvereinigung Metalle e.V., 2009, p. 120-121).

In 2009, production of zinc metal in Germany could be about one-half as much as in 2008 (following the closure of Ruhr-Zink), and it is uncertain whether Ruhr-Zink will be reopened or if production of zinc metal in Germany will increase again in 2010. In 2009, production of refined copper in Germany may not decrease as much as that of other processed metals owing to the expansion of lower-cost production capacity in the country, expectations that China's and other emerging economies' demand for copper will remain strong, and expectations that higher-cost producers of refined copper outside of Germany may have to shut down production, at least temporarily (Aurubis AG, 2009, p. 10-11, 28-29, 61-65; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 17-19, 62-66; Bundesministerium für Wirtschaft und Technologie, 2009, p. 30-34; Wirtschaftsvereinigung Metalle e.V., 2009, p. 114-116)

In 2008, K+S invested about 15% more than in 2007, but about one-half of the company's capital expenditure during

the year was just to maintain production capacity. As a result of the global economic downturn, K+S expected a decrease in cultivated area worldwide, on average, during 2009. In response to an expected decrease in fertilizer demand in 2009, K+S expected to decrease the company's production of potash substantially compared with that of 2008. However, the company also expected that possible grain shortages in 2009 would lead to a substantial increase in agricultural land use and fertilizer demand in 2010, which K+S expected could provide adequate market conditions for the company to increase production of potash substantially. In 2008, the company was reportedly examining projects to enhance its base stock of available mineral raw materials to be ready to increase production if global demand for potash were to increase substantially after 2009, but information concerning company approval of a specific project was not available (K+S Aktiengesellschaft, 2009, p. 10-11, 13, 17, 40).

Metal foundries are an important source of demand for such industrial minerals as bentonite and silica in Germany, and expected decreases in foundry production in 2009 and beyond could have a corresponding effect on levels of production of these industrial minerals in the country. Similarly, other industrial minerals produced in Germany are used in the country's metallurgical sector (such as fluorspar being used in the manufacturing of both aluminum and steel), and trends in production by the metallurgical sector in the country could help determine the production of these industrial minerals. Through at least 2009, decreases in the number of construction projects are also expected to result in decreased demand and lead to reduced mine production of industrial minerals, which are used primarily in Germany's construction sector (ICR Research, 2008; Bundesministerium für Wirtschaft und Technologie, 2009, p. 23-30; Moores, 2009; ThyssenKrupp AG, 2009, p. 97).

RAG Deutsche Steinkohle AG expected to continue mining the Grangeleisen and the Wahlschied hard coal veins at the Saar Mine until the expected final closure of the entire mine in July 2012, but the company expected production capacity to be (at most) one-half of what it was in 2007. The smaller-scale Fischbach Mine was already closed at the end of 2008. In addition, the Lippe Mine in the Ruhr mining district was expected to be closed at the beginning of 2009, the Ost Mine at the end of September 2010, and the West Mine at the end of 2012 or the beginning of 2013. Starting in 2013, it is expected that only the Augusta Victoria/Blumenthal, Ibbenbüren, and Prosper-Haniel Mines would still be in production with an estimated capacity to produce not more than 12 million metric tons per year (Mt/yr) of anthracite and bituminous coal, and it is uncertain whether any of these three mines would still be in operation after the scheduled termination of the Government's hard coal subsidy in 2018 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 35-36, 42-43; Bundesministerium für Wirtschaft und Technologie, 2009, p. 11-15; Gesamtverband Steinkohle e.V., 2009, p. 10; RAG Deutsche Steinkohle AG, 2010).

Production of lignite in Germany was expected to decrease by about 3% in 2009 compared with that of 2008, but the long-run production of lignite was expected to remain close to the 2008 level unless the implementation of alternative

energy technologies or the increased use of different fuels significantly affects the amount of lignite used to generate electricity. RWE was developing plans for the construction of a new lignite-fired powerplant near Cologne, where the company expected to be able to sequester about 90% of the carbon dioxide emissions in nearby geologic rock formations. Final company decisions on whether to proceed with this and some other projects to modernize RWE's lignite and hard-coal-fired electricity generation capacity were delayed owing to uncertainty concerning possible new EU climate resolutions, but the company reported that the new lignite-fired powerplant could be commissioned as early as 2014 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 35-36, 42-43; Bundesministerium für Wirtschaft und Technologie, 2009, p. 11-15; RWE Aktiengesellschaft, 2009, p. 21, 37-39, 54-55).

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TABLE 1
GERMANY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
METALS					
Aluminum:					
Alumina ^c	835	830	850	1,000	1,000
Aluminum hydroxide, Al ₂ O ₃ equivalent	1,174	1,255	1,393	1,388	1,395
Metal:					
Primary	667,839	647,934	515,539	551,030	605,876
Secondary	703,756	718,291	795,668	857,619 ^r	720,898
Total	1,371,595	1,366,225	1,311,207	1,408,649 ^r	1,326,774
Cadmium, metal, refinery including secondary ^c	640	640	640	400	400
Cobalt, matte, including shavings and scrap	721	601	686	685	913
Copper, metal:					
Smelter:					
Primary	278,600	257,200	273,800	270,200 ^r	295,000 ^p
Secondary	262,600	251,400	266,300	273,400 ^r	293,300 ^p
Total	541,200	508,600	540,100	543,600 ^r	588,300 ^p
Refined:					
Primary	283,686	293,812	312,092	301,702	300,470
Secondary	368,956	344,446	350,246	363,815	389,300
Total	652,642	638,258	662,338	665,517	689,770
Gallium, crude ^c	12	12	12	12	12
Indium, refined ^c	10	10	10	10	10
Iron and steel:					
Ore, run of mine:²					
Gross weight	412	360	416	422	455
Fe content	43	38	44	44	48
Metal:					
Pig iron	30,018	28,854	30,362	31,149	29,111
Direct reduced iron	593	440	580	590 ^r	520
Ferroalloys:					
Ferromanganese	24,857	22,672	26,710	22,030	26,960
Other ^c	26,500 ³	25,400 ³	24,100 ³	5,000	5,000
Steel, crude	46,377	44,524	47,224	48,550	45,833
Semimanufactures	39,976	37,771	41,174	41,999	39,805
Lead, metal, refined:					
Primary	133,710 ^r	118,778	113,760 ^r	110,934	113,200 ^p
Secondary	279,780 ^r	298,915 ^r	265,190 ^r	244,147	301,900 ^p
Total	413,490 ^r	417,693 ^r	378,950 ^r	355,081	415,100 ^p
Magnesium, metal including castings	26,985	27,282	30,556	30,791	29,818
Platinum-group metals, metal, refined	95,135	104,725	116,350	137,645	121,597
Selenium, metal ^c	650 ^r	680 ^r	720 ^r	700 ^r	690
Silicon, metal	28,773	29,349	35,500 ^e	35,254	35,000 ^e
Silver, metal, refined, including secondary ⁴	1,343 ^r	1,386 ^r	1,527 ^r	1,673 ^r	1,783
Tin, alloys	5,431	5,612	6,046	6,674	6,114
Zinc, metal:					
Primary	252,133	245,140	245,883	237,638	211,370
Secondary	129,887	89,751	96,683	97,253	80,910
Total	382,020	334,891	342,566	334,891	292,280
INDUSTRIAL MINERALS					
Abrasives, manufactured	72,565	73,620	75,817	84,666	94,566
Aluminum salt slag, Al ₂ O ₃ equivalent ^c	200	200	200	200	200
Barite, marketable (contained BaSO ₄)	93,624	88,591	85,524	88,265	78,941
Boron compounds, manufactured, including boric acid and oxide	168,841	203,475	222,169	217,885	204,411
Bromine compounds, including oxide	248	274	431	1,612	1,600 ^e
Cement:					
Clinker, intended for market	26,281	24,378	24,921	26,992	25,366 ^p
Hydraulic	31,854	31,009	33,630	33,382	33,581 ^p

See footnotes at end of table.

TABLE 1—Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
INDUSTRIAL MINERALS—Continued					
Chalk, natural, including ground	1,005	1,068	1,309	1,358	1,495
Clays, natural:					
Bentonite	405	352	364	385	414
Ceramic and refractory clays ^c	4,400	4,430	4,600	4,400	4,140
Of which, fire clay and chamotte	176	176	194	252	267
Kaolin, marketable	3,752	3,768	3,815	3,843	3,612
Other, unspecified	197	185	509	467	182
Diatomite ^{e,5}	1,500	1,500	1,500	1,500	1,500
Feldspar	182,842	168,640	167,332	171,303	161,416
Fluorspar, acid-grade	33,203	35,364	53,009	54,359	48,519
Graphite, mine output	3,155	2,638	--	--	--
Gypsum and anhydrite:					
Natural	1,579	1,644	1,771	1,898	2,112
Byproduct of flue-gas desulfurization ^c	7,660	7,640	7,490	7,100 ^r	7,000 ^p
Lime, quicklime, dead-burned dolomite	6,947	6,823	7,119	7,218	7,313
Magnesium compounds, byproduct of potash mining	1,197	1,290	1,203	1,357	1,418
Nitrogen, N content of ammonia	2,741	2,789	2,718	2,746	2,819
Peat, natural ^c	119,961 ⁶	116,000	108,000	112,000 ^r	98,900
Phosphoric acid, manufactured, P ₂ O ₅ content	37,810	37,374	34,373	31,684	31,756
Pigments, iron oxide ^c	4,000	4,000	4,000	4,000	4,000
Potash, K ₂ O content:					
Crude	4,439	4,434	4,385	4,406	4,046
Marketable	3,627	3,664	3,625	3,637	3,280
Salt, NaCl content, marketable:					
Evaporated salt, including marine salt	572	594	593	592 ^r	580
Industrial brines	10,432	9,904	9,590	10,395 ^r	9,084
Rock salt and other brines	7,833	8,834	9,663	7,819	5,855
Total	18,837	19,332	19,846	18,806 ^r	15,519
Siliceous earth, marketable	54,801	50,399	53,282	51,980	52,003
Soda ash (Na ₂ CO ₃), manufactured	1,438	1,533	1,515	1,510	1,567
Stone, sand and gravel:					
Stone, crude:					
Dimension, including partially worked	229	212	219	200	215
Of which, dolomite and limestone	76	75	75	63	68
Crushed, not including chalk	152,985	150,747 ^r	162,168	152,790	156,098
Dolomite and limestone, not for cement manufacture	23,700	20,600	22,400	22,800	21,300
Gravel, natural:					
Building gravel	65,566	62,498	68,706	65,370	65,937
Crude, including flint and pebbles	12,889	12,753	13,301	12,928	12,631
Other gravel, including quartzite	10,898	12,014	13,326	12,639	11,911
Sand, natural:					
Building sand	63,619	57,463	59,767	56,851	56,748
Silica sand, including glass sand and quartz sand	8,162	7,681	7,703	8,382	8,186
Other, including from granite and pegmatite	13,239	13,185	13,578	12,796	13,416
Total sand and gravel	174,373	165,594	176,381	168,966	168,829
Strontium carbonate, manufactured ^c	80	80	80	80	80
Sulfur:					
Marketable	939	1,055	1,114	1,093	1,030
Byproduct:					
Metallurgy ^c	591 ⁶	600	600	600	600
Natural gas and petroleum	1,503	1,585	1,686	1,637	1,709
Total ^c	2,094 ⁶	2,190	2,290	2,240	2,310

See footnotes at end of table.

TABLE 1—Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
MINERAL FUELS AND RELATED MATERIALS					
Carbon black thousand metric tons	340	333	631	665	607
Coal:					
Anthracite and bituminous, marketable do.	25,691 ^r	24,713 ^r	20,674 ^r	21,307	17,077
Lignite do.	181,926	177,908	176,324	180,412 ^r	175,316
Coke:					
Of anthracite and bituminous coal do.	8,479	8,397	8,372	8,432 ^r	8,213
Of lignite do.	187	173	181	173	177
Fuel briquets:					
Of anthracite and bituminous coal do.	102	92	96	89	--
Of lignite, including dust and dried do.	1,435	1,490	1,662	1,328	1,631
Gas:					
Manufactured:					
Blast furnace ^e million cubic meters	9	9	9	9	9
Coke oven do.	974	974	958	970	969
Total ^e do.	983	983	967	979	978
Natural:					
Gross do.	20,264	19,762	19,667	17,966	16,447
Marketable do.	19,333	18,666	18,443	16,884	15,377
Petroleum: ⁷					
Crude thousand 42-gallon barrels	25,800	26,200	25,800	25,300 ^r	22,400
Refinery products:					
Liquefied petroleum gas do.	36,710 ^r	37,130 ^r	36,800 ^r	38,560 ^r	36,390
Distillate fuel oil do.	370,000	390,000	380,000	380,000	370,000
Residual fuel oil do.	77,300 ^r	74,500 ^r	76,200 ^r	75,300 ^r	67,500
Gasoline, including aviation do.	210,000	210,000	210,000	200,000	200,000
Kerosene and jet fuel do.	34,000	32,700 ^r	33,900 ^r	35,200 ^r	36,500
Naphtha do.	94,000	94,000	90,000	86,000	87,000
Refinery gas do.	51,300	50,600	49,100	48,300	47,800
Bitumen, bituminous mixtures, and other residues do.	29,000	32,100 ^r	30,900 ^r	31,300 ^r	33,900
Lubricants and miscellaneous oils do.	15,000	14,000	16,000	17,000	17,000
Petroleum coke do.	10,300 ^r	10,900 ^r	11,000	10,600 ^r	11,500
Mineral jelly, waxes, and paraffins do.	1,800	1,800	2,000	2,100	1,300
Other do.	10,900 ^r	9,440 ^r	9,850 ^r	10,700 ^r	8,290
Total ^e do.	940,000	957,000 ^r	946,000 ^r	935,000 ^r	917,000
Uranium concentrate, U ₃ O ₈ content	91	111	77	48	--

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

¹Table includes data available through May 7, 2010.

²Iron ore is used domestically as an additive in cement and other construction materials but is of too low a grade to be used in the steel industry.

³Estimated from reported total marketed production of ferroalloys [Statistische Bundesamt, 2007, Fachserie 4, Reihe 3.1—Produzierendes Gewerbe, Produktion im Produzierenden Gewerbe, Jahr 2006: Wiesbaden, Germany, Statistische Bundesamt, April 30, p. 176].

⁴Revised to include silver metal production as a byproduct from processing copper ores and concentrates and other imported mineral materials containing silver.

⁵Estimated figures revised according to information that the main producer stopped producing in 1994.

⁶Reported figure.

⁷All figures were converted to barrels from those reported in metric tons according to data from Mineralölwirtschaftsverband e.V., 2009, Jahresbericht—Mineralöl-Zahlen, 2008: Berlin, Germany, Mineralölwirtschaftsverband e.V., May, p. 48, 75, 79, and reflect significant digits of conversion factors.

TABLE 2
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2008¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Abrasives (silicon carbide)	ESK-SiC GmbH	Plant at Grefrath, Cologne	65
Alumina	Almatis GmbH (Dubai International Capital LLC)	Plant at Ludwigshafen	NA
Do.	Nabaltec AG	Plant at Schwandorf	120
Do.	Aluminium Oxid Stade GmbH (DADCO Alumina & Chemicals Ltd., 100%)	Plant at Stade	1,000 ^c
Do.	Martinswerk GmbH (Albemarle Corp., 100%)	Plant at Bergheim	350
Aluminum	Hydro Aluminium Deutschland GmbH (Norsk Hydro ASA, 100%)	Rheinwerk primary smelter at Neuss	230
Do.	Metallhüttenwerke Bruch GmbH	Secondary foundry alloy plant at Dortmund; secondary cast alloy plants at Asperg and Bad Saeckingen	110
Do.	Aleris Recycling GmbH (Aleris International Inc., 100%)	Secondary smelters: Ertwerk at Grevenbroich, Innwerk at Toeing am Inn, and Neckarwerk at Deizisau	320
Do.	Trimet Aluminium AG	Smelter at Essen-Borbeck	175 ^c
Do.	Hamburger Aluminium-Werke GmbH (Trimet Aluminium AG, 100%)	Primary smelter at Hamburg	133
Do.	Corus Aluminium Voerde GmbH (Tata Steel Ltd., 100%)	Primary smelter at Voerde, North Rhine-Westphalia	90
Aluminum, hot-rolled products	Aluminium Norf GmbH [Novelis Inc. (Hindalco Industries Ltd., 100%), 50%, and Hydro Aluminium Deutschland GmbH, 50%]	Lippenwerk at Luenen (secondary) and rolling mill at Neuss	1,500
Aluminum salt slag	Alsa Technologies GmbH (Agor AG, 100%)	Plants at Hannover, Luenen, and Toeing	380
Do.	K+S Entsorgung GmbH (K+S Aktiengesellschaft, 100%)	REKAL plant at Sigmundshall	100
Arsenic, metal	metric tons PPM Pure Metals GmbH ² (Recylex S.A., 100%)	Plant at Langelsheim	5
Do.	do. Reinstmetalle Osterwieck GmbH (PPM Pure Metals GmbH, ² 100%)	Plant at Osterwieck	NA
Barite	Sachtleben Bergbau GmbH	Clara Mine in the Black Forest and plant at Wolfach, and Dreislar Mine at Medebach-Dreislar	87
Do.	Deutsche Baryt-Industrie Dr. Rudolf Alberti GmbH & Co. KG (Sachtleben Bergbau GmbH, 75%, and other private, 25%)	Wolkenhügel Mine ³ in the Harz Mountains and plant at Bad Lauterberg	50
Bentonite	Süd-Chemie AG	Mining near Gammelsdorf, Bavaria, and plants at Moosburg, Duisburg, and Heufeld	500
Do.	S&B Industrial Minerals GmbH (S&B Industrial Minerals S.A., 100%)	Mining in region between Landshut and Mainburg, Bavaria	400
Do.	do.	Stollberg plant at Oberhausen	200 ^c
Do.	do.	Plant at Neuss	50
Do.	Kärlicher Ton- und Schamotte-Werke Mannheim & Co. KG (KTS)	Quarry at Muelheim-Kaerlich	50
Calcium carbonate, natural, ground	Alpha Calcit Fullstoff GmbH & Co. KG	Plant at Cologne	250
Do.	Omya GmbH (Omya AG, 100%)	Plants at Burgberg, Emden, Lagerdorf, and Sohlde, and another plant near Hamburg	2,250
Do.	Eduard Merkle GmbH & Co. KG	Mine at Ulm, Blaubeuren	NA
Calcium carbonate, natural, including chalk	Vereinigte Kreidwerke Dammann KG (Omya AG, 100%)	Quarries and plants at Laegerdorf, on Ruegen Island, and at Soehlde	500
Cement	HeidelbergCement AG	Plant at Burglengenfeld; two plants at Ennigerloh; two plants at Geseke; plants at Koenigs Wusterhausen, Leimen, Paderborn, Mainz-Weisenau, and Schelklingen; the Lengfurt plant at Triefenstein; and plant at Wetzlar	9,500 ^c
Do.	Dyckerhoff AG (Buzzi Unicem SpA, 88.37%, and other private, 11.63%)	Plants at Deuna, Geseke, Goellheim, Lengerich, Neuss, Neuwied, and the Amöneburg plant at Wiesbaden	7,200
Do.	CEMEX Deutschland AG (CEMEX S.A. de C.V., 100%)	Two plants at Beckum; plants at Dortmund, Duisburg, Eisenhuettenstadt, and Ruedersdorf	6,000

See footnotes at end of table.

TABLE 2—Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2008¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement—Continued	SCHWENK Zement KG	Plants at Allmendingen, Bernburg, Heidenheim-Mergelstetten, and Karlstadt	5,000 ^c
Do.	Holcim (Deutschland) AG (Holcim Ltd., 88.9%, and other private, 11.1%)	HANSA plant at Bremen, plants at Laegerdorf and Rostock, and the Höver plant at Sehnde	3,600
Do.	Lafarge Zement GmbH (Lafarge S.A., 100%)	Plants at Kall-Soetenich, Karsdorf, and Walzbachtal	3,500
Do.	Holcim (Baden-Württemberg) AG (Holcim Ltd., 100%)	Plant at Dotternhausen	1,600
Do.	TEUTONIA Zementwerk AG (HeidelbergCement AG, 94.2%, and other private, 5.8%)	Plant at Hannover	900
Do.	Märker Zement GmbH	Plants at Harburg and Lauffen	NA
Clay, including ball and refractory clays	Stephan Schmidt KG	Tonbergbau Grube Anton open pit mine, Dornburg-Langendernbach, Müllenbach and Thewald Mines, Hoehr-Grenzhausen; Wiesa-Thonberg and Cunnersdorf quarries, Kamenz-Wiesa, Westerwald	1,400 ^c
Do.	Marx Bergbau GmbH & Co. KG (Stephan Schmidt KG, 100%)	Lämmersbach and Meudt Mines, Ruppach-Goldhausen quarry, Dornburg-Langendernbach, Westerwald	350
Do.	Goerg & Schneider GmbH & Co. KG	Quarry and main plant at Boden, others at Mogendorf, Goddert, Siershahn, Wirges/Staudt, and Kettenbach/Taunus, Westerwald region; others in Saxony and Eifel regions	NA
Do.	Mittelhessische Tonbergbau GmbH (Goerg & Schneider GmbH & Co. KG, 50%, and Stephan Schmidt KG, 50%)	Quarry and plant in the Giessen/Lahn region	100
Do.	Rohstoffgesellschaft GmbH Ponholz	Mine and chamotte plant at Maxhuetten-Haidoff, and Aufhofweiher Mine, Bavaria	100
Do.	Adolf Gottfried Tonwerke GmbH	Quarries and plant near Grosseirath, Coburg, Bavaria	100
Coal, anthracite and bituminous	Deutsche Steinkohle AG (RAG Aktiengesellschaft, 100%)	Augusta Victoria/Blumenthal, Lippe, Ost, Prosper-Haniel, and West Mines, Ruhr region, North Rhine-Westphalia	14,500 ^c
Do.	do.	Saar Mine, Saar Basin, Saarland	2,000 ^c
Do.	do.	Ibbenbüren Mine, Steinfurt District, North Rhine-Westphalia	2,100
Coke	Deutsche Steinkohle AG (RAG Aktiengesellschaft, 100%)	Pitside coking plant at the Prosper-Haniel Mine	2,000 ^c
Do.	ThyssenKrupp Steel AG	Schwelgern plant at Duisburg	2,100
Do.	Hüttenwerke Krupp Mannesmann GmbH (ThyssenKrupp Steel AG, 50%; Vallourec & Mannesmann Tubes SA, 20%; Mannesmannröhren-Werke GmbH, 30%)	Plant at Duisberg-Huckingen steel complex	1,100
Copper, refined	Norddeutsche Affinerie AG (Salzgitter AG, 20%; other private investors, 40%; and institutional investors, 40%)	Primary smelter and refinery and secondary plant at Hamburg	500 ^c
Do.	Hüttenwerke Kayser AG (Norddeutsche Affinerie AG, 100%)	Secondary plant and refinery at Luenen	210 ^c
Dolomite	Rheinkalk Hagen-Halden GmbH & Co KG (Lhoist NV, 100%)	Steinbruch-Donnerkuhle quarry and Hönnetal plant at Menden, and plant at Hagen-Halden	7,500
Dolomite and lime	Geomin Erzgebirgische Kalkwerke GmbH	Underground mines at Hermsdorf and Lengendorf	NA
Feldspar	Amberger Kaolinwerke GmbH—Eduard Kick GmbH & Co. KG (Quarzwerte GmbH, 100%)	Mine at Hirschau, Bavaria	135
Do.	Saarfeldspatwerke H. Huppert GmbH & Co. KG	Mine at Oberthal, Gudesweiler, Saarland	60
Do.	Gottfried Feldspat GmbH	Mine at Freihung-Thansuss, Weiden, Bavaria	15
Feldspar, kaolin, and quartz	Gebrüder Dorfner GmbH & Co Kaolin - und Kristallquartzsand Werk KG	Mine near Hirschau, Bavaria	NA
Ferrochrome	Elektrowerk Weisweiler GmbH (Kermas Ltd., 100%)	Plant at Eschweiler-Weisweiler, near Aachen	30

See footnotes at end of table.

TABLE 2—Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2008¹

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Fluorspar		Sachtleben Bergbau GmbH	Clara Mine in the Black Forest and plant at Wolfach	55 ^c
Gallium	metric tons	Geo Gallium S.A. (Mining & Chemical Products Ltd., 50%, and Recapture Metals Inc., 50%)	Ingal plant at Stade	35
Do.	do.	PPM Pure Metals GmbH ² (Recylex S.A., 100%)	Plant at Langelsheim	NA
Graphite, manufactured		Graphit Kropfmühl AG	Plant at Kropfmuehl, Passau	20
Do.		do.	Plants at Bad Godesberg and Wedel, Holstein	8
Gypsum		VG-ORTH GmbH & Co. KG	Mine and plant at Stadtoldendorf, and plants at Osterode, Spremberg, and Witzenhausen	150
Do.		Gyproc GmbH (Lafarge S.A., 100%)	Mines and plant in Lower Saxony	110
Iron, blast furnace		ThyssenKrupp Steel AG	Two blast furnace plants at Hamborn and Schelgern	12,000
Iron, direct reduced		ArcelorMittal Hamburg GmbH, (ArcelorMittal, 100%)	Plant at Hamburg	600 ^c
Iron oxide, pigments		Lanxess AG	Plant at Krefeld-Uerdingen	300
Kaolin		SIBELCO Deutschland GmbH (S.C.R.- Sibelco NV, 100%)	25 quarries and 8 plants, including 2 at Ransbach and Kannenbäckerland plant in Hoehr-Grenzhausen, Westerwald region; also including quarries and plants of Kaolin- und Tonwerke Seilitz-Loethain, Saxony region	2,000
Do.		Amberger Kaolinwerke GmbH—Eduard Kick GmbH & Co. KG (Quarzwerte GmbH, 100%)	Mines at Caminau, Hirschau, Kemmlitz, and Schnaittenbach	350
Do.		Rohstoffgesellschaft mbH Ponholz (Teublitzler Ton GmbH, 51%, and Erich Koller Group, 49%)	Mines at Maxhutte-Haidhof and Auhofweiher	150
Do.		Erbisloh Lohrheim GmbH (Erbisloh Family, 100%)	Mine at Lohrheim, Rheinland-Pfalz	30
Lead		Weser Metall GmbH (Recylex S.A., 100%)	Primary and secondary smelter and refinery at Nordenham	145
Do.		BERZELIUS Metall GmbH [Eco-Bat Technologies Ltd. (Quexco Inc., 100%), 100%]	Primary smelter at Stolberg and secondary smelters at Braubach am Rhein and Freiberg/Sachsen	200
Do.		Sudamin MHD GmbH	Refinery at Duisburg	120
Do.		Norddeutsche Affinerie AG	Refinery at Hamburg	50
Lignite		RWE Power AG (RWE Aktiengesellschaft, 100%)	Open pit mines in Rhenish mining area: Bergheim, Garzweiler, Inden, and Hambach	105,000
Do.		Vattenfall Europe Mining AG	Jänschwalde-Cottbus-Nord, Nochten, and Welzow-Süd Mines, Lausatian mining area	60,000
Do.		Mitteldeutsche Braunkohlengesellschaft AG	Profen and Vereinigtes Schleenhain Mines	25,000
Limestone		Harz-Kalk GmbH	Quarry at Ruebeland	2,000 ^c
Do.		Kalkwerk Bad Kösen GmbH	Quarry at Bad Koesen	2,000 ^c
Do.		Fels-Werke GmbH	Quarry at Kaltes Tal	2,000 ^c
Do.		Schäfer Kalk GmbH & Co KG	Plants at Hahnstaetten, Steeden, Stromberg, and Grevenbrueck	3,000
Do.		Rheinkalk GmbH & Co KG (Lhoist NV, 100%)	Flandersbach quarry and plant at Wuelfrath	7,500
Magnesium, metal, secondary		Norsk Hydro Magnesiumgesellschaft GmbH (Norsk Hydro ASA, 100%)	Plant at Bottrop	26
Do.		Aleris Recycling GmbH (Aleris International Inc., 100%)	Plant at Toeging am Inn	15
Do.		do.	Plant at Deizisau	50
Natural gas	million cubic meters	Mobil Erdgas-Erdöl GmbH (Exxon Mobil Corp., 100%), including any fields owned or operated by BEB Erdgas und Erdöl GmbH (Exxon Mobil Corp., 50%, and Royal Dutch Shell plc, 50%)	Goldenstedt, Hemmelte, Klosterseele, Rotenburg-Taaken complex, Söhlingen, and other fields in Lower Saxony	14,000 ^c
Do.	do.	RWE-Dea AG (RWE Power AG, 100%)	Böttersen, Hemsbünde, Völkersen, and smaller fields in Lower Saxony; and Inzenham-West Field, Bavaria	3,000 ^c
Do.	do.	Gaz de France Produktion Exploration Deutschland GmbH (Gaz de France S.A., 100%)	Salzwedel Field, Saxony-Anhalt; Schneeren and smaller fields in Lower Saxony	1,500 ^c
Do.	do.	Wintershall Holding AG (BASF AG, 100%)	A6/B4 blocks offshore of Schleswig Holstein; and smaller fields in Lower Saxony	1,200 ^c
Do.	do.	EEG-Erdgas Erdöl GmbH (Gaz de France S.A., 100%)	Muehlhausen and other fields in Thüringen	50 ^c

See footnotes at end of table.

TABLE 2—Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2008¹

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Petroleum:				
Crude	thousand 42-gallon barrels	Wintershall Holding AG (BASF AG, 100%), 50%, and RWE-Dea AG (RWE Power AG, 100%), 50%	Mittelplate-Dieksand field, in tidal flats of the North Sea, offshore of Schleswig-Holstein	15,500
Do.	do.	Wintershall Holding AG (BASF AG, 100%)	A6/B4 blocks offshore of Schleswig Holstein; Aitingen Field, Bavaria; Emlichheim Field, Lower Saxony; and smaller fields in Lower Saxony and Rheinland-Pfalz	2,000 ^c
Do.	do.	Gaz de France Produktion Exploration Deutschland GmbH (Gaz de France S.A., 100%)	Bramberge, Ruelertwist, Scheerhorn, and Ringe fields in Lower Saxony; and smaller fields in the States of Bavaria, Hamburg, Lower Saxony, and Mecklenburg-Western Pomerania	3,500 ^c
Do.	do.	Mobil Erdgas-Erdöl GmbH (Exxon Mobil Corp., 100%)	Barenburg, Ruehme, and Lueben fields, Lower Saxony; and smaller fields in the States of Lower Saxony and Rheinland-Pfalz	1,800 ^c
Do.	do.	BEB Erdgas und Erdöl GmbH (Exxon Mobil Corp., 50%, and Royal Dutch Shell plc, 50%)	Georgsdorf, Meppen, and Ruelermoor fields, west of the Ems River (Emsland), Lower Saxony	3,000 ^c
Refined	do.	Deutsche Shell AG	Refineries at Godorf, Hamburg, and Grasbrook	256,000 ^c
Do.	do.	Esso Deutschland GmbH (ExxonMobil Central Europe Holding GmbH, 100%)	Refineries at Karlsruhe and Ingolstadt	245,000 ^c
Do.	do.	Ruhr Oel GmbH (Petróleos de Venezuela S.A., 50%, and BP Gelsenkirchen GmbH, 50%)	Refinery at Gelsenkirchen	215,500 ^c
Do.	do.	BAYERNOIL Raffineriegesellschaft mbH (OMV AG, 45%; Ruhr Oel GmbH, 25%; AGIP Deutschland GmbH, 20%; Deutsche BP AG, 10%)	Refinery at Neustadt-Donau	145,000 ^c
Potash, K ₂ O content		K+S Kali GmbH (K+S Aktiengesellschaft, 100%)	Mines at Bergmannsseggen-Hugo, Niedersachsen-Riedel, Salzdettfurth, Sigmundshall, Hattorf, Neuhoef-Ellers, Sondershausen, Unterbreizbach, Wintershall, and Zielitz	6,000
Salt (evaporated and rock)		esco - european salt company GmbH & Co. KG [K+S Salz GmbH (K+S Aktiengesellschaft, 100%)]	Bernburg Mine and evaporated salt works; Borth Mine and evaporated salt works near Wesel; and the Braunschweig-Lüneburg Mine near Helmstedt	5,300 ^c
Do.		Wacker Chemie AG	Stetten rock salt mine near Haigerloch	500
Do.		Südsalz GmbH (Südwestdeutsche Salzwerke AG, 90%, and Vereinigte Schweizerische Rheinsalinen AG, 10%)	Berchtesgaden and Heilbronn rock salt mines; and evaporated salt works at Bad Reichenhall and Bad Friedrichshall-Kochendorf	5,500 ^c
Do.		Saline Luisenhall GmbH	Evaporated salt works at Göttingen	NA
Selenium, metal	metric tons	Retorte GmbH (Norddeutsche Affinerie AG, 100%)	Plant at Röthenbach	2,500
Silica sand (industrial sand)		Quarzwerke GmbH	Mines and plants at Frechen, Gambach, Haltern, Hohenbocka, and Weferlingen	4,500 ^c
Do.		Amberger Kaolinwerke GmbH—Eduard Kick GmbH & Co. KG (Quarzwerke GmbH, 100%)	Mines and plants at Hirschau and Schnaittenbach	850
Siliceous earth, silica		Hoffmann Mineral and Co. KG	Mine and plant near Neuburg	55
Silicon, metal	metric tons	RW Silicium GmbH (Graphit Kropfmühl AG, 100%)	Four electric arc furnaces in plant at Pocking	30,000
Steel, crude		ThyssenKrupp Steel AG (ThyssenKrupp AG, 100%)	Bruckhausen and Beeckerwerth plants, near Duisburg	12,000
Do.		Salzgitter AG	Plants at Peine and Salzgitter	6,400 ^c
Do.		Hüttenwerke Krupp Mannesmann GmbH (ThyssenKrupp Steel AG, 50%; Vallourec & Mannesmann Tubes SA, 20%; and Mannesmannröhren-Werke GmbH, 30%)	Plant at Duisberg-Huckingen	5,600
Do.		ArcelorMittal Bremen GmbH (ArcelorMittal, 99.88%, and other private, 0.12%)	Plant at Bremen	4,000
Do.		Saarstahl AG (Struktur-Holding-Stahl GmbH & Co KG, 74.9%, and Dillinger Hüttenwerke AG, 25.1%)	Plants at Burbach, Neunkirchen, and Voelklingen	3,000

See footnotes at end of table.

TABLE 2—Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2008¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Steel, crude—Continued	AG der Dillinger Hüttenwerke (Saarstahl AG, 33.75%; ArcelorMittal, 30.08%; Struktur-Holding-Stahl GmbH & Co KG, 26.17%; Dillinger Hütte und Saarstahl mbH, 10%; and other 4.72%)	Plant at Dillingen	2,800
Do.	ArcelorMittal Eisenhüttenstadt GmbH (ArcelorMittal, 100%)	Plant at Eisenhuettenstadt	2,700
Do.	Badische Stahlwerke GmbH	Plant at Kehl	2,300 ^e
Do.	Brandenburger Elektrostahlwerk GmbH (RIVA FIRE S.p.A, 100%)	Plant at Brandenburg	1,700 ^e
Do.	ThyssenKrupp Nirosta (ThyssenKrupp Steel AG, 100%)	Plants at Bochum and Krefeld	1,600 ^e
Do.	ArcelorMittal Ruhrort GmbH (ArcelorMittal, 100%)	Plant at Duisburg	1,500 ^e
Do.	Georgsmarienhütte GmbH	Plants at Bous, Georgsmarienhütte, and Groeditz	1,300 ^e
Do.	Stahlwerk Thüringen GmbH (Alfonso Gallardo S.A., 100%)	Plant at Unterwellenborn	1,100 ^e
Do.	Deutsche Edelstahlwerke GmbH	Plants at Siegen and Witten	1,100 ^e
Do.	Lech-Stahlwerke GmbH (Max Aicher GmbH & Co. KG, 100%)	Plant at Herbertshofen	1,100 ^e
Do.	ArcelorMittal Hamburg GmbH (ArcelorMittal, 100%)	Plant at Hamburg	1,100 ^e
Do.	Hennigsdorfer Elektrostahlwerk GmbH (RIVA FIRE S.p.A, 100%)	Plant at Hennigsdorf	1,000 ^e
Do.	Elbe-Stahlwerke Feralpi GmbH (Feralpi Siderurgica S.p.A., 100%)	Plant at Riesa	950 ^e
Strontium carbonate	Solvay & CPC Barium Strontium GmbH & Co. KG (Solvay S.A., 75%, and Chemical Products Corp., 25%)	Plant at Bad Hoenningen, near Hannover	95
Sulfur	Norddeutsche Erdgas-Aufbereitungs GmbH NEAG [BEB Erdgas und Erdöl GmbH (ExxonMobil Production Deutschland GmbH, 50%, and Royal Dutch Shell plc, 50%), 100%]	Natural gas desulfurization plants at Grossenkneten and Voigtei (near Nienburg-Weser), Lower Saxony	600
Zeolites	Hans G. Hauri Mineralstoffwerk GmbH	Mine and plant at Boetzingen, near Freiburg	NA
Zinc, metal	Metaleurop Zinkbetrieb GmbH & Co. KG (Xstrata plc, 100%)	Nordenham Smelter, near Bremerhaven	150
Do.	Ruhr-Zink GmbH (GEA Group AG, 100%)	Refinery at Datteln ⁴	140
Zinc, oxides	Harz Metall GmbH (Recylex S.A., 100%)	Wälz rotary kilns at Oker-Goslar	80 ^e
Do.	Norzinco GmbH (Recylex S.A., 100%)	Secondary plant at Oker-Goslar	35 ^e

^eEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Table includes data available through February 28, 2010.

²In addition to producing arsenic as a byproduct of chemical manufacturing and gallium as a byproduct of aluminum production, PPM Pure Metals GmbH produces small quantities of germanium as a byproduct of processing imported ores and concentrates and small quantities of indium and tellurium as byproducts of zinc metal production by PPM's parent company, Recylex S.A.

³Closed in 2007.

⁴Closed at the end of 2008, and approximately 40% of total production of zinc metal at this refinery was from secondary materials.

