



# 2014 Minerals Yearbook

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## TURKEY

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# THE MINERAL INDUSTRY OF TURKEY

By Sinan Hastorun

Turkey is an emerging market economy and European Union (EU) candidate country that is strategically located in both southeastern Europe and southwestern Asia. Turkey's economy was the 17th largest in the world in 2014. The country's real gross domestic product (GDP) increased at an average annual rate of 4.7% between 2002 and 2014, although the rate for 2009–14 slowed to 3.7%. Turkey's mineral sector had increased its output and exports significantly since 2002 and attracted higher levels of foreign direct investment (FDI), but all three (output, exports, and FDI) decreased in 2014. The country's construction and infrastructure development, which drove economic growth, led to significant increases in imports of mineral fuels, which contributed to a larger trade deficit. Turkey also remained partially import dependent for other mineral commodities, such as iron and steel, although these commodities were also produced domestically. Many of the mineral resources remain undeveloped, particularly those of copper, gold, lead, nickel, silver, and zinc, and particularly those located in eastern Turkey. Although not resource rich in mineral fuels except for coal, Turkey had become a key energy transit corridor for multiple operational and planned hydrocarbon pipelines between the energy-rich countries of the Caspian Basin and the Middle East, and the energy-consuming countries of the EU owing to its unique geographic location between Europe and Asia (Arseven and Ersin, 2015a; European Commission, 2015a; Investment Support and Promotion Agency [Turkey], 2015b; Matthews and Incesulu, 2015; U.S. Department of Commerce, 2015; U.S. Department of State, 2015; U.S. Energy Information Administration, 2015; World Bank Group, 2015b).

Turkey has a diverse mineral industry that produces more than 50 mineral commodities from about 4,500 known mineral deposits, including metals and industrial minerals. In 2014, Turkey was the world's leading producer of boron minerals (accounting for 70% of world production), perlite (40%), and pumice and pumicite (31%). It was also the world's second-ranked producer of feldspar (accounting for 23% of world production) after Italy and of magnesium compounds (9%) after China; the fourth-ranked producer of chromium (10%) and cement (2%); the fifth-ranked producer of bentonite (4%); the eighth-ranked producer of barite (3%) and crude steel (2%); and the ninth-ranked producer of kaolin (4%). Turkey was also Europe's top producer of cement and gold and its second-ranked producer of steel after Germany. The country was also the leading exporter of boron, marble, and travertine in the world. Turkey was a significant source of value-added metals and industrial mineral commodities, such as cement and steel, accounting for 2% of world production of both commodities. The amount of mineral fuels produced in Turkey was small by regional standards and insufficient to meet domestic consumption of petroleum and natural gas (table 1; Arseven and Ersin, 2015a, b; Çelik İhracatçıları Birliği, 2015; Enerji Piyasası Düzenleme Kurumu, 2015a, b;

Eti Maden İşletmeleri Genel Müdürlüğü, 2015a, p. 18; Matthews and Incesulu, 2015; U.S. Energy Information Administration, 2015; World Steel Association, 2015, p. 1–2; Bennett, 2016; Bray, 2016; Crangle, 2016a, b; Flanagan, 2016; McRae, 2016; Papp, 2016; Tanner, 2016; van Oss, 2016).

## Reserves and Resources

Turkey is endowed with a variety of minerals owing to the complex geologic structure of the Anatolian Peninsula, which is a part of the seismically active Alpine-Himalayan orogenic belt. The tectonic structure of the country encompasses multiple fault lines, which makes mineral exploration and extraction relatively difficult because of the need to drill deeply for ores; nonetheless, an estimated 77 globally traded mineral commodities have been identified in Turkey's territory. The U.S. Geological Survey estimates that Turkey holds the world's largest reserves of boron and perlite. It also holds the world's third-largest reserves of barite and fourth-largest reserves of magnesite and feldspar. According to the Government of Turkey, the country contained 5,690 million metric tons (Mt) of perlite, 5,161 million cubic meters of marble, 3,066 Mt of boron, 251 Mt of bentonite, 239 Mt of feldspar, 111 Mt of magnesium compounds, 89 Mt of kaolin, 35 Mt of barite, 26 Mt of chromium, 3.2 Mt of manganese, and 380,000 metric tons (t) of thorium. The country also contained an estimated 15.8 billion metric tons (Gt) of dolomite, 13.3 Gt of lignite coal, 5.7 Gt of salt, 2.3 Gt of quartzite, 1.3 Gt of quartz sand, and 1.1 Gt of hard coal (Maden Tetkik ve Arama Genel Müdürlüğü, 2002, 2011, 2015b; T.C. Ekonomi Bakanlığı, 2014a, b; Arseven and Ersin, 2015a, b; Matthews and Incesulu, 2015, p. 188; Bennett, 2016; Bray, 2016; Crangle, 2016a, b; McRae, 2016; Tanner, 2016).

## Minerals in the National Economy

In 2014, Turkey's real GDP increased by 2.9% compared with a 4.2% rate of growth in 2013. The deceleration of economic growth was owing mainly to a slowdown in the growth of private consumption and investment. Net exports contributed positively to the country's economic growth in 2014, whereas they had subtracted from it in previous years. The nominal GDP in 2014 was \$798.4 billion compared with \$823.2 billion (revised) in 2013 (European Bank for Reconstruction and Development, 2015; European Commission, 2015b, p. 132; Türkiye İstatistik Kurumu, 2015a; World Bank Group, 2015a; 2015b, p. 2).

The mining and quarrying sector accounted for about 1.5% of the nominal GDP in 2014, which was a slight increase compared with its 1.4% share in 2013. The gross value of all mineral-sector-related activity was estimated to constitute about 3% of the nominal GDP because the mining and quarrying figures include only raw material extraction and not production of

value-added processed mineral commodities, such as aluminum, boron chemicals, cement, refined copper, glass, and steel, or coal-based power generation. Ore processing in Turkey was limited, however, by relatively high energy costs owing in large part to the country's continued reliance on imported mineral fuels. The real gross value of the mining and quarrying sector increased by 5.6% to reach \$11.6 billion in 2014. The real gross value of manufacturing (including mineral processing) increased by 3.7% and accounted for 24.2% of Turkey's GDP in 2014 compared with 24.0% in 2013 (Engineering and Mining Journal, 2014, p. 86; Maden İşleri Genel Müdürlüğü, 2015d; Matthews and Incesulu, 2015, p. 165; Türkiye İstatistik Kurumu, 2015b).

Total FDI inflows into the Turkish economy (excluding real estate) decreased to \$8.7 billion in 2014 from \$9.9 billion in 2013. FDI inflows to Turkey's mining and quarrying sector, on the other hand, increased substantially to \$449 million in 2014 (the sector's highest FDI inflow on record) from \$242 million in 2013 and accounted for 5.2% of the country's total FDI inflows. The manufacturing sector received \$2.9 billion in FDI inflows, accounting for 33.3% of total FDI in 2014 compared with \$2.2 billion in 2013. Within the manufacturing sector, the manufacture of coke, refined petroleum products, and nuclear fuel registered FDI inflows of \$100 million in 2014 compared with \$236 million in 2013; the manufacture of base metals and fabricated metal products, \$129 million compared with \$100 million in 2013; and the manufacture of other nonmetallic mineral products, \$158 million compared with \$29 million in 2013 (Investment Support and Promotion Agency, 2015a).

## Government Policies and Programs

Mineral exploration and extraction activities in Turkey are regulated by Mining Law No. 3213 of June 15, 1985, and the Mining Activities Regulation of February 18, 2015, which was the latest amendment to the original law with regard to transferability of mining licenses, reporting of mining activities, mine supervision, and license fees. Regulations on mineral sector activities included the Regulation on the Implementation of Mining Activities of November 6, 2010, and the Regulation on Mining Activity Permits of June 21, 2005. Under Article 4 of the Mining Law, all minerals are owned by the state. Under Article 14, the state may authorize third parties to undertake mining activities and provide permits and licenses to state institutions and organizations (Arseven and Ersin, 2015a, p. 1–2; Matthews and Incesulu, 2015, p. 165).

Under Article 2 of the Mining Law, all natural resources with commercial value are regarded as minerals and are subject to licensing procedures, with the exception of natural gas and petroleum, which are subject to different regulations. The law classifies minerals into five groups, which are subject to different exploration, operating, and licensing procedures. Group I covers (a) sand and gravel used in construction and roadworks, and (b) brick and roofing tile clay, cement clay, marl, pozzolanic rocks, and rocks used in the cement and ceramic industries. Group II covers (a) crushed stone derived from andesite, basalt, calcite, dolomite, granite, and limestone, and (b) dimension stone, such as andesite, basalt, granite, marble,

and travertine. Group III covers carbon dioxide, hydrogen sulfide, and salt. Group IV covers (a) minerals used as raw materials for industry, including boron, calcium, lithium, and sodium; (b) minerals that are energy sources, including anthracite and lignite coal; (c) metals, including copper, gold, iron, manganese, nickel, platinum, silver, and zinc, and rare-earth minerals; and (d) radioactive minerals, such as radium and thorium. Group V includes precious gemstones, including diamond and sapphire (Arseven and Ersin, 2015a, p. 2; Matthews and Incesulu, 2015, p. 165).

Under Article 6 of the Mining Law, the state may grant mining rights to Turkish citizens, companies incorporated under Turkish law (including subsidiaries of foreign companies), and authorized public entities and institutions. There are two types of licenses for prospecting and operating mines: exploration licenses and operating licenses. The exploitation of Groups I, II(a), and II(c) mineral deposits do not require an exploration license. For all other groups, however, an exploration license is required as the first step for commencing any mining operations. Exploration licenses are obtained through a tender, with the exception of Groups II(b) and IV minerals, which are awarded on a first-come-first-served basis. Exploration licenses grant the license holder a 1-year pre-exploration period, a 2-year general exploration period, and a 4-year detailed exploration period. To obtain an operation license, the holder must submit a detailed operating plan before the exploration license expires. To begin extracting ore, an operating permit must be obtained. The permit is granted only after an Environmental Impact Assessment (EIA) is submitted and all necessary administrative and environmental permits as well as land-use approvals for the project area are issued. The term of an operating permit cannot exceed 10 years before it must be renewed, except for Group I(a) minerals, for which the maximum permit period is 5 years (Arseven and Ersin, 2015a, p. 3–5; Matthews and Incesulu, 2015, p. 166).

The Maden İşleri Genel Müdürlüğü (MİGEM) [General Directorate of Mining Affairs] of the T.C. Enerji ve Tabii Kaynaklar Bakanlığı (ETKB) [Ministry of Energy and Natural Resources] is the primary mineral regulatory agency. MİGEM sets general rules and policies for the mining sector and oversees mining operations. It is also responsible for issuing exploration and operating certificates and permits. The ETKB issues regulations concerning mineral exploration and extraction activities. It is also responsible for preparing and implementing national energy policies (Arseven and Ersin, 2015a, p. 1–2; Matthews and Incesulu, 2015, p. 165).

As of yearend 2014, there were 20,805 mineral licenses in effect in Turkey, of which 7,341 were exploration licenses and 13,464 were operating licenses. The total number of active licenses decreased from 23,366 licenses in 2013 owing largely to the decrease in the number of exploration licenses issued (9,984 as of December 2013). Of the total active mineral licenses, 9,359 had been issued for Group IV minerals, 5,398 for Group II(b) minerals, 4,781 for Group II(a) minerals, 879 for Group I(b) minerals, 70 for Group III minerals, 57 for Group I(a) minerals, and 37 for Group V minerals. Of the total exploration licenses, 5,021, or 73%, were for Group IV minerals, followed by 1,608 for Group II(b) minerals. Of the total 9,177 sites that had received operating permits, 5,862 were

active in 2014 compared with 8,418 in 2013. Among those active operations in 2014, 1,957 were for Group II(a) minerals (33% of the total), 1,944 were for Group IV minerals (33%), 1,536 were for Group II(b) minerals (26%), 380 were for Group I(b) minerals (6%), 44 were for Group III minerals (0.7%), and only 1 was for Group V minerals. There were no producing operations for Group I(a) minerals (Maden İşleri Genel Müdürlüğü, 2015g).

A total of 3,181 new applications for mining licenses were filed in Turkey in 2014 compared with 5,577 applications in 2013. Of applications submitted during the same year, the Government granted 494 new licenses in 2014 compared with 981 in 2013 and 1,575 in 2012. The decrease in the number of new licenses granted during the year of filing since 2012 was attributed to delays in the licensing process caused by the additional layer of approval by the Office of the Prime Minister that was mandated by Circular 2012/15 of June 2012 as well as the decline in global mineral commodity prices. In 2014, MIGEM issued a total of 2,025 new licenses compared with 2,292 in 2013, including for applications submitted in previous years. Of the total issued in 2014, 1,258 were operating licenses and 767 were exploration licenses. Of the total operating licenses issued, 80 were for Group I(b) minerals, 490 were for Group II(a) minerals, 393 were for Group II(b) minerals, 7 were for Group III minerals, 293 were for Group IV minerals, and 2 were for Group V minerals and Group VI minerals. Of the total exploration licenses issued, 523 were for Group IV minerals, 218 were for Group II(b) minerals, 14 were for Group VI minerals, 10 were for Group V minerals, and 2 were for Group III minerals (Mining Turkey, 2014, p. 86; Maden İşleri Genel Müdürlüğü, 2015b, i).

Three Government institutions attached to the ETKB are involved in data collection and geologic surveying in the mineral sector. Maden Tetkik ve Arama Genel Müdürlüğü (MTA) [General Directorate of Mineral Research and Exploration] conducts geologic and geophysical surveys and mineralogical research to identify mineral deposits and produce reserve estimates and relevant maps of Turkey. Petrol İşleri Genel Müdürlüğü (PIGM) [General Directorate of Petroleum Affairs] collects information about petroleum exploration and production activity in the country. Türkiye Atom Enerjisi Kurumu (TAEK) [Turkish Atomic Energy Authority] is responsible for nuclear energy policy development and the coordination of scientific and technical activities in the nuclear sector. TAEK's programs are set by the Atom Enerjisi Komisyonu (AEK) [Atomic Energy Commission], which is composed of representatives from the TAEK, various ministries, and academia; the AEK oversees all nuclear activities and drafts and submits nuclear-related legislation and budgets to the Prime Minister (Maden Tetkik ve Arama Genel Müdürlüğü, 2015a; Petrol İşleri Genel Müdürlüğü, 2015; Türkiye Atom Enerjisi Kurumu, 2015a, b; World Nuclear Association, 2016).

Nuclear energy production in Turkey is governed by the Law on Construction and Operation of Nuclear Power Plants and Energy Sale (law No. 5710). Under the law, the TAEK is the competent authority for setting the criteria for building and operating nuclear powerplants and issuing licenses to nuclear powerplant operators, including site licenses, construction

licenses, and operation licenses. The Draft Nuclear Law of 2014, however, would establish a Nuclear Regulatory Authority that would take over the nuclear licensing duties from the TAEK. As of yearend 2014, the draft law had not yet been introduced in the Parliament (Demirkan and Eryiğit, 2015, p. 173; Karaduman, 2015; World Nuclear Association, 2016).

Upstream activities for petroleum and natural gas are regulated by the PIGM under the Turkish Petroleum Law of 2013 (law No. 6491). Under Article 6 of the law, licenses and permits must be obtained from the PIGM to undertake hydrocarbon research and extraction and to operate hydrocarbon-related facilities in Turkey. Downstream activities for petroleum and natural gas are regulated by Enerji Piyasası Düzenleme Kurumu (EPDK) [Energy Market Regulatory Authority], an independent Government agency, under the Petroleum Market Law (law No. 5015) and the Natural Gas Market Law of 2001 (law No. 4646), as amended by law No. 5367 of 2005. The EPDK supervises and monitors all energy market activities. Under Article 3 of the Petroleum Market Law, the EPDK is responsible for issuing licenses for the following downstream petroleum activities: refining, distribution, storage, transmission, processing, and delivery, as well as independent user licenses and dealership licenses. Under Article 4 of the Natural Gas Market Law, the EPDK is responsible for issuing licenses for the following downstream natural gas activities: importing, exporting, transmission, storage, wholesale sale, distribution, and transportation. Upstream liquefied petroleum gas (LPG) activities are regulated by the Petroleum Law. Downstream LPG activities are regulated by the LPG Market Law of 2005 (law No. 5307), which requires a range of licenses (similar to those for petroleum) to be obtained from the EPDK to undertake LPG-related activities in Turkey (Arseven and Ersin, 2015b, p. 3).

## Production

In 2014, significant increases in production were reported for illite (1,925%), other mica (514%), nepheline syenite (455%), talc (346%), olivine (92%), bentonite (75%), kaolin (74%), zeolites (49%), bauxite (37%), granite (36%), pumice (30%), silica (quartz) sand (29%), boron minerals (28%), phosphate rock (18%), calcite and travertine (14% each), basalt (12%), and fluorspar and soda ash (10% each). Production was also estimated to have increased for lead content of mined ore (48%), alumina (37%), aluminum (27%), and refined borates (12%). Significant decreases in production were reported for obsidian (88%), graphite (87%), asphalt (natural) and leonardite (48% each), feldspar (42%), diabase and onyx (32% each), hard coal (31%), diatomite (27%), chalcedony (25%), sodium sulfate (22%), lubricants (20%), perlite (17%), quartz and quartzite and pyrites (12% each), and emery, natural gas, and sepiolite and palygorskite (11% each). Production was also estimated to have decreased for antimony concentrates (Sb content), coke and semicoke, copper content of mined ore, iron content of mined ore, liquefied petroleum gas, and naphtha. No production was reported for aluminum sulfate, alunite, and sulfur. Zirconium production was reported again in 2014 after no production was reported in 2013 (table 1; Maden İşleri Genel Müdürlüğü, 2015a).

## Structure of the Mineral Industry

Turkey's industrial minerals and metals production was undertaken mainly by privately owned companies, which also produced some coal, natural gas, and petroleum and all refined petroleum products. The Government's involvement in the mineral industry was focused on boron, coal, and hydrocarbon exploration and production. Although mining was one of the major sectors of the economy with active Government-owned enterprises, about 85% of mineral-producing facilities were estimated to be owned by the private sector. This was a complete reversal from before 2002 when Government-owned enterprises accounted for 85% of the mineral industry and was owing to ongoing privatization of enterprises in the mining and energy sectors and to other market liberalization measures undertaken by the Government (table 2; Matthews and Incesulu, 2015, p. 165; U.S. Department of State, 2015, p. 15).

Six Government-owned enterprises were engaged in mineral-related activities, as follows: Boru Hatları ile Petrol Taşıma A.Ş. (BOTAŞ) [Transportation of Petroleum by Pipelines Corp.] imported, transported, and sold natural gas and transported petroleum; Elektrik Üretim A.Ş. (EÜAŞ) [Electricity Generation Corp.] produced electricity primarily from coal; Eti Maden İşletmeleri Genel Müdürlüğü [General Directorate of Eti Mining Enterprises] had exclusive rights to explore for and develop boron deposits according to law No. 2840 of 1983; Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ) [General Directorate of Turkish Coal Enterprises] mined lignite and subbituminous coal; Türkiye Petrolleri Anonim Ortaklığı (TPAO) [Turkish Petroleum Co.] explored for, produced, and marketed crude petroleum; and Türkiye Taşkömürü Kurumu (TTK) [Turkish Hard Coal Enterprises] mined anthracite and bituminous coal (Boru Hatları ile Petrol Taşıma A.Ş., 2015b; Elektrik Üretim A.Ş., 2015; Eti Maden İşletmeleri Genel Müdürlüğü, 2015a, p. 20; Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü, 2015b; Türkiye Petrolleri Anonim Ortaklığı, 2015b; Türkiye Taşkömürü Kurumu, 2015a).

## Mineral Trade

In 2014, Turkey's total exports of goods increased by 3.8% to \$157.6 billion, whereas its total imports of goods decreased by 3.8% to \$242.1 billion. As a result, the country's trade deficit amounted to \$84.6 billion in 2014 compared with \$99.9 billion in 2013, and the proportion of exports to imports increased to 65.1% from 60.3% in 2013 (Türkiye İstatistik Kurumu, 2015c).

Turkey's exports of iron and steel were valued at \$10.8 billion in 2014 compared with \$11.6 billion in 2013. Exports of fabricated metal products in 2014 were valued at about \$6.7 billion compared with \$6.2 billion in 2013; petroleum and petroleum products, \$5.6 billion compared with \$6.2 billion in 2013; industrial minerals, including cement, ceramics, glass, lime, and stone, about \$4.0 billion compared with \$3.9 billion in 2013; nonferrous metals, about \$2.7 billion compared with \$2.6 billion in 2013; fertilizers, \$1.9 billion compared with \$2.0 billion in 2013; and natural gas, \$409 million compared with \$516 million in 2013 (T.C. Kalkınma Bakanlığı, 2015a).

Turkey's imports of petroleum and petroleum products were valued at \$16.1 billion in 2014, which remained about the same as in 2013. Imports of iron and steel, which consisted primarily of scrap steel, were valued at \$11.3 billion compared with \$12.2 billion in 2013; nonferrous metals, \$7.9 billion compared with \$7.7 billion in 2013; fabricated metal products, \$3.9 billion compared with \$3.8 billion in 2013; natural gas, \$2.7 billion, which remained about the same as in 2013; industrial minerals, \$2.0 billion compared with \$1.8 billion in 2013; and fertilizers, \$1.5 billion, which remained about the same as in 2013 (T.C. Kalkınma Bakanlığı, 2015b).

In 2014, the value of Turkey's exports of mined minerals decreased by 7.7% to \$4.65 billion. Turkey's total exports, by tonnage, amounted to 21.2 Mt compared with 22.3 Mt in 2013. Mineral exports accounted for 2.9% of the country's exports, by value, in 2014 compared with 3.3% in 2013. Exports of natural stones (of which marble was the largest component) amounted to 7.3 Mt and accounted for 45.8% of Turkey's mineral exports, by tonnage; metals, 4.5 Mt (30.0%); and industrial minerals, 143,000 t (18.3%). The leading mineral exports in 2014 by both tonnage and value were marble block and travertine, which amounted to 4.92 Mt valued at \$977.8 million, and processed marble, 1.54 Mt valued at \$799.3 million. These were followed by copper ore, which amounted to 342,300 t valued at \$370 million (and accounted for 8% of the total mineral exports); chromite ore, 1.41 Mt valued at \$342 million (7%); borates and concentrate, 841,000 t valued at \$266 million (6%); zinc ore, 420,300 t valued at \$236 million (5%); feldspar, 4.6 Mt valued at \$157 million (3%); ferrochromium, 102,300 t valued at \$151 million (3%); magnesite, 303,900 t valued at \$101 million (2%); gypsum, 847,600 t valued at \$71 million (1%); quartz, 465,900 t valued at \$63 million (1%); and bentonite, 373,600 t valued at \$48 million (1%) (İstanbul Maden ve Metaller İhracatçıları Birlikleri, 2015a; Maden İşleri Genel Müdürlüğü, 2015c, e, f, h).

China continued to be the leading recipient of Turkey's mined mineral exports, accounting for 39.0% of the total in 2014; it was followed by the United States (9.2%), Belgium (3.1%), Italy (2.9%), Iraq (2.8%), Saudi Arabia (2.6%), and India (2.3%). Mined mineral exports to East Asia decreased by 20.8%, whereas exports to the EU increased by 10.9%; and those to North America, by 9.9% in 2014 (İstanbul Maden ve Metaller İhracatçıları Birlikleri, 2015b, p. 2–3).

Turkey's exports of goods to the United States amounted to \$7.4 billion in 2014 compared with \$6.7 billion in 2013. Exports of semifinished iron and steel products, such as bars and rods, ingots, and rolled steel, were valued at \$1.0 billion. Exports of material categorized under the label stone, sand, cement, and lime were valued at \$361 million. Exports of iron and steel products, such as pipes and wire, were valued at \$121 million. Exports of metals were also relatively small, with exports of bauxite and aluminum valued at \$12.9 million, and those of nickel, \$2.0 million (U.S. Census Bureau, 2015b).

Turkey's imports of goods from the United States amounted to \$11.6 billion in 2014 compared with \$12.0 billion in 2013. More than 30% of goods exported to Turkey from the United States were related to the mineral industry. Imports of steelmaking products, which consisted mostly of steel scrap,

were valued at \$1.3 billion. In 2014, imports of steel scrap from the United States increased by 48.8% to 3.7 Mt, whereas imports from the EU decreased by 4.6% to 10.2 Mt. Imports of fuel oil were valued at about \$679 million; metallurgical-grade coal, about \$403 million; other petroleum products, \$249 million; finished metal shapes, \$91 million; other coal and fuels, \$69 million; nonmonetary gold, \$62 million; aluminum and alumina, \$21 million; and iron and steel mill products, \$17 million (Türkiye Çelik Üreticileri Derneği, 2015a; U.S. Census Bureau, 2015a).

The leading mineral commodity exporters of Turkey were among the country's largest exporters overall in terms of the value of exports. Eti Maden, the leading mineral exporter of the country, ranked 14th among all exporters, with \$266 million in mineral exports and \$839 million in total exports. Çayeli Bakır İşletmeleri A.Ş., a copper producing subsidiary of First Quantum Minerals Ltd. of Canada, ranked second among mineral exporters and 57th among all exporters with \$219 million in exports. Eti Krom A.Ş., a ferrochromium producing subsidiary of Yıldırım Group of Turkey, ranked third in mineral exports and 83d overall with \$159 million exports. These companies were followed by Tuprag Metal Madencilik Sanayi ve Ticaret A.Ş., a gold-producing subsidiary of Eldorado Gold Corp. of Canada, with \$135 million in exports; Ekin Maden Ticaret ve Sanayi A.Ş., a chromium, copper, lead, and zinc producer, with \$103 million in exports; and Kuzey Ege Bakır İşletmeleri AŞ, a copper- and molybdenum-producing subsidiary of Özdoğu İnşaat ve Tic. Ltd. Şti., with \$72 million in exports (Türkiye İhracatçılar Meclisi, 2015).

## Commodity Review

### Metals

**Aluminum and Bauxite and Alumina.**—Eti Alüminyum A.Ş., which was a 100%-owned subsidiary of Cengiz Holding A.Ş., remained the only primary aluminum producer in Turkey. The company continued its multiyear modernization of the Seydisehir aluminum smelter in Konya Province in central Anatolia. The fully integrated smelter was supplied by seven bauxite mines located within 25 kilometers (km) of the smelter and produced about 53,500 t of aluminum in 2014. It was estimated to supply 15% of Turkey's annual aluminum consumption; imported aluminum supplied the remaining 85%. Eti Alüminyum was in the process of converting the smelter from Soderberg to prebaked anode technology by installing a green anode plant and rodding shop technology. The reconstructed smelter was scheduled to be commissioned at the end of 2014. The ongoing modernization of the Seydisehir plant was projected to increase capacity to 95,000 metric tons per year (t/yr) by 2016 from 70,000 t/yr (Anatolia News Agency, 2011; Daynes, 2013; Outotec Oyj, 2013; Eti Alüminyum A.Ş., 2014).

Şahinler Metal Sanayi ve Ticaret A.Ş. was the leading producer of secondary aluminum from scrap and other recycled metals in Turkey and among the top 500 industrial producers in the country. It had the capacity to produce of 92,000 t/yr (combined) of aluminum ingot, deoxidant, and billet (Şahinler Metal Sanayi ve Ticaret A.Ş., 2015).

Demireller Tarım Madencilik Petrol Sanayi ve Ticaret Limited Şti. was Turkey's leading producer of nonmetallurgical bauxite and calcium aluminate cement with a production capacity of 500,000 t/yr. The company produced bauxite from 10 licensed areas with total probable reserves of 10 Mt in Mersin Province. It planned to expand its bauxite production capacity to 750,000 t/yr in coming years (Industrial Minerals, 2010, 2014, 2016; Demireller Tarım Madencilik Petrol Sanayi ve Ticaret Limited Şti., 2013).

**Antimony.**—Eti Bakır A.Ş., which was a 100%-owned subsidiary of Cengiz Holding A.Ş., remained the leading antimony producer in Turkey. The company's Halikoy ore enrichment (flotation) plant had the capacity to produce 0.26 metric tons per day (t/d) of antimony concentrate at a grade of 69% antimony. Eti Bakır operated an underground mine in the village of Emirli with a production capacity of 65 t/d of antimony ore (Cengiz Holding A.Ş., 2014; Eti Bakır A.Ş., 2014b).

Üç Yıldız Antimon Madencilik İthalat ve İhracat Sanayi ve Ticaret A.Ş., which was a subsidiary of Tri-Star Resources plc of the United Kingdom, held a Group IV exploitation concession covering nonferrous metals at the Goynuk antimony prospect on the Murat Dagi belt located 50 km north of the city of Usak in western Turkey. The company's property covered 25 hectares within an exploration area of 1,480 hectares. According to a technical report commissioned by Tri-Star Resources in 2012, the average grade of the estimated 80,000 t of rock in the Goynuk Mine dumps was estimated to be between 2.13% and 2.36% antimony. The Goynuk deposit remained undeveloped in 2014 (Juhas, 2013, p. 15, 73; Tri-Star Resources plc, 2015, p. 8).

**Chromium and Ferrochromium.**—Eti Krom A.Ş. remained Turkey's leading chromite ore and sole ferrochromium producer in 2014. The company was also the country's leading exporter of chromite ore. Eti Krom operated 79 mines across the country, with a total annual production capacity of 1 Mt of chromium. Most of these mines were underground mines located in Elazig Province; the other mines were located in Adana, Diyarbakir, Hatay, Kayseri, and Malatya. The company's total proven reserves were about 100 Mt and probable reserves were about 150 Mt at a grade of 48% chromium (Mining Turkey, 2013, p. 48; Eti Krom A.Ş., 2014a, b).

Eti Krom operated two ferrochromium plants in Elazig Province, which together had four furnaces with a combined production capacity of 150,000 t/yr, but the plants produced only about 61,000 t of ferrochromium in 2014. Plant B accounted for 100,000 t/yr of capacity and Plant A, 50,000 t/yr. The two plants also had a slag-recycling operation with a total recovery capacity of 10,000 t/yr. They used slag containing 6% to 8% chromium to produce ferrochromium (Eti Krom A.Ş., 2014b, c).

**Cobalt and Nickel.**—Meta Nikel Kobalt A.Ş. (META), which was jointly owned by Meta Mining Co. and the Zorlu Group, began test production at its nickel- and cobalt-processing plant in Gordes in Manisa Province in the 4th quarter of 2014. This was the first hydrometallurgy processing plant in Turkey. In the first phase of the project, which required an investment of \$360 million and was to be fully activated in 2015, 1.5 million metric tons per year (Mt/yr) of lateritic ore would be processed

to obtain a mixed nickel-cobalt hydroxide product containing 10,000 t of nickel and 750 t of cobalt. In the second phase of the project (up through 2018), which would involve an additional investment of \$340 million, the production capacity of the nickel-cobalt refinery would be doubled to 3 Mt/yr of lateritic ore. The company planned to double production of nickel to 20,000 t/yr by 2018 (Mining Turkey, 2014, p. 21; Zorlu Group, 2015).

Çaldağ Nikel Madencilik San. ve Tic. A.Ş. submitted a new EIA for its nickel and cobalt project at the Caldag Mine in Manisa Province in January. The company planned to process a total of 29.7 Mt/yr of ore at three open facilities during 15 years of operation. It would process 250,000 t/yr of ore to produce 2,500 t/yr of nickel and 150 t/yr of cobalt in the first 5 years of operation. Once full capacity was reached, Çaldağ planned to process 1.5 Mt/yr of ore to produce 15,000 t/yr of nickel and 900 t/yr of cobalt. The ore body at Caldag was estimated to contain 1.16% nickel and 0.07% cobalt, as well as 21.6% iron. In November, the EIA was approved by the Ministry of Environment and Urban Planning, but construction had not yet begun as of yearend 2014 (Enerji Ajansı, 2014; T.C. Çevre ve Şehircilik Bakanlığı, 2014, p. 31, 58, 63; Çaldağ Nikel Madencilik San. ve Tic. A.Ş., 2015).

**Copper, Molybdenum, and Zinc.**—Eti Bakır remained the leading copper-ore-producing company in Turkey. Other notable copper ore producers included Çayeli Bakır İşletmeleri A.Ş. and Park Elektrik Üretim Madencilik San. ve Tic. A.Ş., which was majority owned by Park Holding A.Ş. (61.24%) (Eti Bakır A.Ş., 2014a; Çayeli Bakır İşletmeleri A.Ş., 2015; Park Elektrik Üretim Madencilik San. ve Tic. A.Ş., 2015b, c).

Eti Bakır produced about 130,000 t/yr of copper concentrate grading 22% copper from 3.5 Mt of crude ore at its Murgul facility located in Artvin Province and about 110,000 t/yr of copper concentrate and 400,000 t/yr of pyrite concentrate from 1.1 Mt of crude ore at the Kure facility in Kastamonu Province. The company also produced 42,000 t/yr of electrolytic copper and 200,000 t/yr of sulfuric acid at its smelter and electrolysis plant in Samsun Province (Eti Bakır A.Ş., 2014c, e, f).

Park Elektrik operated the Siirt Madenkoy copper mine in Siirt Province, which was the largest open pit mine in Turkey in terms of resources. The mine had a resource of 41.5 Mt consisting of 36.3 Mt of measured resources at a grade of 1.95% copper, 5.0 Mt of indicated resources at a grade of 2.45%, and 225,000 t of inferred resources at a grade of 3.52%. The average grade was reported to be 2.02% in 2014. As of yearend 2014, 8 Mt of ore had been extracted. Park Elektrik produced 1.7 Mt of ore and processed 1.6 Mt of total output at its 1.8-Mt/yr concentration facility. Copper concentrate production in Madenkoy decreased by 9% to 91,185 t in 2014 from 96,038 t in 2013; however, this level was higher than the 89,253 t produced in 2012. Sales decreased by 9% to 85,038 t in 2014 (Park Elektrik Üretim Madencilik San. ve Tic. A.Ş., 2015a, p. 15–16).

Çayeli Bakır İşletmeleri produced about 29,000 t of copper and 37,000 t of zinc at its Cayeli copper mine located in Rize Province in 2014 compared with 31,510 t of copper and 43,097 t of zinc in 2013. Both the mine and plant achieved production records in the 4th quarter of 2014. Total mineral reserves of the Cayeli Mine stood at 7.1 Mt at 3.06% copper, 3.64% zinc, and 0.39 gram per metric ton (g/t) gold as of yearend 2012. Proven

reserves were 4.5 Mt at grades of 3.02% copper, 3.19% zinc, and 0.36 g/t gold, whereas probable reserves were 2.6 Mt at grades of 3.12% copper, 4.42% zinc, and 0.43 g/t gold (First Quantum Minerals Ltd., 2015, p. 14; 2016a, b).

Columbus Copper Corp. of Canada received an operating permit for its Karapınar copper porphyry license in Kayseri Province in July. The company reported that its drilling intersected mineralization of 0.48% copper and 0.10 g/t gold at a depth of 91.3 meters (m), and a 49.35-m-long zone with a mineralization of 0.47% copper and 0.12 g/t gold at a depth of 408 m in one hole and 0.93% copper and 0.10 g/t gold at a depth of 79.6 m in another hole. Columbus Copper was in negotiations with First Quantum to purchase the latter's 20% interest in Karapınar in exchange for Columbus Copper's assets in Serbia (Columbus Copper Corp., 2014).

Özdoğu İnşaat ve Ticaret Ltd. Şirketi held an operating license for Turkey's sole molybdenum producer, which was located in Tepeoba in Balıkesir Province, and which also produced copper. The company produced 50,000 t of copper concentrate and 1,800 t of molybdenum concentrate annually. It estimated the Tepeoba Mine's reserves to be 23.5 Mt grading 0.32% copper and 0.04% molybdenum (revised from the 17.5 Mt that had previously been reported by the MTA). Özdoğu planned to operate the mine for 12 years following a 1-year preparation stage and to process 2.5 Mt/yr of ore owing to its relatively low grade. At a processing rate of 350 metric tons per hour, the Tepeoba facility would produce copper concentrate at grades of 29% to 31% copper and molybdenum concentrate at grades of 50% to 55% molybdenum. Özdoğu doubled its metallurgical recovery capacity through technological upgrades in 2012 (Maden Ocak Teknolojileri, 2014, p. 12–13; Metso Corp., 2015).

**Gold and Silver.**—Turkey remained Europe's leading gold producer, but production decreased by 7.5% to 31 t in 2014. Gold imports decreased by 57% to 131 t in 2014 compared with imports in 2013, although this was still more than the 120 t of gold imported in 2012. According to the Turkish Gold Miners Association, reserves in Turkish gold deposits contained 800 t of gold and resources (exclusive of reserves) contained an additional 5,700 t of gold. Among gold deposits, Kisladağ and Cöpler were the most significant, with reserves containing 530 t (17 million troy ounces) and 310 t (10 million troy ounces) of gold, respectively (Turkish Gold Miners Association, 2015c–e).

Sixteen international companies were engaged in either exploration or extraction activities in Turkey in 2014, including 10 companies from Canada (Alamos Gold Inc., Aldridge Minerals Inc., Centerra Gold Inc., Columbus Copper Corp., Eldorado Gold Corp., Eurasian Minerals Inc., Frontline Gold Corp., Mediterranean Resources Ltd., Pilot Gold Inc., and Teck Resources Ltd.), 3 from Australia (Chesser Resources Ltd., Global Resources Corp., and Impact Minerals Ltd.), 2 from the United Kingdom (Ariana Resources plc. and Stratex International plc.), and 1 from the United States (Alacer Gold Corp.). Koza Altın İşletmeleri A.Ş. and Gümüştaş Madencilik ve Ticaret A.Ş. were the only two domestically owned gold producers in the country (Gümüştaş Madencilik ve Ticaret A.Ş., 2015; Turkish Gold Miners Association, 2015b).

In 2014, the following eight gold mines were in operation in Turkey: Efemcükuru and Kisladağ, which were operated

by Eldorado; Copley, by Alacer; Himmetdede, Kaymaz, Mastra, and Ovacik, by Koza Altın; and Bolkar, by Gümüştaş Madencilik. The Kisladağ open pit gold porphyry mine in Uşak Province, which became the first heap-leach gold mine in Turkey when it began operating in 2006, remained the largest gold mine in the country in terms of output. In 2014, total gold production at Eldorado's Kisladağ and Efemcukuru Mines were 9.7 t (311,233 troy ounces) and 3.1 t (98,829 troy ounces), respectively. The Copley open pit mine continued to be the second largest gold mine. In 2014, gold production at Alacer's Copley Mine decreased by 16% to 7.1 t (227,927 troy ounces) (Turkish Gold Miners Association, 2015a; Alacer Gold Corp., 2016; Eldorado Gold Corp., 2016a, b).

Koza Altın produced 9.8 t (316,510 troy ounces) of gold (from ore grading 5.73 g/t) and 4.4 t (142,000 troy ounces) of silver (from ore grading 4.27 g/t) in 2014 compared with 10.9 t (350,000 troy ounces) of gold (from ore grading 5.27 g/t) and 5.6 t (179,000 troy ounces) of silver (from ore grading 4.72 g/t) in 2013. The company held 57 operating licenses and 281 exploration licenses across the country as of yearend 2014. Koza Altın began operating its fourth mine, the Himmetdede Mine, in November 2013. It completed the construction of a crushing circuit in the 2d quarter of 2014. The processing plant in Himmetdede was scheduled to begin operating in January 2015. The Mollakara project in the Ağrı Province was at the feasibility stage (Koza Altın İşletmeleri A.Ş., 2015, p. 3–4).

In April, Ariana Resources renewed its mining license for the Kiziltepe sector of the Red Rabbit project for 10 years; the project was jointly owned with Proccea Construction Co. of Turkey. In May, the company defined high-grade drilling targets in Kiziltepe. In September, it acquired 100% surface land rights at the Arzu South section of Kiziltepe. In November, Ariana Resources confirmed the presence of porphyry deposits in Kiziltepe. In December, the company defined gold targets at the Kepez West section of the project. It also continued to work with Eldorado on the Salınbas zone of the Artvin project in Artvin Province. The scoping study on the project was nearly completed and was expected to show resources of about 1 million troy ounces (Ariana Resources plc, 2015, p. 8, 10).

**Iron and Steel.**—Turkey's production of crude steel decreased further by 1.8% to 34.0 Mt in 2014 after decreasing by 3.4% in 2013. This was in contrast to rapid growth from 2007 to 2012 when Turkey's steel output had increased at the third fastest rate globally after those of China and India. Output in 2014 was below the level of 2011, although it was 32% higher than the pre-global-recession level in 2007. Seventy percent of steel was produced from steel scrap in electric arc furnaces (EAFs). Crude steel production in EAF mills decreased by 3.9%, whereas production in basic oxygen furnace mills increased by 3.5%. Turkey's annual crude steel production capacity increased by 1.9% to 50.2 Mt in 2014. EAF mills accounted for 77% of the country's total steel capacity. The steel sector's capacity utilization rate decreased to 68% in 2014 from 70% in 2013 (Türkiye Çelik Üreticileri Derneği, 2015b).

Billet accounted for 72% of total crude steel production in Turkey in 2014. Billet production decreased by 6.4% to 24.6 Mt, whereas slab production increased by 12.7% to 9.4 Mt. Slab output in 2014 nonetheless remained below its level in 2011.

The capacity utilization rate of slab producers increased to 55% in 2014 from 52% in 2013. Finished steel production continued to exceed crude steel production in Turkey after exceeding it for the first time in 2013. Finished steel output decreased by 0.9% to 36.1 Mt in 2014. Long steel accounted for 71.3% of total finished steel production, and flat steel made up the remaining 28.7%. Finished long steel production decreased by 3.1% to 25.7 Mt, whereas flat steel production increased by 5.1% to 10.4 Mt (Çelik İhracatçıları Birliği, 2015; Türkiye Çelik Üreticileri Derneği, 2015b).

Turkey remained Europe's second-ranked and the world's eighth-ranked exporter of iron and steel. In terms of tonnage, total iron and steel exports, which included articles of steel and steel pipes, decreased by 5.0% to 18.0 Mt in 2014; in terms of value, they decreased by 3.5% to \$15.2 billion. Long steel products accounted for 61% of the country's total steel exports; flat steel, 14%; tube and pipe products, 10%; and semifinished steel products, 3%. Exports of long steel decreased by 2.5% to 11.0 Mt, and that of billet, by 69% to 335,000 t, whereas exports of flat steel increased by 6.4% to 2.5 Mt. Countries in the Middle East and North Africa (MENA) region accounted for 35% of exports, followed by the European Union (16%) and North America (15%). Turkey's total iron and steel imports decreased in 2014, but they stayed at a relatively high level after having increased by 25.4% in 2013. Total steel imports decreased in terms of tonnage by 7.1% to 13.8 Mt in 2014; their value decreased by 6.1% to \$12.0 billion. Imports of flat steel decreased by 5.4% to 6.7 Mt, and that of semifinished steel, by 12% to 4.78 Mt. Turkey also imported about 3.0 Mt of billet and bloom, 1.8 Mt of slab, and 1.5 Mt of long steel products, although the country's long steel capacity was double its consumption. Turkey remained the leading importer of scrap in the world. The country's imports of scrap decreased in value by 4.8% to \$7.2 billion and in weight by 3.3% to 19.1 Mt in 2014 owing to decreased domestic steel production by the EAF mills (Türkiye Çelik Üreticileri Derneği, 2015a, b).

There were a total of 31 iron and steel facilities in the country in 2014, 10 of which were located in the Mediterranean region; 9, in the Marmara region; 7, in the Aegean region; 3, in the Black Sea region; and 2, in the central Anatolia region. The production capacities of 12 facilities exceeded 2 Mt; 7 had capacities of between 1 and 2 Mt/yr, 6 had capacities between 500,000 t/yr and 1 Mt/yr, and 6 had capacities between 50,000 t/yr and 500,000 t/yr. The Erdemir Group, which continued to be Turkey's leading iron and steel producer, produced 2.66 Mt of beneficiated iron ore and pellets in 2014, which was a slight increase from the 2.65 Mt produced in 2013. The company's pellet production increased to 1.55 Mt in 2014 from 1.48 Mt in 2013, whereas other products output, including lump ore, fine ore, byproducts, and pellet cake, decreased to 1.11 Mt in 2014 from 1.17 Mt in 2013. Erdemir accounted for 25% of all crude steel produced in Turkey. The company produced about 7.0 Mt of flat-finished steel products in 2014 compared with 6.4 Mt in 2013, and 1.2 Mt of long-steel products in 2014 compared with 1.4 Mt in 2013. Of total flat-finished steel products, Erdemir Madencilik Sanayi ve Ticaret A.Ş. (Erdemir), which was a subsidiary of the Erdemir Group located in Ereğli, Zonguldak Province, provided about 45% of



the group's hot-rolled flat steel and 100% of its cold-rolled flat steel. İskenderun Demir ve Çelik A.Ş. (İsdemir), which was the Erdemir Group's other subsidiary located in İskenderun, Hatay Province, provided 55% of the group's hot-rolled flat steel. Erdemir produced 2.4 Mt of hot-rolled steel and 1.7 Mt of cold-rolled steel, whereas İsdemir produced 2.9 Mt of hot-rolled steel. Erdemir's capacity utilization rate was 91.2%, whereas İsdemir's was 81.6%; as a whole, the Erdemir Group operated at a capacity utilization rate of 86.3% (Ereğli Demir ve Çelik Fabrikaları T.A.Ş., 2015a, p. 31–33; 2015b, p. 12; Türkiye Çelik Üreticileri Derneği, 2015c).

Turkey has about 900 iron ore deposits located across the country, but only about 30 of them were either exploitable or being exploited. Chief among the latter were the A-B Kafa and Ekinbasi deposits, which accounted for 42% of reserves, the Deveci deposit (34%), the Karacat and Mentese deposits (7%), the Koruyeri deposit (4%), and the Karakuz deposit (3%). Turkey's iron ore reserves are mostly low grade, with 30% to 35% Fe content. Owing to the relatively low grade of its ore and domestic iron ore production not meeting domestic demand, the Turkish steel industry was about 50% dependent on ore imports (Mining Turkey, 2012, p. 19; Steel Orbis, 2012).

Özkoyuncu Madencilik A.Ş. was a leading iron ore producer in Turkey with about 2 Mt in annual output. The company operated 10 mines in Yahyali, Kayseri Province, which reportedly contained the country's largest and highest grade iron ore deposits. Özkoyuncu planned to begin extracting from two new underground mines in the near future. Hekimhan Madencilik İthalat İhracat Sanayi ve Ticaret Ltd. Şti. operated the Deveci iron mine in Malatya Province, which was the largest manganese iron ore deposit in Turkey with more than 50 Mt of iron ore reserves. The company extracted siderite ore from Deveci through open pit mining. Hekimhan Madencilik's estimated sales of ore were about 1 Mt in 2014. The company planned to complete the building of a calcination plant and to operate the mine at its full capacity of 2 Mt/yr beginning in 2015 (Hekimhan Madencilik İthalat İhracat Sanayi ve Ticaret Ltd. Şti, 2015; Özkoyuncu Madencilik A.Ş., 2015a, b).

### **Industrial Minerals**

**Boron.**—Eti Maden İşletmeleri Genel Müdürlüğü continued to be the leading producer and exporter of boron in the world with a 47% global share in 2014. The company's refined boron production increased by 12% to about 2.0 Mt in 2014. Eti Maden planned to increase its share of the global market to 65% by 2019. The company mined borax, colemanite, kernite, and ulexite from deposits located in Bigadic, Canakkale Province; Emet in Kutahya Province; Kestelek in Bursa Province; and Kirka in Eskisehir Province, and it produced 16 types of boron products, including borax decahydrate, boric acid, boron oxide, concentrated colemanite, ground colemanite, calcined tincal, and ulexite. In 2014, exports to more than 100 countries made up 97% of total sales and increased in value by 9% to \$871 million. Countries in Asia received 60% of Turkey's exports of boron products, followed by Europe (23.7%) and North America (17.5%). The remaining 3% of output, or 70,000 t, was sufficient to meet domestic demand for boron

products, 50% of which were consumed by the glass and ceramics industries. Boron chemicals accounted for 95% of total sales, whereas boron concentrate made up only 5%, which was in line with Eti Maden's production focus on higher-value-added boron chemical products (Eti Maden İşletmeleri Genel Müdürlüğü, 2013, p. 11; 2015a, p. 3–4, 20, 22, 26; 2015b; 2015c, p. 7, 27).

Eti Maden's total boron chemical plant capacity increased to 2.19 Mt/yr in 2014 from 2.13 Mt/yr in 2013. The company planned to expand its total boron production capacity to 4.8 Mt/yr by 2019. The plant's capacity utilization rate was 91% in 2014. According to the company, total boron reserves amounted to 3.3 Gt as of yearend 2014. Boron reserves were 1.8 Gt of colemanite and ulexite in Emet, 832.7 Mt of tincal in Kirka, 631.8 Mt of colemanite and ulexite in Bigadic, and 5.3 Mt in Kestelek. Most of Eti Maden's boron chemical production took place in the 840,000-t/yr-capacity borax pentahydrate facility in Kirka, followed by the 290,000-t/yr-capacity boric acid complex in Emet, and the 115,000-t/yr-capacity borax pentahydrate facility in Bandırma. In 2014, Eti Maden began operating a new 50,000-t/yr-capacity boric acid plant at its Emet complex (Eti Maden İşletmeleri Genel Müdürlüğü, 2015a, p. 20, 26, 27; 2015c, p. 27).

**Cement.**—Turkey's production of cement remained at about 71.3 Mt in 2014. Cement plants in the Marmara, Mediterranean, and Central Anatolian regions provided most of the production, accounting for 24.2%, 22.7%, and 14.8% of total output, respectively. Domestic sales of cement accounted for about 89% of total output and increased by 1.5% to 63.2 Mt in 2014. The Marmara region accounted for 28.2% of domestic production, followed by the Mediterranean region (20.2%), and the Central Anatolia region (17.2%), although production in the Black Sea region showed the highest increase with 7.5%. Turkey's production of clinker increased by 1.9% to 62.5 Mt in 2014. Domestic sales of clinker accounted for about 95% of total output and amounted to 59.7 Mt. Clinker sales increased by 188.3% in the Black Sea region to 242,130 t (Türkiye Çimento Müstahsilleri Birliği, 2015a).

Turkey's exports of cement accounted for about 11% of total output in 2014 and decreased by 21% to 7.65 Mt from 9.63 Mt in 2013. Libya received 25% of Turkey's total cement exports, followed by Syria (14%), Iraq (10%), Israel (9%), and Russia (8%). Turkey's exports of clinker, which accounted for only 5% of total output, increased by 31% to 2.86 Mt in 2014 from 2.18 Mt in 2013. Egypt received 22% of Turkey's total clinker exports, followed by Ghana (13%), Brazil (10%), and Mauritania (8%). Turkey imported 103,115 t of clinker in 2014, all of which was supplied by Greece to importers located in the Marmara region (Türkiye Çimento Müstahsilleri Birliği, 2014a; 2015a, b).

In 2014, 49 integrated cement plants and 20 grinding facilities were in operation in Turkey. The Turkish cement sector continued to add new capacity—the sector's total cement production capacity reached 113.5 Mt, and its total clinker production capacity increased to 69.6 Mt as of yearend 2014 compared with 107.4 Mt and 68.5 Mt, respectively, as of yearend 2013. Capacity utilization by cement producers decreased to 63.9% in 2014 from 68.6% in 2013, whereas capacity utilization by

clinker producers increased to 92.2% in 2014 from 91.7% in 2013 (Türkiye Çimento Müstahsilleri Birliği, 2014b, 2015c; International Cement Review, 2015, p. 353).

Domestically owned companies made up about 77% of Turkey's total capacity, and companies with some multinational ownership accounted for the remaining 23%. No individual company held a dominant position in the country's cement market. Ordu Yardımlaşma Kurumu (OYAK) Çimento Grubu was the leading cement producer and operated 10 cement plants that had a total (combined) annual capacity of 21.6 Mt. Adana Çimento Sanayii ve Ticaret A.Ş., which produced both gray and white cement, was OYAK's largest (in terms of output) cement subsidiary; it had the capacity to produce 5.5 Mt/yr of gray cement and 2.3 Mt/yr of clinker. In 2014, OYAK acquired Denizli Çimento, which had the capacity to produce 3.0 Mt of cement and 1.8 Mt of clinker, from CRH plc. and Eren Holdings A.Ş. The second-ranked cement producer in Turkey, Limak Şirketler Grubu, operated seven cement plants and three grinding units with a total (combined) capacity of 12.76 Mt/yr. In 2014, Limak was in the process of expanding the clinker production capacity of its plant in Balıkesir Province to 900,000 t/yr from 430,000 t/yr. It also commissioned a new 3,500 t/d line at its Trakya plant. Akçansa Çimento Sanayi ve Ticaret A.Ş., which was jointly owned by HeidelbergCement AG of Germany (40%) and Sabancı Holding A.Ş. (40%), was the third-ranked cement producer in Turkey. The company operated three cement plants and one grinding plant, and had a total production capacity of 9.2 Mt/yr (International Cement Review, 2015, p. 353–354; Limak Holding, 2015; Ordu Yardımlaşma Kurumu Çimento Grubu, 2015).

**Feldspar.**—Kaltun Madencilik Sanayi ve Ticaret A.Ş. was a leading feldspar producer in Turkey and had the capacity to produce 2 Mt/yr of feldspar, 150,000 t/yr of quartz, and 500 t/yr of mica from its mines, which were located in Cine, Milas, and Yatagan (all in Muğla Province). The company exported about 80% of its output. In 2014, Kaltun's total sales amounted to 1.5 Mt, of which 1.3 Mt was exports. The company accounted for about 40% of Turkey's feldspar production and 35% of its feldspar exports. Its biggest export markets were Italy and Spain, where it also operated milling and blending facilities. Kaltun also owned feldspar deposits in Egypt. The company aimed to increase its annual sales to 2 Mt in 2015 (Industrial Minerals, 2015b).

**Magnesium and Magnesite.**—Turkey produced all three major types of magnesia, including caustic calcined magnesia (CCM), dead-burned magnesia (DBM), and fused magnesia (FM). The refractories industry continued to be the largest end market for the country's magnesia production. Refractories for steel were the largest industrial consumer of magnesia, followed by cement and glass producers (Industrial Minerals, 2016).

Kümaş Kütahya Manyezit Sanayi A.Ş. was the country's leading DBM producer with a production capacity of 300,000 t/yr. The company operated magnesite mines in Bilecik, Eskisehir, and Kutahya Provinces and had total reserves of about 127 Mt. In May, Kümaş constructed two new furnaces with a combined production capacity of 18,000 t/yr in its Kutahya FM plant, which increased the plant's total FM capacity to 40,000 t/yr. Akdeniz Mineral Kaynakları A.Ş., a subsidiary of

Grecian Magnesite S.A. of Greece, was the country's second-ranked producer of magnesite. Its output consisted of a variety of CCM products. The company's deposits were located within three concessions totaling 42.4 square kilometers in Eskisehir Province. In October 2013, Akdeniz installed a new rotary kiln with a production capacity of 50,000 t/d of CCM, which doubled its annual CCM production capacity to 32,000 t/yr. About 75% of annual production was exported. Konya Selçuklu Krom Magnezit Tuğla Sanayi A.Ş. held deposits in Konya Province that were estimated to have about 9 Mt of proven and 40 Mt of probable magnesite reserves. The company operated a rotary kiln with the capacity to produce 40,000 t/yr of CCM. Magnesit Anonim Şirketi (MAŞ), which was a subsidiary of RHI Group of Austria, produced refractories and DBM in five kilns at its Dutlucu plant in Eskisehir Province by processing about 530,000 t/yr of magnesite extracted from its own mines in Eskisehir as well as magnesite obtained from other producers. MAŞ's had the capacity to produce 265,000 t/yr of DBM. The company intended to buy magnesite mining rights and a 60,000-t/yr-capacity DBM plant in Erzurum Province from Cihan Grubu; however, in September 2014, MAŞ announced that it would no longer pursue the deal owing to a contractual dispute (Grecian Magnesite S.A., 2013; Magnesit Anonim Şirketi, 2015; Industrial Minerals, 2016).

**Perlite.**—Bergama Mining Construction Machinery Perlite Industry & Trade Inc. was one of the leading producers of perlite in Turkey and had the capacity to produce about 120,000 t/yr of crushed and screened perlite ore in Bergama, Izmir Province. The company operated 10 perlite quarries using open pit mining within a licensed area of 5,752 hectares in Ankara, Canakkale, Izmir, and Manisa Provinces. Bergama Mining planned to build two new plants in the near future. The proposed Aliaga plant in Izmir Province would be located close to three perlite quarries and to Aliaga Port on the Aegean Sea coast. The proposed Akhisar plant in Manisa Province would produce perlite-based building materials (Bergama Mining Construction Machinery Perlite Industry & Trade Inc., 2015a–c).

**Phosphate Rock.**—Phosphate rock production started in Turkey in 2013 and continued in 2014. Eti Bakır operated the 550,000-t/yr-capacity Mazidagi phosphate fertilizer plant in Mardin Province. In May, the company obtained an incentive package to build a 2.3-Mt/yr-capacity phosphate plant in Mardin that would produce six types of chemicals. When completed, the new Mardin complex would have the capacity to produce 690,000 t/yr of pyrite, 650,000 t/yr of sulfuric acid, 437,000 t/yr of concentrated phosphate rock, and 325,000 t/yr of superphosphate (Ekinci, 2014; Eti Bakır A.Ş., 2014d).

**Soda Ash.**—Eti Soda A.Ş. was Turkey's leading soda ash producer. The company operated the Beypazari trona ore bed in Ankara Province that reportedly had the second largest reserves of soda ash in the world. The start of Eti Soda's construction of its greenfield Kazan Soda soda ash production complex in Kazan, Ankara Province, was delayed in 2014 owing to construction permit and financing issues. The Kazan facility was planned to have a production capacity of 1.5 Mt/yr of soda ash by the completion of phase 1 of the project in the second half of 2017 and 2.5 Mt/yr across two production lines in phase 2 by the first half of 2018. Construction was expected to begin in

January 2015. Turkey aims to become a leading European soda ash producer if Kozan Soda begins operating in 2017 as planned (Ciner Holding, 2015; Industrial Minerals, 2015a).

### ***Mineral Fuels, Related Materials, and Other Sources of Energy***

In 2014, Turkey's total primary energy supply was provided by natural gas (32.5%), petroleum (26.2%), hard coal (16.3%), lignite coal (12.3%), hydropower (2.8%), coke (2.4%), and geothermal energy (2.8%). Domestic energy production came primarily from lignite coal (47.8%), followed by hydropower and geothermal energy (11.3% each), petroleum (8%), wood and biomass (7.3%), wind (2.4%), and natural gas (1.6%). Turkey was reliant on imports for most of its natural gas and crude petroleum consumption in 2014 (T.C. Enerji ve Tabii Kaynaklar Bakanlığı, 2015; Türkiye Petrolleri Anonim Ortaklığı, 2015a, p. 37–38).

**Coal.**—Coal, in particular hard coal and lignite, constituted the bulk of Turkey's indigenous energy resources. The country had an estimated 14.2 Gt of lignite and 1.3 Gt of hard coal reserves and resources, of which 13.9 Gt and 0.5 Gt, respectively, were proven reserves. Lignite constituted 95% of indigenous coal production, whereas hard coal accounted for only 5%. The private sector's share of total output had increased in recent years, whereas that of the Government-owned enterprises TKI and EÜAŞ had decreased owing to the ongoing privatization of coal mines. In 2014, TKI's share in total lignite production decreased to 26%, and that of EÜAŞ, to 50%; the private sector's share increased to 24%. The share of TTK (a third Government-owned coal producer) in total hard coal production increased to 73% in 2014 from 71% in 2013 and 64% in 2012. TTK's hard coal output, however, decreased by 5% to 1.3 Mt in 2014 compared with production in 2013 (Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü, 2015a, p. 32, 43; Türkiye Taşkömürü Kurumu, 2015b, p. 22–23; U.S. Energy Information Administration, 2015, p. 8–9).

EÜAŞ was in the process of evaluating an estimated 1.8 Gt of new lignite resources discovered in Karapınar, Konya Province in 2014. The company signed an agreement with Edison S.p.A. of Italy for Edison to conduct feasibility studies in the region. The development of the reserves would require an investment of about \$8 billion. Also in 2014, companies from China, Japan, Qatar, and the Republic of Korea expressed interest in the construction and operation of a coal-based 8,000-megawatt (MW)-capacity powerplant in the Afsin-Elbistan region after Abu Dhabi National Energy Co. PdSC (TAQA) of the United Arab Emirates deferred its investment decision in late 2013. At a cost of between \$12 and \$14 billion, the construction of the powerplant would reportedly be the largest ever foreign investment made in Turkey. In September, the Government held official talks with the Government of Qatar about the project (Demirkan and Eryiğit, 2015, p. 176).

**Natural Gas, Petroleum, and Refined Petroleum Products.**—Turkey was estimated to hold proven petroleum reserves of 312 million barrels (Mbbbl) and natural gas reserves of 5 billion cubic meters in 2014, which were estimated to last 17 years and 10 years, respectively. Most of the country's petroleum reserves were located in the southeast in Adiyaman

and Batman Provinces; the remaining reserves were located in the northwest in Thrace. In 2014, Turkey's hydrocarbon production did not change significantly from previous years and supplied only a small portion of domestic consumption. Crude petroleum production amounted to 49,319 barrels per day (bbl/d) and met only 7% of domestic consumption of 718,000 bbl/d compared with 48,166 bbl/d of production and 714,000 bbl/d of consumption in 2013. Imports of crude petroleum decreased by 5% to 359,000 bbl/d, whereas imports of refined petroleum products increased by 7% to 310,000 bbl/d in 2014. Domestic natural gas production decreased to its lowest level in a decade to 502 million cubic meters in 2014 from 562 million cubic meters in 2013 owing to declining reserves. Natural gas production met only about 1.0% of domestic consumption of 49.8 billion cubic meters in 2014 compared with 1.2% in 2013. Turkey imported about 93% of its petroleum and 99% of its natural gas supplies in 2014. The main petroleum import sources were Iraq (which supplied 31% of Turkey's total petroleum imports), and Iran (30%), followed by Saudi Arabia (11%), and Nigeria (10%). The main natural gas import sources were Russia (which supplied 55% of total natural gas imports), followed by Iran (19%), and Azerbaijan and Algeria (9% each) (Enerji Piyasası Düzenleme Kurumu, 2015a, p. 7; Türkiye Petrolleri Anonim Ortaklığı, 2015a, p. 37–39, 43, 2015c; U.S. Energy Information Administration, 2015, p. 1, 2, 4, 5).

Domestic production of refined petroleum products took place in four refineries located in Batman, Izmir, Izmit, and Kirikkale Provinces; the refineries had a total (combined) distillation capacity of about 651,000 bbl/d. All four were owned by Türkiye Petrol Rafinerileri A.Ş. (Tüpraş). Diesel, unleaded gasoline, and jet fuel constituted 67% total refined products output. Their combined output decreased by 6.6% following a decrease of 3.0% in 2013. Total imports of refined products increased by 23% in 2014: imports of jet fuel increased by 60%, and those of diesel, by 26%. Two new refineries were planned. One refinery was being constructed in Izmir Province by Star Rafineri A.Ş. and was expected to begin operating in 2015. Another refinery was being planned in Yumurtalık in Adana Province by Doğu Akdeniz Petrokimya ve Rafineri Sanayi ve Ticaret A.Ş. The two refineries were expected to boost Turkey's total crude distillation capacity by 510,000 bbl/d to about 1.2 million barrels per day (International Energy Agency, 2014, p. 454; Enerji Piyasası Düzenleme Kurumu, 2015b, p. 7; Türkiye Petrol Rafinerileri A.Ş., 2015).

TPAO, which had preferential rights to undertake petroleum exploration and production in Turkey, accounted for 72% of domestic crude petroleum output and 50% of natural gas output in 2014. The company's production of petroleum primarily originated from oilfields in Batman (which accounted for 73% of total output), followed by Adiyaman (26%) and Thrace (1%). Production of natural gas took place primarily in Thrace, which accounted for 96% of the company's total natural gas output. In 2014, TPAO completed 233,500 m of drilling in 133 wells, accounting for 63% of total drilling in Turkey. TPAO also drilled most of the new hydrocarbon wells: it independently drilled 20 exploration wells, 31 identification wells, and 74 production wells, and, in partnership with other companies, 5, 7, and 1 well(s), respectively. Among the new wells,

the Hopa-1, Istranca-1, Kastamonu-1, Sinop-1, Sürmene-1/IRE, and Yassihöyük-1 wells, which were drilled in partnership with BP p.l.c. of the United Kingdom, Petrobras S.A. of Brazil, Exxon Mobil Corp. and Chevron Corp. of the United States in the Black Sea, yielded the most promising results. TPAO operated the 2.1-million-cubic-meter-per-day-capacity Akcakoca Platform in the western Black Sea, which produced an average of 250,000 to 300,000 cubic meters per day of natural gas. The company was also in the process of evaluating seismic results obtained off the coasts of Antalya and Mersin Provinces, Iskenderun district, and the country of Cyprus in the Mediterranean Sea (Enerji Piyasası Düzenleme Kurumu, 2015a, p. 5; Türkiye Petrolleri Anonim Ortaklığı, 2015a, p. 36, 41, 47, 48, 49; 2015c; U.S. Energy Information Administration, 2015, p. 2).

BOTAŞ dominated the natural gas market and accounted for about 80% of natural gas imports and most exports. It also operated all five of Turkey's hydrocarbon pipelines, which transported crude petroleum from Azerbaijan (through Georgia) and Iraq as well as within the country from Batman and Kirikkale Provinces to Ceyhan Port and Dortyol Port on the Mediterranean Sea coast. In 2014, the pipelines transported 353 Mbbbl of crude petroleum. To secure Turkey's energy supply, BOTAŞ had in place long-term natural gas purchase agreements with Russia (20 billion cubic meters per year), Azerbaijan (12.75 billion cubic meters per year), and Iran (9.6 billion cubic meters per year), and liquefied natural gas (LNG) purchase agreements with Algeria (4.4 billion cubic meters per year) and Nigeria (1.3 billion cubic meters per year). Imports of 6 billion cubic meters of gas from Azerbaijan's Shah Deniz Faz-II field were scheduled to begin in 2018. Under the draft version of the amendment to the Natural Gas Market Law of 2014, BOTAŞ was required to reduce its share of imports to 20% of annual consumption by selling its imports contracts. Other companies would no longer be prohibited from importing natural gas from countries with which BOTAŞ was already contracted (Boru Hatları ile Petrol Taşıma A.Ş., 2015a, p. 22–24; Demirkan and Eryiğit, 2015, p. 173; U.S. Energy Information Administration, 2015, p. 5).

**Shale Gas.**—Turkey was estimated to have 1.8 trillion cubic meters of shale gas reserves, which is about 40 times the current rate of gas consumption. Shell Upstream Turkey, a joint venture of TPAO and Royal Dutch Shell plc of the United Kingdom and the Netherlands, continued with early-stage exploration targeting of a shale resource in Dadas located north of Diyarbakir Province. The company had finished drilling and testing its first two wells, Konacik-1 and Akcay-1, and was in the process of analyzing the results before engaging in further exploration activity to determine the existence of gas in commercially viable amounts. As of September, TPAO was in negotiations with ExxonMobil and planned to sign an agreement with Halliburton Co. of the United States for projects to explore for shale gas in Thrace (Demirkan and Eryiğit, 2015, p. 178; Royal Dutch Shell plc., 2015; U.S. Energy Information Administration, 2015, p. 2).

**Thorium.**—According to Organisation for Economic Co-operation and Development (OECD) Nuclear Energy Agency and the International Atomic Energy Agency, Turkey had Europe's largest and the world's sixth largest identified thorium resources (after India, Brazil, Australia, United States,

and Egypt) with 374,000 t in 2014. This is about 6% of the world's thorium resources. Eti Maden estimated Turkey's share of world thorium resources to be 14% and the average grade of the resources to be 0.2% ThO<sub>2</sub>. The country's major thorium deposits are located in Sivrihisar in Eskisehir Province, Aksu in Isparta Province, and Hekimhan in Malatya Province. Eti Maden restarted resource exploration studies of the Sivrihisar deposit in 2011 and planned a resource development project for 2014–17, but no further updates were available (Bodur, 2012, p. 22–28; Organisation for Economic Co-operation and Development Nuclear Energy Agency and the International Atomic Energy Agency, 2014, p. 40; Birses, 2015, p. 44).

**Uranium and Nuclear Energy.**—In 2014, Turkey did not produce any uranium or nuclear energy. The country had identified uranium resources in at least five sites, among which the Temrezli deposit in Yozgat Province was the most significant. Uranium exploration activity was undertaken actively by private companies as well as by the MTA. In May, Anatolia Energy Ltd. of Australia, which owned 100% of the Temrezli in situ leach mining (ISL) uranium project, updated its economic assessment based on National Instrument 43–101 figures, reporting that costs would compare favorably with other ISL projects. As of yearend 2013, Temrezli had measured resources of 2,351 t of uranium (U) at a grade of 0.117% U, indicated resources of 2,004 t of uranium at a grade of 0.092% U, and inferred resources of 732 t of uranium at a grade of 0.075% U. Adur Madencilik Ltd. Şti., which was a subsidiary of Anatolia Energy, had obtained an operating license for the Temrezli deposit in October 2013, which was the first operating license ever granted to a uranium project in Turkey. The production license was expected to be issued in 2015 upon the completion of a prefeasibility study. Anatolia Energy also had three other prospects for uranium production as part of its Sefaatlı uranium project—the Akcami, the Delier, and the Tulu Tepe prospects. Significant uranium mineralization had been discovered in Sefaatlı in the 1980s. Anatolia Energy was in the process of conducting a drilling program on the Delier prospect to define resources. The company considered operating Sefaatlı as a satellite of Temrezli (the two sites were located only 35 km away from one another (World Nuclear News, 2013; Organisation for Economic Co-operation and Development Nuclear Energy Agency and the International Atomic Energy Agency, 2014, p. 416–418; World Nuclear Association, 2016).

Turkey planned to build three nuclear powerplants—the Akkuyu, the Sinop, and the Igneada plants—as an essential component of the Government's new energy policy to reduce dependence on imported mineral fuels. With 4.8 gigawatts (GW) of electricity-generating capacity, these plants were expected to generate at least 6% of the country's electricity by 2023. The four-unit Akkuyu powerplant in Mersin Province on the Mediterranean Sea coast would be built, owned, and operated by Rosatom of Russia; it would have a life cycle of 60 years. In January, the site license for the plant was granted by the TAEEK. In December, the EIA was approved by the Ministry of Environment and Urbanization. Construction was expected to begin in 2015, and the first unit was scheduled to be in operation in 2021. The four-unit Sinop powerplant in Sinop Province on the Black Sea coast would be built by

Mitsubishi Heavy Industries of Japan and Areva Group of France and operated by GdF Suez of France; it would have an electricity-generating capacity of 5 to 5.6 GW. In August, the Government concluded a Memorandum of Understanding (MOU) with the Government of Japan and signed the host-government agreement for the Sinop plant. In December, the MOU was submitted to the Parliament for ratification. The feasibility study for the Sinop plant was due in 2017, when construction was also scheduled to begin. The first unit was expected to be in operation by 2023. The ETKB also planned to commission the construction of a third nuclear powerplant, possibly in Igneada in Kırklareli Province in Thrace. In November, EÜAŞ began negotiations with the State Nuclear Power Technology Corp. (SNPTC) of China for the construction of a four-unit plant, which would use reactors from Westinghouse of the United States. Construction was expected to begin in 2019 at the earliest (T.C. Enerji ve Tabii Kaynaklar Bakanlığı, 2014, p. 39–41; Demirkan and Eryiğit, 2015, p. 176; U.S. Energy Information Administration, 2015, p. 9–10; World Nuclear Association, 2016).

## Outlook

Turkey's mineral industry may resume an upward trajectory in terms of output and exports in 2015 after experiencing a slight decrease in the past 2 years if global mineral commodity prices stabilize and demand for Turkish mineral exports by its main trading partners, including China, the United States, the EU, and the countries of the Middle East and North Africa, increases. Although the gross value added by the mineral industry decreased in 2014, mineral extraction and processing activities are expected to contribute to an increasing share of the country's GDP in coming years, in part owing to new Government incentives for the industry. Numerous capacity expansion and modernization projects for such industrial minerals as boron, cement, feldspar, magnesite, phosphate rock, and soda ash, and for such metals as aluminum, molybdenum, and steel, are expected to be completed in the near future. Cobalt and nickel production are likely to increase substantially with the establishment of production facilities for each in Turkey. Although some were put on hold in 2014, multiple exploration and extraction projects in precious metals, such as copper, gold, and silver, may yield increased reserves and, subsequently, higher output in coming years. As a result, Turkey may account for an increasing percentage of world nonferrous metal output while also enhancing its role as a leading supplier of boron, cement, feldspar, marble, and steel. Uranium exploration remains at a relatively early stage; however, exploration efforts could increase, given the Government's emphasis on nuclear energy as an essential ingredient of the country's future energy supply. The new energy strategy also envisions reducing imports of natural gas and petroleum by 2019, but the attainment of that goal hinges on whether new reserves of mineral fuels, in particular reserves of coal and petroleum, are identified so that domestic production can be increased. Turkey is also expected to become more self-sufficient in other minerals that the country currently has to import to meet at least a portion of domestic demand, including aluminum, cobalt, iron ore, nickel, and zinc.

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TABLE 1  
TURKEY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2010	2011	2012	2013	2014
<b>METALS</b>					
Aluminum	60,000	65,000 <sup>r</sup>	43,700 <sup>r</sup>	42,200 <sup>r</sup>	53,500 <sup>e</sup>
Antimony:					
Ore, mine output:					
Gross weight	25,974	43,340	131,839	83,553	55,791
Sb content <sup>e</sup>	1,400	2,400	7,300	4,600	3,100
Concentrates: <sup>c</sup>					
Gross weight	5,400	8,600	26,200	16,600	11,100
Sb content	1,300	2,200 <sup>r</sup>	6,600 <sup>r</sup>	4,200 <sup>r</sup>	2,800
Bauxite and alumina:					
Bauxite	1,311,064	1,024,915	1,521,150	795,562	1,091,442
Alumina, gross weight <sup>c</sup>	160,000	160,000	200,000	105,000	144,000
Chromium, gross weight (34% to 43% chromic oxide) <sup>2</sup>	1,900,000 <sup>r</sup>	2,900,000 <sup>r</sup>	3,600,000	3,200,000	2,900,000
Copper:					
Mine output, exclusive of pyrite: <sup>3</sup>					
Gross weight	5,469,844	5,687,058	7,684,052	7,983,438	6,422,445
Cu content of ore <sup>e</sup>	70,900 <sup>r</sup>	93,700 <sup>r</sup>	102,000 <sup>r</sup>	121,000 <sup>r</sup>	96,900
Metal: <sup>c</sup>					
Smelter output, primary and secondary	30,000 <sup>r</sup>	35,600 <sup>r</sup>	40,500 <sup>r</sup>	40,800 <sup>r</sup>	40,000
Refined	47,200 <sup>r</sup>	86,400 <sup>r</sup>	86,000 <sup>r</sup>	91,200 <sup>r</sup>	91,000
Gold, metal, refined	17,000 <sup>r</sup>	24,600 <sup>r</sup>	29,500 <sup>r</sup>	33,500 <sup>r</sup>	31,300
Iron and steel:					
Iron ore:					
Gross weight					
Fe content <sup>e</sup>					
Metal:					
Pig iron and ferroalloys:					
Pig iron	7,679,000 <sup>r</sup>	8,173,000	8,613,000	9,180,000	9,364,000
Ferrochromium <sup>c</sup>	50,000	53,000 <sup>r</sup>	56,000 <sup>r</sup>	60,000 <sup>r</sup>	61,000
Ferrosilicon <sup>c</sup>	1,000	2,000	2,000	2,500 <sup>r</sup>	2,500
Steel, crude, including castings	29,143 <sup>r</sup>	34,107 <sup>r</sup>	35,885 <sup>r</sup>	34,654 <sup>r</sup>	34,035
Lead:					
Mine output, Pb and Pb-Zn ores:					
Gross weight	526,277	1,044,222	1,076,088	1,491,669	2,206,054
Pb content <sup>e</sup>	23,000	40,000	46,000	64,000	95,000
Concentrates: <sup>c</sup>					
Gross weight	40,000	78,000	80,000	111,000	165,000
Pb content	26,000 <sup>r</sup>	46,000 <sup>r</sup>	47,000 <sup>r</sup>	66,000 <sup>r</sup>	98,000
Manganese ore, gross weight <sup>4</sup>	134,336	172,248	192,756	321,785	245,830
Molybdenum, Mo content	--	400 <sup>e</sup>	600 <sup>e</sup>	800 <sup>e</sup>	900 <sup>e</sup>
Nickel, mine output, Ni content <sup>e</sup>	1,900 <sup>r</sup>	4,300 <sup>r</sup>	3,500 <sup>r</sup>	1,100 <sup>r</sup>	3,000
Silver, mine output, Ag content	363,520	246,500	193,890	189,600	183,880
Zinc, mine output, Zn and Cu-Zn ore:					
Gross weight	421 <sup>r</sup>	793	1,035 <sup>r</sup>	991 <sup>r</sup>	1,041
Zn content <sup>e</sup>	85 <sup>r</sup>	160 <sup>r</sup>	209 <sup>r</sup>	200 <sup>r</sup>	210
<b>INDUSTRIAL MINERALS</b>					
Aluminum sulfate, alunite	433,310	--	--	13,568	--
Barite, crude	172,618	250,786	1,677,221	736,316	203,984
Boron minerals:					
Run of mine	4,520,000 <sup>r</sup>	6,348,487	5,660,000 <sup>r</sup>	5,730,000 <sup>r</sup>	7,309,708
Concentrates	2,220,000	2,130,000	2,220,000 <sup>r</sup>	2,000,000 <sup>r</sup>	1,870,000
Refined borates	1,400,000	1,780,000	1,790,000 <sup>r</sup>	1,780,000 <sup>r</sup>	1,990,000
Calcite	6,629,005	10,084,119	9,248,471	9,727,092	11,054,222

See footnotes at end of table.

TABLE 1—Continued  
TURKEY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2010	2011	2012	2013	2014	
INDUSTRIAL MINERALS—Continued						
Cement, hydraulic	thousand metric tons	62,737	63,405	63,879	71,337	71,329
Clinker	do.	52,832	54,275	54,823	60,236	62,513
Chalcedony		1,814	896	2,287	2,249	1,689
Clays:						
Bentonite		798,397	471,528	1,033,568	622,872	1,088,444
Kaolin		787,287	1,229,352	988,081	1,168,441	2,032,103
Other		4,030,961	3,747,503	4,119,513	3,411,915	4,445,962
Total		5,616,645	5,448,383	6,141,162	5,203,228	7,566,509
Diatomite		18,448	45,187	86,403	84,571	61,884
Emery		67,989	113,602	54,848	43,776	38,816
Feldspar, run of mine		6,281,597	7,076,068 <sup>r</sup>	9,479,699 <sup>r</sup>	13,764,126 <sup>r</sup>	7,960,844
Fluorspar		25,189	4,524	5,197	3,874	4,271
Graphite, run of mine		--	5,250	31,500	28,740	3,850
Gypsum, other than that for cement		6,321,891	5,723,439	8,248,446	9,790,097	9,051,158
Leonardite		--	--	--	5,737	2,996
Lime <sup>5,c</sup>	thousand metric tons	4,300	4,300	4,500	4,400 <sup>r</sup>	4,300
Magnesium, magnesite, run of mine		2,316,763	2,588,276	2,475,828	2,597,465	2,377,157
Mica:						
Illite		35,622	17,265	--	800	16,200
Other		387	277	1,253	1,504	9,240
Nepheline syenite		1,308	1,500	4,000	404	2,241
Nitrogen, N content of ammonia <sup>c</sup>		200,000	200,000	280,000	280,000	300,000
Obsidian		106	300	1,230	3,240	400
Olivine		192,394	221,079	244,353	126,990	244,138
Peat		214,620	148,012	108,610	156,357	150,828
Perlite, run of mine		545,585	702,673	887,600	1,075,949	897,125
Phosphate rock		--	--	--	510,080	604,000
Pumice		4,198,751	5,822,501	4,556,632	5,159,047	6,710,170
Pyrites, cupreous, gross weight		131,315	135,190	124,000	107,792	95,220
Quartz and quartzite		2,542,372	4,367,678	3,430,404	3,957,836	3,494,347
Sepiolite (meerschaum) and palygorskite (attapulgit)		16,342	30,716	31,180	59,426	52,658
Silica (quartz) sand		4,022,433	7,020,622	7,085,380	7,969,392	10,258,912
Sodium compounds:						
Salt, NaCl, all types	thousand metric tons	4,044	6,546	5,255	5,565	5,932
Soda ash, trona	do.	1,623	1,749	1,853	1,665	1,828
Sodium sulfate		1,600,603	2,491,441	1,366,179	1,000,150	779,894
Stone:						
Basalt		1,837,450 <sup>r</sup>	1,830,672 <sup>r</sup>	3,196,140 <sup>r</sup>	3,328,929 <sup>r</sup>	3,739,116
Diabase		1,969	293,777	94,835	335,958	226,939
Dolomite		15,224,546	20,340,135	16,950,670	17,291,454	15,743,710
Granite		239,819	245,911	566,650	896,348	1,219,916
Limestone, for cement	thousand metric tons	270,441	345,014	365,348	392,352	382,404
Marble	cubic meters	3,352,070	4,086,222	4,488,947	4,255,545	4,220,564
Onyx	do.	2,113	7,678	13,335	15,665	10,688
Sandstone		8,908,971	6,127,433	6,356,666	10,453,003	9,609,882
Serpentine		26,745	2,514,601	1,025,427	14,701	13,112
Travertine	cubic meters	879,319	1,685,049	797,915	713,697	812,840
Sulfur:						
Byproduct of petroleum		427	3,820	5,889	8,069	8,000 <sup>e</sup>
S content of pyrites <sup>c</sup>		34,000	35,000	32,000	28,000	25,000
Total		34,400	38,800	37,900	36,069	25,000
Talc		1,826	9,959	14,537	1,132	5,048
Titanium minerals, rutile, gross weight		1,000	--	5,000	5,000	5,000
Zeolites		33,813	214,179	60,258	33,197	49,366
Zirconium		--	500	200	--	1,100

See footnotes at end of table.

TABLE 1—Continued  
TURKEY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2010	2011	2012	2013	2014
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Asphalt, natural	285,362	572,089	649,830	648,953	336,852
Coal:					
Hard coal, run of mine	2,727	2,619	3,235	2,789	1,917
thousand metric tons					
Lignite, run of mine	81,957	82,375	78,014	63,324	65,739
do.					
Coke and semicoke <sup>c</sup>	3,900	4,000	4,000	4,000	3,500
do.					
Gas, natural, marketed	726 <sup>r</sup>	793 <sup>r</sup>	664 <sup>r</sup>	562 <sup>r</sup>	502
million cubic meters					
Petroleum: <sup>c</sup>					
Crude	18,300 <sup>r</sup>	17,400 <sup>r</sup>	17,100 <sup>r</sup>	17,600 <sup>r</sup>	18,000
thousand 42-gallon barrels					
Refinery products:					
Liquefied petroleum gas	7,900	8,800	9,100 <sup>r</sup>	9,200 <sup>r</sup>	8,100
do.					
Gasoline	33,400 <sup>r</sup>	35,200 <sup>r</sup>	37,700 <sup>r</sup>	36,800 <sup>r</sup>	34,900
do.					
Naphtha	4,000	4,000	3,500	3,500	3,000
do.					
Jet fuel and kerosene	21,100 <sup>r</sup>	23,200 <sup>r</sup>	26,400 <sup>r</sup>	28,800 <sup>r</sup>	28,600
do.					
Distillate fuel oil	41,900 <sup>r</sup>	45,300 <sup>r</sup>	47,400 <sup>r</sup>	48,100 <sup>r</sup>	45,300
do.					
Lubricants	2,200	2,800	1,900 <sup>r</sup>	1,000 <sup>r</sup>	800
do.					
Residual fuel oil	17,900 <sup>r</sup>	16,100 <sup>r</sup>	10,200 <sup>r</sup>	10,200 <sup>r</sup>	10,000
do.					
Asphalt	16,900	17,900 <sup>r</sup>	17,000 <sup>r</sup>	17,700 <sup>r</sup>	11,600
do.					
Unspecified <sup>6</sup>	4,300 <sup>r</sup>	4,900 <sup>r</sup>	5,400 <sup>r</sup>	4,000 <sup>r</sup>	3,500
do.					
Total	150,000 <sup>r</sup>	158,000 <sup>r</sup>	159,000 <sup>r</sup>	159,000 <sup>r</sup>	146,000

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Table includes data available through February 16, 2016.

<sup>2</sup>Approximately 70% of gross production is salable product.

<sup>3</sup>Copper mines produce a copper concentrate (of about 22% Cu) and a cupreous pyrite concentrate (of about 0.7% Cu). Copper is not recovered from the cupreous pyrite concentrate.

<sup>4</sup>Does not include manganiferous iron ore from the Deveci Mine, production of which amounts to several hundred thousand metric tons per year and has a manganese content of 3% to 5%.

<sup>5</sup>Estimated sales only.

<sup>6</sup>Includes refinery fuel and losses.

TABLE 2  
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum, metal	Eti Alüminyum A.Ş. (Cengiz Holding A.Ş., 100%)	Smelter at Seydisehir, Konya Province	70
Antimony ore, Sb content	Eti Bakır A.Ş. (Cengiz Holding A.Ş., 100%)	Halikoy, Izmir Province	100
Do.	Özdemir Antimuan Maden Limited Şti. (Koza-İpek Holding A.Ş.)	Turhal, Tokat Province	NA
<b>Bauxite and alumina:</b>			
Alumina	do.	Refinery at Seydisehir, Konya Province	270
Bauxite	do.	Mines near Madenli, about 25 kilometers south of Seydisehir, Konya Province	500
Do.	Demireller Tarım Madencilik Petrol Sanayi ve Ticaret Limited Şti.	Mines near Arslankoy, Mersin Province	500
Do.	Albuck Madencilik San. ve Tic. A.Ş.	Mine near Cirpi, Mugla Province	NA
Do.	do.	Mine near Mihaliccik, Eskisehir Province	NA
<b>Boron:</b>			
Concentrate and ground ore	Bigadiç Bor İşletme Müdürlüğü (Eti Maden İşletmeleri Genel Müdürlüğü, 100%) (Government)	Four open pit mines at Bigadic, Balikesir Province	650
Do.	Emet Bor İşletme Müdürlüğü (Eti Maden İşletmeleri Genel Müdürlüğü, 100%) (Government)	Espey Mine, Emet, Kutahya Province	500
Do.	do.	Hisarcik Mine, Emet, Kutahya Province	500
Do.	Kestelek Bor İşletme Müdürlüğü (Eti Maden İşletmeleri Genel Müdürlüğü, 100%) (Government)	Kestelek Mine, Bursa Province	100
Do.	Kırka Bor İşletme Müdürlüğü (Eti Maden İşletmeleri Genel Müdürlüğü, 100%) (Government)	Mine at Kırka, Eskisehir Province	800
Refined borates	Bandırma Bor ve Asit Fabrikaları İşletme Müdürlüğü (Eti Maden İşletmeleri Genel Müdürlüğü, 100%) (Government)	Plant at Bandırma, Balikesir Province	115
Do.	Emet Bor İşletme Müdürlüğü (Eti Maden İşletmeleri Genel Müdürlüğü, 100%) (Government)	Boric acid complex, Emet, Kutahya Province	290
Do.	Kırka Bor İşletme Müdürlüğü (Eti Maden İşletmeleri Genel Müdürlüğü, 100%) (Government)	Plant at Kırka, Eskisehir Province	840
Calcite	Hisar Madencilik (Kombassan Holding, 100%)	2 plants in Aksaray and Aydın	120
<b>Cement:</b>			
Gray portland	Adana Çimento Sanayii ve Ticaret A.Ş. [Ordu Yardımlaşma Kurumu (OYAK) Çimento Grubu, 57%]	Adana, Adana Province	5,500
Do.	do.	Iskenderun grinding plant, Iskenderun, Hatay Province	1,000
Do.	Afyon Çimento Sanayii Ticaret A.Ş. (Ciments Français S.A., 77%)	Afyon, Afyonkarahisar Province	550
Do.	Akçansa Çimento Sanayi ve Ticaret A.Ş. (HeidelbergCement AG, 40%, and Sabancı Holding A.Ş., 40%)	Buyukcekmece plant, Buyukcekmece, Istanbul Province	2,600
Do.	do.	Canakkale plant, about 11 kilometers northwest of Ezine, Canakkale Province	5,500
Do.	do.	Ladik plant, Ladik, Samsun Province	1,050
Do.	Aslan Çimento A.Ş. [Ordu Yardımlaşma Kurumu (OYAK) Çimento Grubu, 97%]	Darica plant, Gebze, Kocaeli Province	2,000
Do.	AS Çimento Sanayi ve Ticaret A.Ş.	Bucak, Burdur Province	4,300
Do.	Aşkale Çimento Sanayi ve Ticaret A.Ş.	Trabzon plant, Degirmendere, Trabzon Province	1,000
Do.	do.	Askale, Erzurum Province	900
Do.	Bakırçay Çimento Sanayii ve Ticaret A.Ş. (Kars Çimento San. ve Tic. A.Ş., 98%)	Poyracik, near Kinik, Izmir Province	12
Do.	Bartın Çimento Sanayii ve Ticaret A.Ş. (Sanko Holding A.Ş.)	Bartın plant, Bartın Province	400
Do.	Baştaş Çimento Sanayii A.Ş. (Vicat Group, 85%)	Elmadag, Ankara Province	1,500
Do.	Batiçim Batı Anadolu Çimento Sanayii A.Ş. (Orascom Construction Industries, 23%)	Bornova, Izmir Province	2,000
Do.	Batsöke Söke Çimento Sanayii ve Ticaret A.Ş. (Batiçim Batı Anadolu Çimento Sanayii A.Ş., 75%)	Soke, Aydın Province	1,300
Do.	Bolu Çimento Sanayii A.Ş. [Ordu Yardımlaşma Kurumu (OYAK) Çimento Grubu, 52%]	About 14 kilometers east of Bolu, Bolu Province	5,500
Do.	do.	Ankara grinding plant, Kazan, Ankara Province	800
Do.	Bursa Çimento Sanayii ve Ticaret A.Ş. (Bursa Çimento Fabrikası A.Ş., 98%)	Kestel, Bursa Province	3,000

See footnotes at end of table.

TABLE 2—Continued  
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement—Continued:			
Gray portland—Continued	Çimentaş İzmir Çimento Fabrikası Türk A.Ş. (Interceem SA, 67%, and Cementir Holding SpA, 29%)	Isikkent, Izmir Province	2,600
Do.	do.	Trakya plant, Lalapasa, Edirne Province	1,300
Do.	Çimko Adıyaman Çimento ve Beton Sanayii ve Ticaret A.Ş. (Çimko Çimento ve Beton Sanayii Ticaret A.Ş.)	About 18 kilometers southwest of Adıyaman, Adıyaman Province	1,350
Do.	Çimko Çimento Kahramanmaraş Narlı Fabrikası (Çimko Çimento ve Beton Sanayii Ticaret A.Ş.)	Narlı plant, Narlı, Kahramanmaraş Province	3,300
Do.	Cimpor Yibitaş Çimento Sanayii ve Ticaret A.Ş. (Cimpor Internacional, SGPS, S.A., 99%)	Corum plant, Corum, Corum Province	950
Do.	do.	Hasanoglan grinding plant, Hasanoglan, Ankara Province	725
Do.	do.	Nevşehir grinding plant, Kalaba, Nevşehir Province	300 <sup>c</sup>
Do.	do.	Samsun grinding plant, about 6 kilometers west of Samsun, Samsun Province	300 <sup>c</sup>
Do.	do.	Sivas plant, Sivas, Sivas Province	615
Do.	do.	Yozgat plant, Saraykoy, Yozgat Province	800
Do.	Çimsa Çimento Sanayii ve Ticaret A.Ş. (Sabancı Holding A.Ş., 47%)	Ankara grinding plant, Lalahan, Ankara Province	230
Do.	do.	About 20 kilometers northwest of Eskisehir, Eskisehir Province	1,800
Do.	do.	Near Agirnas, Kayseri Province	1,000
Do.	do.	Mersin plant, Yenitaskent, Mersin Province	2,300
Do.	do.	Nigde plant, Nigde, Nigde Province	1,200
Do.	Denizli Çimento Sanayi ve Ticaret A.Ş. (OYAK, 100%)	About 5 kilometers northwest of Kaklık, Denizli Province	3,000
Do.	Elazığ Çimento A.Ş. (Kars Çimento Sanayii ve Ticaret A.Ş., 93.55%; Cimentas A.Ş., 6.17%; Bakırçay Çimento Sanayii ve Ticaret A.Ş., 0.27%)	Elazig, Elazig Province	900
Do.	Ereğli Çimento Sanayii ve Ticaret A.Ş. [Ordu Yardımlaşma Kurumu (OYAK) Çimento Grubu, 50%]	Karadeniz Ereğli plant, Kemer, Zonguldak Province	300
Do.	Göлтаş Çimento A.Ş. (Sadecib S.A., 34%, and Göl Yatırım Holding A.Ş., 28%)	About 15 kilometers north-northwest of Isparta, Isparta Province	2,000
Do.	Kars Çimento Sanayii ve Ticaret A.Ş. (Cimentas A.Ş., 58%, and Alfacem Srl, 40%)	Bozkale, Kars Province	2,800
Do.	Konya Çimento Sanayii A.Ş. (Vicat Group, 81%)	Konya, Konya Province	1,600
Do.	Lafarge Van Çimento A.Ş. (Lafarge S.A., 99.99%)	Edremit, Van Province	600
Do.	Limak Ege Çimento Sanayii ve Ticaret A.Ş. (Limak Şirketler Grubu)	Ege plant, Turgutlu, Manisa Province	700
Do.	Limak Kurtalan Çimento Sanayii ve Ticaret A.Ş. (Limak Şirketler Grubu)	Ambarlı grinding plant, Buyukcekmece, Istanbul Province	1,200
Do.	do.	Ankara plant, Ankara, Ankara Province	1,600
Do.	do.	Balikesir, Balikesir Province	1,300
Do.	do.	Gaziantep plant, Gaziantep (Sehit Kamil), Gaziantep Province	1,400
Do.	do.	Kurtalan plant, Kurtalan, Siirt Province	1,200
Do.	do.	Mardin, Balikesir Province	790
Do.	do.	Sanliurfa plant, about 14 kilometers north-northwest of Sanliurfa, Sanliurfa Province	2,150
Do.	do.	Trakya plant, Pinarhisar, Kirklareli Province	1,600
Do.	Limak Madencilik Yapı Çimento Sanayii ve Ticaret A.Ş. (Limak Şirketler Grubu)	Ergani plant, Ergani, Diyarbakir Province	1,400
Do.	Limak-Istaç İnşaat Sanayi ve Ticaret A.Ş.	Bitlis plant, Bitlis Province	1,000
Do.	Mardin Çimento Sanayii ve Ticaret A.Ş. [Ordu Yardımlaşma Kurumu (OYAK) Çimento Grubu, 56%]	About 6 kilometers northeast of Mardin, Mardin Province	3,000

See footnotes at end of table.

TABLE 2—Continued  
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
<b>Cement—Continued:</b>			
Gray portland—Continued	Nuh Çimento Sanayi A.Ş. (Nuh Ticaret ve Sanayi A.Ş., 43%)	Hereke, Kocaeli Province	5,700
Do.	Taçım Çimento Sanayii ve Ticaret A.Ş. (Soyak Holding A.Ş. and TBS Taşıma Beton A.Ş.)	Evrencik, Vize, Kırklareli Province	2,000
Do.	Ünye Çimento Sanayi ve Ticaret A.Ş. [Ordu Yardımlaşma Kurumu (OYAK) Çimento Grubu, 51%, and Nuh Çimento Sanayi A.Ş., 39%]	Unye, Ordu Province	2,600
Slag	KarÇimsa Çimento Sanayii ve Ticaret A.Ş. (Akçansa Çimento Sanayi ve Ticaret A.Ş.)	Karabuk, Karabuk Province	200
White	Adana Çimento Sanayii ve Ticaret A.Ş. [Ordu Yardımlaşma Kurumu (OYAK) Çimento Grubu, 57%]	Adana, Adana Province	325
Do.	Çimsa Çimento Sanayii ve Ticaret A.Ş. (Sabancı Holding A.Ş., 47%)	Mersin plant, Yenitaskent, Mersin Province	1,000 <sup>e</sup>
Chromium	Eti Krom A.Ş. (Yildirim Holding A.Ş., 100%)	Mines in Adana, Diyarbakir, Elazig, Hatay, Kayseri, and Malatya Provinces	1,000
<b>Coal:</b>			
Anthracite (hard)	Amasra Taskömürü İşletme Müessesesi [Türkiye Taşkömürü Kurumu (TTK)] (Government)	Amasra Mine, Amasra, Bartın Province	5,000
Do.	Armutçuk Taskömürü İşletme Müessesesi [Türkiye Taşkömürü Kurumu (TTK)] (Government)	Armutçuk Mine, Kandilli, Zonguldak Province	400
Do.	Karadon Taskömürü İşletme Müessesesi [Türkiye Taşkömürü Kurumu (TTK)] (Government)	Karadon Mine, Kilimli, Zonguldak Province	450
Do.	Kozllu Taskömürü İşletme Müessesesi [Türkiye Taşkömürü Kurumu (TTK)] (Government)	Kozlu Mine, Kozlu, Zonguldak Province	600
Do.	Üzülmez Taskömürü İşletme Müessesesi [Türkiye Taşkömürü Kurumu (TTK)] (Government)	Uzulmez Mine, Asma, Zonguldak Province	500
Lignite <sup>1</sup>	Bursa Linyitleri İşletmesi Müdürlüğü [Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ)] (Government)	Bursa lignite facility, Orhaneli, Bursa Province	1,000
Do.	Çan Linyitleri İşletmesi Müdürlüğü [Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ)] (Government)	Can lignite facility, Can, Canakkale Province	1,800
Do.	Ege Linyitleri İşletmesi Müessesesi Müdürlüğü [Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ)] (Government)	Soma Mine, Soma, Manisa Province	10,500
Do.	Garp Linyitleri İşletmesi Müessesesi Müdürlüğü [Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ)] (Government)	Tuncbilek mining center, Tavşanlı, Kutahya Province	7,000
Do.	Güney Ege Linyitleri İşletmesi Müessesesi Müdürlüğü [Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ)] (Government)	South Aegean lignite facility, Yatagan, Mugla Province	4,900
Do.	Ilgın Linyitleri İşletmesi Müdürlüğü [Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ)] (Government)	Ilgın lignite facility, Ilgın, Konya Province	300
Do.	Seyitömer Linyitleri İşletmesi Müessesesi Müdürlüğü [Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ)] (Government)	Seyitomer lignite facility, Seyitomer, Kutahya Province	8,000
Do.	Yeniköy Linyitleri İşletmesi Müdürlüğü [Türkiye Kömür İşletmeleri Kurumu Genel Müdürlüğü (TKİ)] (Government)	Yeniköy lignite facility, Oren (Milas), Mugla Province	8,500
<b>Copper:</b>			
Concentrate, Cu content	Çayeli Bakır İşletmeleri A.Ş. (First Quantum Minerals Ltd., 100%)	Cayeli Mine, near Cayeli, Rize Province	37
Do.	Demir Export A.Ş. (Koç Holding A.Ş.)	Lahanos Mine, Giresun Province	4
Do.	Eti Bakır A.Ş. (Cengiz Holding A.Ş., 100%)	Kastamonu Kure facility (three open pit mines and one underground mine), 50 kilometers north of Kastamonu, Kastamonu Province	110
Do.	Eti Bakır A.Ş. (Cengiz Holding A.Ş., 100%)	Murgul facility (three open pit mines, including the Anayatak and the Cakmakaya Mines), Murgul, Artvin Province	130
Do.	Kuzey Ege Bakır İşletmeleri A.Ş. (Özdoğu İnşaat Tic. Ltd. Şti, 100%)	Tepeoba, Balıkesir Province	55
Do.	Nesko Maden (Yıldızlar SSS Holding, 100%)	Ivrindi facility, Balıkesir Province	NA
Do.	do.	Kocayayla Mine, Canakkale Province	NA
Do.	do.	Yenice Mine, Canakkale Province	NA

See footnotes at end of table.

TABLE 2—Continued  
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
<b>Copper—Continued:</b>				
Concentrate, Cu content— Continued	Park Elektrik Üretim Madencilik San. ve Tic. A.Ş. (Park Holding A.Ş., 61.24%; Turgay Ciner, 6.76%; others, 32%)		Madenkoy, Siirt Province	20
Anode (blister)	Eti Bakır A.Ş. (Cengiz Holding A.Ş.)		Smelter, Tekkekoy, Samsun Province	38
Cathode	Er-Bakır Elektrolitik Bakır Mamulleri A.Ş.		Denizli, Denizli Province	200
Do.	Sarkuysan Elektrolitik Bakır San. ve Tic. A.Ş.		Darica, Kocaeli Province	200
Feldspar	Kaltun Madencilik Sanayi ve Ticaret A.Ş.		Cine, Milas, Yatagan Mines, Mugla Province	2,000
Ferrochromium, high-carbon	Eti Krom A.Ş. (Yildirim Holding A.Ş., 100%)		About 55 kilometers east of Elazig, Elazig Province	150
Do.	Eti Elektrometalurji A.Ş. (Özdoğu İnşaat Tic. Ltd. Şti, 100%)		12 mines in Mugla, Fethiye, and Gocek	100
<b>Fertilizer:</b>				
Ammonium nitrate	Kütahya Gübre Sanayii A.Ş. (Yıldız Yatırım Holding A.Ş.)		Kutahya, Kutahya Province	344
Diammonium phosphate	Samsun Gübre Fabrikası [Türkiye Gübre Sanayii A.Ş. (TÜGSAŞ)]		Tekkekoy, Samsun Province	227
Do.	Ege Gübre Sanayii A.Ş.		Aliaga, Izmir Province	165
Do.	İstanbul Gübre Sanayii A.Ş. (IGSAŞ) (Yıldız Yatırım Holding A.Ş.)		Korfez, Kocaeli Province	240
Monoammonium phosphate	Ege Gübre Sanayii A.Ş.		Aliaga, Izmir Province	130
<b>Gold:</b>				
Ore, Au content	kilograms	Koza Altın İşletmeleri A.Ş. (ATP İnşaat ve Ticaret A.Ş., 60%, and Koza İpek Holding A.Ş., 40%)	Ovacik Mine, Ovacik, Mugla Province	2,000
Do.	do.	do.	Mastra Mine, near Demirkaynak, Gumushane Province	5,000
Do.	do.	do.	Cukuralan Mine, Dikili, Izmir Province <sup>2</sup>	3,800
Do.	do.	do.	Corakliktepe Mine, Ovacik, Mugla Province	500
Do.	do.	do.	Hitmetdede Mine, Kayseri Province	NA
Do.	do.	do.	Kaymaz Mine, Sivrihisar, Eskisehir Province	3,300
Do.	do.	Anagold Madencilik Sanayi ve Ticaret A.Ş. (Alacer Gold Corp., 80%, and Lidya Madencilik Sanayi ve Ticaret A.Ş., 20%)	Copler Mine	6,000
Do.	do.	Gümüştaş Madencilik ve Ticaret A.Ş.	Niğde-Bolkar Mine, Niğde Province	NA
Do.	do.	Pomzaexport Madencilik Sanayi ve Ticaret A.Ş.	Sart placer mine, Manisa Province	NA
Do.	do.	Tüprag Metal Madencilik Sanayi ve Ticaret A.Ş. (Eldorado Gold Corp., 100%)	Kisladag Mine, Katranci, Usak Province	10,000
Do.	do.	do.	Efemcukuru Mine, Izmir Province	4,000
Metal	metric tons	Atasay Kuyumculuk Sanayi ve Ticaret A.S.	Refinery at Istanbul	15
Do.	do.	İstanbul Altın Rafinerisi A.Ş.	do.	120
Do.	do.	Nadir Metal Rafineri A.Ş.	do.	140
<b>Iron and steel:</b>				
Iron ore	Erdemir Madencilik Sanayi ve Ticaret A.Ş. (Ereğli Demir ve Çelik Fabrikaları T.A.Ş.) (Erdemir Group)		Fourteen mines in the Divrigi area, Sivas Province	2,900
Do.	Hekimhan Madencilik İthalat İhracat Sanayi ve Ticaret Ltd. Şti. (Kolin İnşaat Turizm Sanayi ve Ticaret A.Ş.)		Deveci Mine, Malatya Province	2,000
Do.	Özkoyuncu Madencilik A.Ş.		Mines in Yahyali, Kayseri Province	2,000
<b>Steel:</b>				
Crude	Asil Çelik A.Ş.		Plant south of Orhangazi, Bursa Province	485
Do.	Bilecik Demir Çelik Sanayi ve Ticaret A.Ş. (Global Yatırım Holding A.Ş., 40%)		Bilecik, Bilecik Province	240
Do.	Çebitaş Demir Çelik Endüstrisi A.Ş.		Aliaga, Izmir Province	750
Do.	Çelik Makina Sanayi ve Ticaret A.Ş. (ÇEMTAŞ)		Bursa, Bursa Province	174
Do.	CER Çelik Endüstrisi A.Ş.		Plant at Bornova, Izmir Province	850
Do.	Çolakoğlu Metalurji A.Ş.		Dilovasi, Kocaeli Province	3,200
Do.	Diler Demir Çelik Endüstrisi ve Ticaret A.Ş.		do.	1,500
Do.	Ege Çelik Endüstrisi Sanayi ve Ticaret A.Ş.		Aliaga, Izmir Province	2,000
Do.	Ekinciler Holding A.Ş.		About 10 kilometers north of Iskenderun, Hatay Province	1,000
Do.	Erege Metal Demir Çelik Sanayi ve Ticaret A.Ş.		Aliaga, Izmir Province	720
Do.	Ereğli Demir ve Çelik Fabrikaları T.A.Ş. (Erdemir Group) (Ataer Holding Karadeniz Ereğli, Zonguldak A.Ş., 49.29%, and ArcelorMittal, 24.99%)		Ataer Holding Karadeniz Ereğli, Zonguldak Province	3,800
Do.	Habaş Sınai ve Tibbi Gazlar İstihsal Endüstrisi A.S. (Habaş Topluluğu)		Aliaga, Izmir Province	3,000
Do.	İçdaş Demir Çelik Enerji Tersane ve Ulaşım Sanayi A.Ş.		Istanbul (Gunesli), Istanbul Province	1,000

See footnotes at end of table.



TABLE 2—Continued  
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron and steel—Continued:			
Steel—Continued:			
Crude—Continued	İçdaş Demir Çelik Enerji Tersane ve Ulaşım Sanayi A.Ş.	About 25 kilometers north of Biga, Canakkale Province	1,500
Do.	İlhan Metalurji A.Ş.	Toprakkale, Osmaniye Province	220
Do.	İskenderun Demir ve Çelik A.Ş. (Isdemir) [Erdemir Group, 92%]	Iskenderun, Hatay Province	4,700
Do.	İzmir Demir Çelik Sanayi A.Ş. (İDÇ)	Aliaga, Izmir Province	1,320
Do.	Kaptan Demir Çelik Endüstrisi ve Ticaret A.Ş.	Marmara Ereglisi, Tekirdag Province	1,400
Do.	Karabük Demir Çelik Sanayi ve Ticaret A.Ş. (Kardemir) (Kardemir retirement group, 68%, and Kardemir employees, 21%)	Karabuk, Karabuk Province	1,500
Do.	Kroman Çelik Sanayii A.Ş.	Cayirova, Kocaeli Province	1,250
Do.	Makina ve Kimya Endüstrisi Kurumu Genel Müdürlüğü (MKEK)	Kirikkale, Kirikkale Province	60
Do.	Mega Demir Mamulleri Sanayi ve Ticaret Ltd. ŞTI	North of Iskenderun, Hatay Province	220
Do.	Nursan Metalurji A.Ş.	Payas, Hatay Province	1,100
Do.	Sivas Demir Çelik İşletmeleri A.Ş. (Sidemir)	About 20 kilometers south of Sivas, Sivas Province	350
Do.	Tosyalı Demir Çelik Sanayi A.Ş. (Tosyalı Holding A.Ş.)	Iskenderun, Hatay Province	NA
Do.	Yazıcı Demir Çelik Endüstrisi ve Ticaret A.Ş. (Diler Demir Çelik Endüstrisi ve Ticaret A.Ş.)	Karabuk, Karabuk Province	900
Do.	Yeşilyurt Demir Çelik A.Ş.	Tekkekoy, Samsun Province	1,300
Rolled products	Asil Çelik A.Ş.	Rolling mill south of Orhangazi, Bursa Province	200
Do.	Borçelik Çelik Sanayii ve Ticaret A.Ş. (ArcelorMittal and Borusan Holding A.Ş.)	Near Gemlik, Bursa Province	1,600
Do.	Çebitaş Demir Çelik Endüstrisi A.Ş.	Aliaga, Izmir Province	600
Do.	Çelik Makina Sanayi ve Ticaret A.Ş. (ÇEMTAŞ)	Bursa, Bursa Province	230
Do.	CER Çelik Endüstrisi A.Ş.	Rolling mill at Bornova, Izmir Province	300
Do.	Çolakoğlu Metalurji A.Ş.	Dilovasi, Kocaeli Province	750
Do.	Demirsan Haddecilik Sanayi ve Ticaret A.Ş.	do.	NA
Do.	Diler Demir Çelik Endüstrisi ve Ticaret A.Ş.	do.	800
Do.	Ege Çelik Endüstrisi Sanayi ve Ticaret A.Ş.	Aliaga, Izmir Province	1,200
Do.	Ekinciler Holding A.Ş.	About 10 kilometers north of Iskenderun, Hatay Province	1,100
Do.	Erege Metal Demir Çelik Sanayi ve Ticaret A.Ş.	Aliaga, Izmir Province	400
Do.	Ereğli Demir ve Çelik Fabrikaları T.A.Ş. (Erdemir) (Ataer Holding A.Ş., 49.29%, and ArcelorMittal, 24.99%)	Karadeniz Ereğli, Zonguldak Province	8,800
Do.	Habaş Sınai ve Tibbi Gazlar İstihsal Endüstrisi A.S. (Habaş Topluluğu)	Aliaga, Izmir Province	NA
Do.	İçdaş Demir Çelik Enerji Tersane ve Ulaşım Sanayi A.Ş.	Istanbul (Gunesli), Istanbul Province	1,500
Do.	do.	About 25 kilometers north of Biga, Canakkale Province	1,500
Do.	İnernet A.Ş.	Two rolling mills, Istanbul, Istanbul Province	600
Do.	İskenderun Demir ve Çelik A.Ş. (Isdemir) [Ereğli Demir ve Çelik Fabrikaları T.A.Ş. (Erdemir), 92%]	Iskenderun, Hatay Province	3,500
Do.	İzmir Demir Çelik Sanayi A.Ş. (İDÇ)	Aliaga, Izmir Province	900
Do.	Kaptan Demir Çelik Endüstrisi ve Ticaret A.Ş.	Marmara Ereglisi, Tekirdag Province	700
Do.	do.	Corlu, Tekirdag Province	200
Do.	do.	Karabuk, Karabuk Province	100
Do.	Karabük Demir Çelik Sanayi ve Ticaret A.Ş. (Kardemir) (Kardemir retirement group, 68%, and Kardemir employees, 21%)	do.	700
Do.	Kar-demir Haddecilik Sanayi ve Ticaret Ltd. ŞTI	Aliaga, Izmir Province	700
Do.	Kocaer Haddecilik Sanayi ve Ticaret Ltd. ŞTI. (Kocaer Grubu)	do.	600
Do.	do.	Denizli, Denizli Province	100
Do.	Kroman Çelik Sanayii A.Ş.	Bar and profile mill at Cayirova, Kocaeli Province	200
Do.	Kürüm Demir Sanayi Dış Ticaret A.Ş.	Gebze, Kocaeli Province	445
Do.	Nursan Haddecilik A.Ş.	Payas, Hatay Province	500
Do.	Özefe Demir Sanayi ve Tic A.Ş. (Efesan Demir Sanayi ve Ticaret A.Ş.)	Bar mills at Alibeykoy, Istanbul Province	250

See footnotes at end of table.

TABLE 2—Continued  
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron and steel—Continued:				
Steel—Continued:				
Rolled products—Continued		Özkan Demir Sanayi A.Ş.	Aliaga, Izmir Province	500
Do.		Sivas Demir Çelik İşletmeleri A.Ş. (Sidemir)	About 20 kilometers south of Sivas, Sivas Province	450
Do.		Sözer Demir Çelik A.Ş.	Aliaga, Izmir Province	220
Do.		Yazıcı Demir Çelik Endüstrisi ve Ticaret A.Ş. (Diler Demir Çelik Endüstrisi ve Ticaret A.Ş.)	Karabuk, Karabuk Province	1,024
Do.		Yeşilyurt Demir Çelik A.Ş.	Tekkekoy, Samsun Province	720
Liquefied natural gas	million cubic meters	Boru Hatları İle Petrol Taşıma A.Ş. (Botaş) (Government)	Botas Marmara Ereglisi regasification terminal, Sultankoy, Tekirdag Province	6,500
Do.	do.	EgeGas LNG (Çolakoğlu Group, 100%)	Aliaga regasification terminal, Aliaga, Izmir Province	6,000
Magnesite		Kümaş Kutahya Manyezit Sanayi A.Ş. (Yıldız Holding and Gurmen Group, 90%)	Dead-burned magnesia plant in Kutahya, Kutahya Province	300
Do.		do.	Fused magnesia plant in Kutahya, Kutahya Province	40
Do.		Akdeniz Mineral Kaynakları A.Ş. (Grecian Magnesite S.A., 90%)	Caustic calcined magnesia plant in Eskisehir, Eskisehir Province	32
Do.		Konya Selçuklu Krom Magnezit Tuğla Sanayi A.Ş. (Grecian Magnesite S.A., 90%)	Caustic calcined magnesia plant in Selcuklu, Konya Province	40
Do.		Magnesit Anonim Şirketi (MAŞ) (RHI Group, 100%)	Dead-burned magnesia plant in Dutlucu, Eskisehir Province	265
Do.		Cihan Grubu	Dead-burned magnesia plant in Erzurum, Erzurum Province	60
Molybdenum	metric tons	Kuzey Ege Bakır İşletmeleri AŞ (Özdoğu İnşaat Tic. Ltd. Şti, 100%)	Tepeoba, Balıkesir Province	2,500
Natural gas	million cubic meters	Türkiye Petrolleri Anonim Ortaklığı (TPAO)	Akkakoca offshore terminal, Duzce Province	730
Nitrogen, N content of ammonia		Istanbul Gübre Sanayii A.Ş. (IGSAŞ) (Yıldız Yatırım Holding A.Ş.)	Korfez, Kocaeli Province	326
Do.		Gemlik Gübre Sanayii A.Ş. [Türkiye Gübre Sanayii A.Ş. (TÜGSAS)]	Gemlik, Bursa Province	270
Perlite		Bergama Mining Construction Machinery Perlite Industry & Trade Inc. (Cullas Group)	Bergama plant, Izmir Province	120
Do.		do.	Konya plant, Konya Province	20
Petroleum				
Crude	thousand 42-gallon barrels per day	Türkiye Petrolleri Anonim Ortaklığı (TPAO)	Oilfields in Adiyaman and Batman Provinces	65
Refined products	do.	Türkiye Petrol Rafinerileri A. Ş. (Tüpras) (Enerji Yatırımları A.S., 51%)	Izmir refinery, Aliaga, Izmir Province	255
Do.	do.	do.	Izmit refinery, Izmit, Kocaeli Province	255
Do.	do.	do.	Kirikkale refinery, Kirikkale, Kirikkale Province	116
Do.	do.	do.	Batman refinery, Batman, Batman Province	25
Do.	do.	Ersan Petrol Sanayii A.Ş. (Sayer Group, 100%)	Narli refinery, <sup>3</sup> Narli, Kahramanmaraş Province	2
Phosphate rock		Eti Bakır A.Ş. (Cengiz Holding, 100%)	Mazidagi, Mardin Province	550
Silver:				
Ore	metric tons	Eti Gümüş A.Ş. (Yıldızlar SSS Holding)	Gumuskoy, Kutahya Province	12,000
Metal	do.	Atasay Kuyumculuk Sanayi ve Ticaret A.S.	Refinery at Istanbul	NA
Do.	do.	Istanbul Altın Rafinerisi A.Ş.	do.	NA
Do.	do.	Nadir Metal Rafineri A.Ş.	do.	150
Soda ash		Alkim Alkali Kimya	Cayirhan Mine, Ankara Province	150
Do.		Eti Soda A.Ş. [Ciner Group, 74%, and Eti Maden İşletmeleri Genel Müdürlüğü (Government), 26%]	Beypazari trona mine and soda ash plant, Beypazari, Ankara Province	1,000
Do.		Soda Sanayii A.Ş. [Türkiye Şişe ve Cam Fabrikaları A.Ş. (ŞİŞECAM)]	Kazanli, Mersin Province	1,150

See footnotes at end of table.

TABLE 2—Continued  
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Sulfur	Türkiye Petrol Rafinerileri A. Ş. (Tüpras) (Enerji Yatırımları A.Ş., 51%)	Izmir refinery, Aliaga, Izmir Province	NA
Do.	do.	Izmit refinery, Izmit, Kocaeli Province	NA
Do.	do.	Kirikkale refinery, Kirikkale, Kirikkale Province	NA
Sulfuric acid	Bandırma Bor ve Asit Fabrikaları İşletme Müdürlüğü (Eti Maden İşletmeleri Genel Müdürlüğü) (Government)	Plant at Bandırma, Balıkesir Province	240
Zinc concentrate, Zn content	Çanakkale Madencilik Limited Şti.	Koru Mine, Çanakkale Province	5
Do.	Çayeli Bakır İşletmeleri A.Ş. (First Quantum Minerals Ltd., 100%)	Çayeli Mine, near Çayeli, Rize Province	52
Do.	Dedeman Madencilik Tic. ve San. A.Ş.	Delikkaya and Yeşil Hisar Cadirkaya Mines, Kayseri Province	10
Do.	Eczacıbaşı Esan	Balya Mine, Balıkesir Province	120
Do.	Elkin Maden Tic. ve San. A.Ş.	Mines in Hakkari Province	NA
Do.	Meskan Ölmez Madencilik Harfiyat İnşaat yol Yapım Petrol Ürünleri İthalat İhracat Nakliye Taahüt San. ve Tic.	do.	20
Do.	RCR ve Seyitoğlu Madencilik İthalat İhracat Tic. ve San. A.Ş. (Red Crescent Resources Ltd. and the Seyitoğlu family)	Hakkari Mine	NA
Do.	Seyitoğlu Madencilik A.Ş.	Mines in Hakkari Province	NA
Do.	Silvermet Inc.	İskenderun, Hatay Province	12

<sup>e</sup>Estimated. Do., do. Ditto. NA Not available.

<sup>1</sup>Includes subbituminous coal.

<sup>2</sup>Suspended operations in 2013.

<sup>3</sup>Suspended operations in 2011.