USGS
science for a changing world

2020–2021 Minerals Yearbook

ISRAEL [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

January 2025

The Mineral Industry of Israel

By Philip A. Szczesniak

Note: In this chapter, information for 2020 is followed by information for 2021.

Israel was a major producer of bromine, fertilizers, magnesium metal, phosphate rock, and potash in 2020. Excluding United States production, Israel was the world's leading producer of bromine, accounting for 48% of global output, and it ranked third among magnesium metal producers, accounting for 1.9% (estimated) of global output. Among all the world's producers of potash and phosphate rock, Israel ranked 5th (accounting for 5.2% of global output) and 12th (1.4%), respectively. Other mining and mineral-processing operations included those for cement, clays, crushed stone, diamond cutting and polishing, gypsum, refined secondary lead, lime, natural gas, phosphoric acid, salt, sand and gravel, steel products, sulfur, and petroleum (both crude and refinery products). Israel consumed substantial amounts of bromine, phosphate rock, and potash in downstream processing operations; most of the final output from these operations was exported (Bray, 2022; Jasinski, 2022a, b; Kimberley Process Certification Scheme, 2022; Schnebele, 2022).

Minerals in the National Economy

In 2020, the gross domestic product (GDP) of Israel was $377 billion;[1] the manufacturing sector and the mining and quarrying sector contributed a combined 12.2% of the GDP. Real GDP decreased by 1.7%. Total employment in the country was 3,371,400 people. The manufacturing sector employed 328,500 people, of which the basic metals and fabricated metal products sector employed 38,600 people; the chemicals, chemical products, and petroleum products sector, 18,300 people; and the industrial minerals sector, 8,600 people. The mining and quarrying sector employed 4,400 people. The total exports of goods from Israel were valued at $47.5 billion in 2020, of which the manufacturing sector and the mining and quarrying sector (excluding worked diamond) accounted for a combined $43.6 billion (92% of the total); worked diamond, $2.2 billion; and wholesale diamond, $857 million. Total imports of goods were valued at about $69.3 billion, of which mineral fuels accounted for $5.5 billion, and unworked and worked diamond (net), $3.0 billion. The five leading destinations for exported goods in 2020 were the United States, which received 26% of all Israel's exports; the European Union, 22%; China, 9%; the United Kingdom, 8%; and India, 3%. The five leading sources of imported goods in 2020 were the European Union, which supplied 29% of all Israel's imports; the United States, 18%; China, 10%; the United Kingdom, 6%; and Switzerland, 5% (European Commission, 2021, p. 8; Central Bureau of Statistics, 2022a, p. 1; 2022b, c).

Exports to the United States from Israel in 2020 were valued at $15.2 billion, which was a decrease of 22% from $19.5 billion exported to the United States in 2019. Gem diamond exports, which were valued at about $3.3 billion, accounted for about 22% of these exports. Other notable mineral-related exports to the United States included chemicals (fertilizers) valued at $182.3 million; stone, sand, and cement, $101.3 million; iron and steel products (not elsewhere classified), $84.1 million; gemstones (other), $62.1 million; nonferrous metals (other), $39.5 million; petroleum products (other), $23.1 million; copper, $12.6 million; bauxite and aluminum, $7.6 million; fuel oil, $6.2 million; and other precious metals, $1.4 million. Imports to Israel from the United States in 2020 were valued at $11.2 billion, which was a decrease of 31% from the $16.3 billion imported from the United States in 2019. Gem diamond imports, which were valued at about $2.2 billion, accounted for about 21% of these imports. Other notable mineral-related imports from the United States included petroleum products (other) valued at $230.5 million; crude petroleum, $209.9 million; natural gas, $86.2 million; aluminum and alumina, $70.4 million; nonferrous metals (other), $56.5 million; chemicals (fertilizers), $13.1 million; precious metals (other), $11.3 million; copper, $3.3 million; nonmetallic minerals, $2.5 million; nonmonetary gold, $1.3 million; and coal and other fuels, $1.2 million (U.S. Census Bureau, 2022a, b).

The Ministry of Energy oversees activities in the mining sector; the mining sector is governed by regulations enacted in 1973 and 1978. Among the regulations enacted in 1978 was that which established the Quarry Rehabilitation Fund to reduce environmental damage from quarry operations and to ensure the rehabilitation of abandoned mines and quarries. The Law of Profits from Natural Resources that was enacted in 2016 sets the royalty rate on mineral production at 5%. The Dead Sea Concession Law passed in 1961 and amended in 1986 authorizes Israel Chemicals Ltd. (ICL) to utilize the resources of the Dead Sea and to lease the land required for its plants in Sodom until 2030. Upstream exploration and production of natural gas and crude petroleum are governed by the Petroleum Law of 1952, Petroleum Regulations of 1953, the Petroleum Profits Taxation Law of 2011, and the Offshore Regulations of 2016. Downstream production and other activities are governed by the Natural Gas Sector Law of 2002, which establishes a licensing system for natural gas distribution and transmission and liquefied natural gas facilities (Ministry of Energy, 2018, p. 3; undated; United Nations, 2010, p. 21; Weintraub and Anouchi, 2020; Israel Chemicals Ltd., 2022, p. 6, 61).

Production

In 2020, notable increases in mineral production included that of crude petroleum, which increased by 55%; natural gas

[1]Where necessary, values have been converted from Israeli shekels (NIS) to U.S. dollars (US$) at the annual average rates of NIS 3.4409=US$1.00 for 2020 and NIS 3.2327=US $1.00 for 2021.

(marketable), by 49%; natural gas (gross), by 47%; potash compound (potassium nitrate), by 29%; potash ore (potassium oxide content), by 19%; phosphate fertilizer (monoammonium phosphate), by 17%; asphalt, by 16%; potash ore (gross weight), by 15%; and phosphate fertilizer (other) and phosphate rock (beneficiated, gross weight), by 10% each. Notable decreases in mineral production included that of gypsum and stone (dimension, marble), for which production stopped in 2020. Other decreases in mineral production included that of kerosene, by 61%; sulfur (petroleum byproduct, sulfur content), by 37%; residual fuel oil, by 36%; sand and gravel (other), by 31%; phosphate fertilizer (triple superphosphate), by 24%; gasoline, by 15%; and magnesium metal (primary), by 13%. Data on mineral production are provided in table 1.

Structure of the Mineral Industry

Most of the mining and mineral-processing operations in Israel were privately owned, including the producers of aggregates, cement, clays, lime, and salt. The country's sole producer of bromine, magnesia, refined magnesium metal, phosphates, potash, and sulfuric acid was ICL [owned by Israel Corp. (45.62%) and institutional investors and the public (54.38%)]. Other mineral commodities produced by only one company included refined secondary lead, by Hakurnas Lead Works Ltd.; refined secondary zinc, by Numinor Chemical Industries Ltd.; and clay and silica sand, by Negev Industrial Minerals Ltd. Cement was produced by two companies, namely Har Tuv Cement Ltd. and Nesher Israel Cement Enterprises Ltd. The diamond cutting and polishing industry was composed of many small producers. Natural gas was produced by partnerships among Chevron Corp. of the United States (through its acquisition of Noble Energy Inc. of the United States in October 2020), Mubadala Investment Co. PJSC (Mubadala) of the United Arab Emirates, and several other companies; the partnerships operated in the Leviathan and the Tamar offshore gasfields in the Eastern Mediterranean Sea. Table 2 is a list of major mineral industry facilities (table 2; Chevron Corp., 2021, p. 27; Murphy, 2021; Israel Chemicals Ltd., 2022, p. 58–59, 152–153, 227).

Commodity Review

Metals

Magnesium.—In 2020, Israel produced 18,500 metric tons (t) of magnesium metal compared with 21,350 t in 2019. Dead Sea Magnesium Ltd. (DSM, a subsidiary of ICL) operated a 24,000 metric-ton-per-year (t/yr)-capacity magnesium metal plant in Sodom in southeastern Israel near the southern end of the Dead Sea. The magnesium metal was produced by ICL through electrolysis of magnesium chloride found in carnallite extracted from the Dead Sea; the process separates magnesium chloride into metal magnesium and chloride gas (used to produce bromine) (table 1; Israel Chemicals Ltd., 2021, p. 65, 109).

Industrial Minerals

Bromine.—Dead Sea Bromine Co. Ltd. (DSBC), a subsidiary of ICL, extracted brines from the Dead Sea at its plant at Sodom, which had a production capacity of 280,000 t/yr of bromine. The company's production of bromine decreased to 173,000 t in 2020 from 180,000 t in 2019. Most of the bromine produced was consumed by ICL in the downstream manufacturing of bromine compounds at its plants in China, Israel, and the Netherlands. Bromine compounds produced by DSBC were used in such applications as the production of flame retardants, natural gas, crude petroleum, and pharmaceuticals, and in water treatment applications. In 2019, ICL announced that it was increasing its bromine-compounds production capacity after entering into several agreements with customers in Asia. The company said that it would invest about $50 million at its Sodom plant. The expansion, which was expected to be completed by 2021, would increase the plant's capacity to produce tetrabromobisphenol A—a flame-retardant bromine compound used primarily in the manufacturing of printed circuit boards for the electronics industry—by as much as 25,000 t/yr. In 2020, ICL sold approximately 211,000 t of bromine compounds from its facilities in China, Israel, and the Netherlands (table 1; Rabinovitch, 2019; Israel Chemicals Ltd., 2021, p. 40, 52–53, 135).

Cement.—Israel produced an estimated 5.3 million metric tons (Mt) of cement in 2020, which was an increase of 5% from the 5.0 Mt (estimated) produced in 2019; cement production had decreased by more than 25% since the previous high of 7.2 Mt in 2016. The decrease in production since 2016 was due to competition from lower-priced cement imports from Greece and Turkey. In early 2019, the Ministry of Economy of Israel imposed an antidumping duty on imports of portland cement from Greece and Turkey. The duty rate on cement imports from Greece was set at 0.25%, and the rate from Turkey was set at between 0% and 0.25%. The duty was expected to remain in effect until October 2021. In June 2020, the Economy Minister proposed a notable increase in the import duty rate on cement to 17.25%; however, the Finance Minister declined to approve the rate increase (Times of Israel, 2018; Global Trade Alert, 2019; Cemnet, 2020; Nesher Israel Cement Enterprises Ltd., 2021).

Phosphate Rock.—Production of beneficiated phosphate rock (gross weight) in Israel increased by 10% to 3.1 Mt in 2020 from 2.8 Mt in 2019. Rotem Amfert Negev Ltd. (a subsidiary of ICL) produced phosphate rock at the Oron, the Rotem, and the Zin Mines in the Negev Desert in southern Israel; the Zin Mine closed that year owing to restrictions related to the coronavirus disease 2019 (COVID-19) pandemic. The open pit mines had a combined production capacity of 4.7 million metric tons per year (Mt/yr). As of yearend 2020, the estimated remaining life of the Oron Mine was 3 years, and that of the Rotem Mine, 4.5 years. Phosphate rock was exported by ICL through the Port of Ashdod, which is a port in eastern Israel about 40 kilometers (km) south of Tel Aviv on the Mediterranean Sea, and the Port of Eilat, which is a port and resort town in southern Israel on the Red Sea (tables 1, 2; Israel Chemicals Ltd., 2021, p. 113, 125, 129).

Potash.—The production of potash in Israel increased by about 15% to a record high of 3.9 Mt in 2020 from 3.3 Mt in 2019. The increase in production by ICL's wholly owned subsidiary, Dead Sea Works (DSW), in 2020 was achieved despite the negative effects of the COVID-19 pandemic. Government officials deemed DSW's potash operations to be essential, allowing DSW to operate its recently upgraded facility at full capacity during the COVID-19 pandemic. The capacity of

ICL's Dead Sea facilities increased in 2020 by an estimated 5% to about 4.2 Mt/yr of potash (table 2; Cohen, 2020; Israel Chemicals Ltd., 2021, p. 58–59).

Mineral Fuels

Natural Gas.—Natural gas (gross) production in Israel increased sharply in 2020 to 15.5 billion cubic meters from 10.5 billion cubic meters in 2019. The Leviathan offshore gasfield, which began production in December 2019, increased production to 7.3 billion cubic meters; the production capacity was 12 billion cubic meters per year. The Leviathan Gasfield, which included Leviathan North and Leviathan South, was located 130–140 km west of Haifa and covered a total area of 500 square kilometers. The Leviathan Gasfield was jointly owned by Delek Group (45.34%), Chevron (39.66%), and Ratio Energies Ltd. (15%). The Tamar offshore gasfield decreased production by 21% to 8.2 billion cubic meters from 10.4 billion cubic meters in 2019. It is located 90 km offshore near Haifa Bay and had a production capacity of 11.4 billion cubic meters per year. Total estimated reserves for the Leviathan Gasfield (as of yearend 2019) and the Tamar Gasfield (as of yearend 2020) were reported to be 414 billion cubic meters and 299 billion cubic meters of natural gas, respectively (tables 1, 2; Delek Group, 2021, p. A-14–A-15, A-26, A-40–A-41, A-142, B-21; 2022, p. A-33; Tamar Petroleum Ltd., 2021).

Israel increased natural gas exports to Jordan and initiated natural gas exports to Egypt during the year because of the increased production. Total exports of natural gas increased to 4.3 billion cubic meters (2.2 billion cubic meters to Egypt and 2.1 billion cubic meters to Jordan) in 2020 from 200 million cubic meters in 2019. The partners in the Leviathan and the Tamar Gasfields signed an amended supply agreement in 2019 with Dolphinus Holdings Ltd. of Egypt to export natural gas to Egypt. Dolphinus Holdings agreed to purchase natural gas from Israel valued at $19.5 billion, which amounted to 85 billion cubic meters of natural gas over 15 years. Of those 85 billion cubic meters, 60 billion was expected to come from the Leviathan Gasfield and 25 billion was expected to come from the Tamar Gasfield. Under the deal, natural gas exports from Israel to Egypt were expected to continue through 2034. The Energy Minister of Israel noted that the deal with Dolphinus Holdings was the most notable trade deal between Israel and Egypt since their peace treaty in 1979 (Azran and others, 2019; Lewis and Rabinovitch, 2020; Delek Group, 2021, p. A–122—A–123, B–21, C–134—C–135).

The Delek Group reported that the development plan for the first phase of the Leviathan natural gas project would be implemented in two stages. The first stage of phase 1, which was implemented in 2019, included development of four production wells and installation of treatment facilities that had a capacity of as much as 12 billion cubic meters per year; $3.6 billion was invested for this stage. The second stage of phase 1 was to include four additional wells and expansion of the treatment facilities to add 9 billion cubic meters to their annual capacity of as much as 9 billion cubic meters; an investment of $1.5 billion to $2.0 billion would be required for the second stage. No specific date was announced for the start of the second stage (Delek Group, 2021, p. A–36).

Energean Oil and Gas plc. (Energean) of Greece continued to develop the Karish, Karish North, and Tanin offshore gasfields in 2020; these gasfields are located about 90 km northwest of the Port of Haifa, north of the Tamar offshore gasfield. The estimated combined reserves for the gasfields were 40 billion cubic meters of natural gas and 61 million barrels of light oil or condensate. Energean's licenses were expected to expire in 2044, but a 10-year extension option was available. Energean planned to start production from the gasfields in 2022 (Energean Oil and Gas plc., 2021a, p. 2, 5–6; 2021b).

In June, the Ministry of Energy announced that the portion of electricity generated by coal in Israel would decrease to 24.9% by the end of 2020, down from 30% in 2019. The Ministry of Energy had previously announced in 2019 that Israel would stop using coal for electricity generation by 2025, which was 5 years earlier than the 2030 target set in the Government's Policy 2030 plan. The decision to change the conversion date of the two remaining coal-fired powerplants to natural gas was made after a review by the Israel Public Utility Authority for Electricity, which for its decision cited the coal plants' high environmental, capital, and operational costs and increased domestic natural gas supplies. The announcement was related to the two main electricity power stations in the northern city of Hadera and the southern city of Ashkelon. The Ministry also announced in June a target for electric power generation to be 30% natural gas and 70% renewable by 2030 (Xinhua, 2019; Surkes, 2020).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

Israel remained a major producer of bromine, fertilizers, magnesium metal, phosphate rock, and potash in 2021. Excluding United States production, Israel was the world's leading producer of bromine, accounting for 47% of global production (estimated), and it was the fourth-ranked producer of magnesium metal, accounting for 1.7% of the world's production. Among all global producers of potash, Israel was tied with Germany for sixth [accounting for 5.1% of global production (estimated)]. The country ranked 13th among global producers of phosphate rock [1.1% (estimated)] (Bray, 2023; Jasinski, 2023a, b; Schnebele, 2023).

In 2021, the GDP of Israel was $444 billion;[2] the manufacturing sector and mining and quarrying sector contributed a combined 11.2% to the GDP. The real GDP growth rate was 8.4%. Total employment was 3,623,400 people. The manufacturing sector employed 340,200 people, of which the basic metals and fabricated metal products sector employed 39,200 people; the chemicals, chemical products, and petroleum products sector, 18,400 people; and the industrial minerals sector, 8,700 people. The mining and quarrying sector employed 4,400 people. Total exports of goods from Israel were valued at $56.4 billion in 2021, of which the manufacturing sector and the mining and quarrying sector (excluding worked diamond) together accounted for $50.2 billion (89% of the total); worked diamond, $3.5 billion; and wholesale diamond, $1.8 billion. Total imports of goods were valued at about $91.0 billion,

[2]Where necessary, values have been converted from Israeli shekels (NIS) to U.S. dollars (US$) at the annual average exchange rate of NIS 3.2327=US$1.00 for 2021.

of which mineral fuels accounted for $9.0 billion and unworked and worked diamond (net), $5.1 billion. The five leading destinations for exported goods in 2021 were the United States, which received 27% of all Israel's exports; the European Union, 24%; China, 7%; India, 5%; and the United Kingdom, 4%. The five leading sources of imported goods in 2020 were the European Union, which supplied 34% of all Israel's imports; China, 12%; the United States, 9%; Switzerland, 7%; and Turkey, 5% (Central Bureau of Statistics, 2022a, p. 1; 2022b, c; European Commission, 2022, p. 8).

Exports to the United States from Israel in 2021 were valued at $18.7 billion, which was an increase of 22% compared with the value in 2020. Gem diamond exports, which were valued at about $5.0 billion, accounted for about 27% of these exports. Other notable mineral-related exports to the United States included chemicals (fertilizers) valued at $368.0 million; gemstones (other), $120.2 million; iron and steel products (not elsewhere classified), $107.2 million; stone, sand and cement, $95.8 million; petroleum products (other), $63.3 million; copper, $33.9 million; nonferrous metals (other), $32.9 million; bauxite and aluminum, $14.1 million; sulfur, $1.9 million; and other precious metals, $1.0 million. Imports to Israel from the United States in 2021 were valued at $12.8 billion, which was a decrease of 1% from the $12.9 billion imported in 2020. Gem diamond imports, which were valued at about $3.0 billion, accounted for about 23% of these imports. Other notable mineral-related imports from the United States included petroleum products (other) valued at $205.4 million; crude petroleum, $197.4 million; natural gas, $59.6 million; aluminum and alumina, $47.3 million; nonferrous metals (other), $44.1 million; chemicals (fertilizers), $13.0 million; precious metals (other), $22.7 million; nonmonetary gold, $4.8 million; copper, $3.6 million; nonmetallic minerals, $1.9 million; and coal and other fuels, $1.3 million (U.S. Census Bureau, 2022a, b).

In 2021, notable increases in production included that of kerosene, which increased by 39%; phosphate fertilizer (triple superphosphate), by 28%; crude petroleum, by 26%; natural gas (gross), by 25%; natural gas (marketable) and industrial sand and gravel (unspecified), by 24% each; phosphate fertilizer (other), by 17%; magnesium chloride (magnesium content), by 15%; crushed stone (unspecified), by 13%; and liquefied petroleum gas, by 10%. Significant decreases in production included that of phosphate rock (beneficiated), which decreased by 21%; phosphate rock (phosphorus pentoxide content), by 19%; and sand and gravel (other), by 13%.

Production of beneficiated phosphate rock (gross weight) in Israel decreased to about 2.4 Mt from about 3.1 Mt in 2020. Reserves of phosphate rock at ICL's mines at the end of 2021 were 60.2 Mt, which was an increase of 13.6% from the 53 Mt of reserves in 2020. These reserves were categorized by ICL into 27.7 Mt of high-organic and bituminous phosphate, 24.0 Mt of low-organic phosphate, and 8.5 Mt of white phosphate. In December 2020, ICL noted that the Ministry of Energy granted a 3-year extension to 2024 for the Rotem mining concessions. Production of potash in Israel increased slightly to 3.9 Mt. Reserves of potash at ICL's Dead Sea deposits near Sodom were reported by ICL to be 172 Mt; the estimated remaining life of the mine was 9 years (to 2030) (Israel Chemicals Ltd., 2022, p. 145, 147, 150–151, 153, 158).

Natural gas (gross) production in Israel increased by 25% in 2021 to 19.3 billion cubic meters, which was a record high. The Leviathan offshore gasfield increased production by 47% to 10.7 billion cubic meters; the production capacity was 12 billion cubic meters per year. Total estimated reserves for the Leviathan Gasfield (as of yearend 2021) were reported by Ratio Energies to be 379 billion cubic meters. The Tamar offshore gasfield increased production by 4.9% to 8.6 billion cubic meters. Total estimated reserves for the Tamar Gasfield (for yearend 2021) were reported by Tamar Petroleum Ltd. to be 288 billion cubic meters. In December 2021, the Delek Group sold its 22% share in the Tamar Gasfield to Mubadala for $1 billion (tables 1, 2; Murphy, 2021; Delek Group, 2022, p. A–33, B–15; Ratio Energies Ltd., 2022, p. 57; Tamar Petroleum Ltd., 2022, p. 288).

Israel increased natural gas exports in 2021 by nearly 70% to 7.4 billion cubic meters (estimated). These exports went primarily to Egypt (to which Israel's exports increased by 96%) and Jordan (by 46%). Exports of natural gas from the Leviathan Gasfield increased by 61% to 6.1 billion cubic meters, of which 3.4 billion cubic meters went to Egypt and 2.7 billion cubic meters went to Jordan; exports of natural gas from the Tamar Gasfield increased to 1.3 billion cubic meters (estimated). In February 2021, Government officials from Egypt and Israel announced an agreement to construct an offshore natural gas pipeline from the Leviathan Gasfield to two liquefaction facilities in Egypt (Arab Weekly, The, 2021; Economist Intelligence, The, 2021; Delek Group, 2021, p. B–21; 2022, p. B–15; International Trade Administration, 2022).

Energean continued to develop the Karish, Karish North, and Tanin offshore natural gas fields in 2021. It noted that development of the gasfields was 92.5% completed by the end of the year; first production was expected in the third quarter of 2022. With an expected production capacity of between 7 and 8 billion cubic meters per year, the company had signed 18 natural gas sales agreements covering a 16-year period. In December 2021, Energean signed a memorandum of understanding with Egyptian Natural Gas Holding Co. (EGAS) of Egypt for the sale of up to 3 billion cubic meters per year of natural gas for a period of 10 years (Energean Oil and Gas plc., 2022, p. 9, 42–43).

Outlook

The GDP of Israel was forecast by the International Monetary Fund to increase by 5.0% in 2022 and 3.5% in 2023. The energy sector is expected to become more important as the country continues to develop its offshore energy resources. Natural gas production is expected to increase in the next few years as the expansions of the Leviathan and the Tamar Gasfields continue and operations are started up at the Karish and the Tanin Gasfields. The increased natural gas supply is expected to fulfill export demand (especially that of Egypt) and satisfy increasing domestic demand for natural-gas-generated electric power. The gasfields may transform Israel into a major natural-gas-producing country in the Eastern Mediterranean region. The production outlooks for bromine, fertilizer, phosphate rock, and potash will likely depend on market conditions in the world economy (International Monetary Fund, 2022, p. 138).

References Cited

Arab Weekly, The, 2021, Egypt agrees with Israel on new gas pipeline project: The Arab Weekly [London, United Kingdom], February 22. (Accessed January 10, 2021, at https://thearabweekly.com/egypt-agrees-israel-new-gas-pipeline-project.)

Azran, Eram, Coren, Ora, and Reuters, 2019, New deal hikes export of Israeli natural gas to Egypt: Haaretz [Tel Aviv, Israel], October 2. (Accessed January 6, 2023, at https://www.haaretz.com/israel-news/israel-to-increase-gas-exports-to-egypt-companies-say-1.7925666.)

Bray, E.L., 2022, Magnesium metal: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 104–105.

Bray, E.L., 2023, Magnesium metal: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 112–113.

Cemnet, 2020, Israel's Economy Minister seeks higher import tariff: Surrey, United Kingdom, Cemnet, June 22. (Accessed January 4, 2023, at https://www.cemnet.com/News/story/169071/israel-s-economy-minister-seeks-higher-import-tariff.html.)

Central Bureau of Statistics, 2022a, 9.39 Employee jobs, wages and average wages per employee job, by industry (division, group, and class), *in* Statistical abstract of Israel 2022: Jerusalem, Israel, Central Bureau of Statistics, August 11, 6 p. (Accessed January 5, 2023, at https://www.cbs.gov.il/he/publications/doclib/2022/9.shnatonlabourmarket/st09_39x.pdf.)

Central Bureau of Statistics, 2022b, 11.3 Gross domestic product (GDP) of the entire economy, by industry, *in* Statistical abstract of Israel 2022: Jerusalem, Israel, Central Bureau of Statistics, December 20, 2 p. (Accessed January 5, 2023, at https://www.cbs.gov.il/he/publications/doclib/2022/11.shnatonnationalaccounts/st11_03x.pdf.)

Central Bureau of Statistics, 2022c, 13.3 Imports and exports, by group of goods (net), *in* Statistical abstract of Israel 2022: Jerusalem, Israel, Central Bureau of Statistics, September 15, 2 p. (Accessed January 5, 2023, at https://www.cbs.gov.il/he/publications/doclib/2022/13.shnatonimportsandexportsofgoodsandservices/st13_03x.pdf.)

Chevron Corp., 2021, 2020 supplement to the annual report: San Ramon, California, Chevron Corp., March, 57 p. (Accessed January 6, 2023, at https://www.chevron.com/-/media/shared-media/documents/2020-chevron-annual-report-supplement.pdf.)

Cohen, Tova, 2020, Israel Chemicals fourth quarter meets estimates, sales dip on plant upgrade: Thomson Reuters, February 13. (Accessed January 6, 2023, at https://www.reuters.com/article/us-icl-results/israel-chemicals-fourth-quarter-meets-estimates-sales-dip-on-plant-upgrade-idUSKBN2070Z6.)

Delek Group, 2021, Annual report 2020: Netanya, Israel, Delek Group, [variously paginated, 751 p.]. (Accessed January 6, 2023, at https://ir.delek-group.com/wp-content/uploads/2021/04/Delek-Group-2020-Annual-Report.pdf.)

Delek Group, 2022, Annual report 2021: Netanya, Israel, Delek Group, [variously paginated, 550 p.]. (Accessed January 10, 2023, at https://ir.delek-group.com/wp-content/uploads/2022/04/Delek-Group-Annual-Report-2021-Complete_Eng.pdf.)

Economist Intelligence, The, 2021, Israel and Egypt collaborate on natural gas development: The Economist Intelligence, February 24. (Accessed January 10, 2023, at http://country.eiu.com/article.aspx?articleid=1830749566.)

Energean Oil and Gas plc., 2021a, Annual report 2020: London, United Kingdom, Energean Oil and Gas plc., 274 p. (Accessed January 6, 2023, at https://www.energean.com/media/4907/energean-2020-annual-report.pdf.)

Energean Oil and Gas plc., 2021b, Karish: London, United Kingdom, Energean Oil and Gas plc. (Accessed January 6, 2023, at https://www.energean.com/operations/israel/karish/.)

Energean Oil and Gas plc., 2022, 2021 annual report: London, United Kingdom, Energean Oil and Gas plc., 273 p. (Accessed January 10, 2023, at https://www.energean.com/media/5183/energean-annual-report-2021.pdf.)

European Commission, 2021, European Union, trade in goods with Israel: Brussels, Belgium, European Commission, June 2, 10 p. (Accessed November 26, 2021, at https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_israel_en.pdf.)

European Commission, 2022, European Union, trade in goods with Israel: Brussels, Belgium, European Commission, August 2, 10 p. (Accessed January 5, 2023, at https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_israel_en.pdf.)

Global Trade Alert, 2019, Israel: Definitive antidumping duty on imports of portland cement from Turkey and Greece: Global Trade Alert, April 7. (Accessed January4, 2023, at https://www.globaltradealert.org/intervention/58857/anti-dumping/israel-definitive-antidumping-duty-on-imports-of-portland-cement-from-turkey-and-greece.)

International Monetary Fund, 2022, World economic outlook—War sets back the global recovery: Washington, DC, International Monetary Fund, April, 178 p. (Accessed May 18, 2022, at https://www.imf.org/-/media/Files/Publications/WEO/2022/April/English/text.ashx.)

International Trade Administration, 2022, Israel's oil and gas sector: Washington, DC, U.S. Department of Commerce, September 28. (Accessed January 10, 2023, at https://www.trade.gov/market-intelligence/israels-oil-and-gas-sector.)

Israel Chemicals Ltd., 2021, Annual report 2020: Tel Aviv, Israel, Israel Chemicals Ltd., 226 p. (Accessed January 6, 2023, at https://s27.q4cdn.com/112109382/files/doc_financials/2020/ar/ICL-Group-Ltd.-final-20F-2020.pdf.)

Israel Chemicals Ltd., 2022, Annual report 2021: Tel Aviv, Israel, Israel Chemicals Ltd., 264 p. (Accessed January 4, 2023, at https://s27.q4cdn.com/112109382/files/doc_financials/2021/ar/ICL-2021-Annual-Report-FINAL.pdf)

Jasinski, S.M., 2022a, Phosphate rock: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 124–125.

Jasinski, S.M., 2022b, Potash: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 128–129.

Jasinski, S.M., 2023a, Phosphate rock: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 132–133.

Jasinski, S.M., 2023b, Potash: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 136–137.

Kimberley Process Certification Scheme, 2022, Annual global summary—2021 production, imports, exports, and KPC counts: New York, New York, Kimberley Process Rough Diamond Statistics, 1 p. (Accessed January 5, 2023, at https://kimberleyprocessstatistics.org/static/pdfs/public_statistics/2021/2021GlobalSummary.pdf.)

Lewis, Aidan, and Rabinovitch, Ari, 2020, Israel starts exporting natural gas to Egypt under landmark deal: Thomson Reuters, January 15. (Accessed January 6, 2023, at https://www.reuters.com/article/israel-egypt-natgas-idUSL8N29K1R8.)

Ministry of Energy, 2018, The Ministry of Energy main activities 2018: Tel Aviv, Israel, Ministry of Energy, 34 p. (Accessed January 5, 2023, at https://www.gov.il/BlobFolder/reports/energy_2018/en/energy_2018_en.pdf.)

Ministry of Energy, [undated], The petroleum law and regulations: Tel Aviv, Israel, Ministry of Energy. (Accessed January 5, 2023, at http://www.energy-sea.gov.il/English-Site/Pages/Regulation/The-Petroleum-Law--Regulations.aspx.)

Murphy, Joseph, 2021, Delek closes Tamar sale to Mubadala: Vancouver, British Columbia, Canada, Natural Gas World, December 9. (Accessed January 10, 2023, at https://www.naturalgasworld.com/delek-closes-tamar-sale-to-mubadala-94715.)

Nesher Israel Cement Enterprises Ltd., 2021, Ramle, Israel, Plants: Nesher Israel Cement Enterprises Ltd. (Accessed November 30, 2021, at https://www.nesher.co.il/en/factories/.)

Ratio Energies Ltd., 2022, 2021 annual financial statement: Tel Aviv, Israel, Ration Energies Ltd., March 30, 157 p. (Accessed January 10, 2023, at https://ratioenergies.com/wp-content/uploads/2022/04/%E2%80%8F%E2%80%8FRatio-Energies-2021-Annual-Financial-Statement.pdf.)

Rabinovitch, Ari, 2019, Israel Chemicals to expand Dead Sea bromine plant on higher Asia demand: Thomson Reuters, September 10. (Accessed January 6, 2023, at https://www.reuters.com/article/icl-bromine-asia/israel-chemicals-to-expand-dead-sea-bromine-plant-on-higher-asia-demand-idINFWN2610C9.)

Schnebele, E.K., 2022, Bromine: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 40–41.

Schnebele, E.K., 2023, Bromine: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 48–49.

Surkes, Sue, 2020, Coal-fired power to drop from 30% to 25% by the end of this year: The Times of [Jerusalem] Israel, June 24. (Accessed January 6, 2023, at https://www.timesofisrael.com/coal-fired-power-to-drop-from-30-to-25-by-the-end-of-this-year/.)

Tamar Petroleum Ltd., 2021, Annual report 2020: Herzliya, Israel, Tamar Petroleum Ltd., March 18, 388 p. (Accessed January 10, 2023, at https://www.tamarpetroleum.co.il/wp-content/uploads/2021/06/Annual_Report_2020.pdf.)

Tamar Petroleum Ltd., 2022, Periodic report for the year 2021: Herzliya, Israel, Tamar Petroleum Ltd., March 24, [variously paginated, 393 p.]. (Accessed January 10, 2023, at https://www.tamarpetroleum.co.il/wp-content/uploads/2022/10/Tamar_Petroleum_Ltd_2021.pdf.)

Times of Israel, 2018, Cement workers block major Tel Aviv highway in 2nd such protest over imports: Times of [Jerusalem] Israel, November 26. (Accessed January 4, 2023, at https://www.timesofisrael.com/cement-workers-block-major-tel-aviv-highway-in-protest-over-imports/.)

United Nations, 2010, Israel national report—Eighteenth session of the commission on sustainable development: New York, New York, United Nations, April, 88 p. (Accessed January 5, 2023, at https://sustainabledevelopment.un.org/content/documents/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/israel/Full_text.pdf.)

U.S. Census Bureau, 2022a, Foreign trade—Country and product trade data—Product detail and partner country—End-use—Country by 5-digit end-use code, annual totals, 2012–present—Download full exports dataset: U.S. Census Bureau. (Accessed May 23, 2022, via https://www.census.gov/foreign-trade/statistics/country/index.html.)

U.S. Census Bureau, 2022b, Foreign trade—Country and product trade data—Product detail and partner country—End-use—Country by 5-digit end-use code, annual totals, 2012–present—download full imports dataset: U.S. Census Bureau. (Accessed May 23, 2022, via https://www.census.gov/foreign-trade/statistics/country/index.html.)

Weintraub, Simon, and Anouchi, Avi, 2020, Israel—Oil and gas: New York, New York, Mondaq.com, February 7. (Accessed January 5, 2023, at https://www.mondaq.com/oil-gas-electricity/891280/oil-gas-.)

Xinhua, 2019, Israel to end coal era by 2025—Energy Minister: Beijing, China, Xinhuanet, November 13. (Accessed January 6, 2023, at http://www.xinhuanet.com/english/2019-11/13/c_138552538.htm#:~:text=13%20(Xinhua)%20%2D%2D%20Israel%20will,Energy%20Yuval%20Steinitz%20announced%20Wednesday.&text=%22In%20recent%20years%2C%20the%20ministry,natural%20gas%20and%20renewable%20energy.)

TABLE 1
ISRAEL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2017	2018	2019	2020	2021
METALS						
Lead, refinery, secondary		25,261	28,700	24,090	23,946	23,896
Magnesium, primary, metal		23,000	21,000	21,350	18,500	18,211
INDUSTRIAL MINERALS						
Bromine, elemental		180,000	175,000	180,000	173,000	182,000
Cement, hydraulic	thousand metric tons	6,361	5,858	5,000 e	5,250 e	5,700 e
Clay:						
Brick		34,288	32,700	33,000 e	32,500 e	33,000 e
Common		1,158,600	1,019,000	1,000,000 e	1,000,000 e	1,000,000 e
Flint[e]		330,000	300,000	300,000	300,000	300,000
Fertilizers, phosphate fertilizer:						
Monoammonium phosphate		29,150	350,500 r	369,700 r	431,970	444,946
Triple superphosphate		655,900	662,300	659,000	500,395	641,221
Other		299,550	-- r	45,800 r	50,500	58,915
Gypsum, mine		116,000	75,800	72,000	--	--
Lime		384,900	614,000	706,000	674,530	680,282
Magnesium compounds:						
Magnesia		45,000	30,870	31,699	33,232	34,000 e
Magnesium chloride, Mg content		90,000	113,000	105,530 r	113,903	131,201
Phosphate:						
Phosphate rock:						
Gross weight	thousand metric tons	3,332	3,550	2,807	3,090	2,431
P_2O_5 content[e]	do.	1,030	1,100	870	930	750
Compounds, phosphoric acid		726,900	583,600	588,800	573,200	555,964
Potash:						
Mine, ore:						
Gross weight	thousand metric tons	3,700	3,800	3,334	3,850	3,900
K_2O content	do.	1,900	2,200 e	2,034 r	2,416	2,379
Compounds, potassium nitrate		124,400	192,700	189,400	245,000	252,000
Salt, marketable	thousand metric tons	514	377	301	275	262
Sand and gravel, industrial, unspecified		559,800	409,400	417,000	416,834	517,133
Stone, sand, and gravel, construction:						
Sand and gravel	thousand metric tons	5,113	4,900	4,654	3,217	2,800
Stone:						
Crushed, unspecified	do.	57,442	55,300 e	54,600	53,266	60,000
Dimension, marble		76,000 e	40,000 e	16,000 r	--	--
Sulfur:						
Byproduct, petroleum, S content	thousand metric tons	77	76	71 r	45	44
Compounds, sulfuric acid:						
Gross weight	do.	2,118	2,057	2,099	2,058	2,027
S content[e]	do.	700	680	700	680	670
MINERAL FUELS AND RELATED MATERIALS						
Natural gas:						
Gross	million cubic meters	9,570	10,480	10,500	15,470	19,330
Marketable[e]	do.	8,600	9,400	9,400	14,000	17,400
Petroleum:						
Crude	thousand 42-gallon barrels	480	552	627	974	1,230
Refinery:						
Asphalt	do.	1,876	1,892	1,609	1,860	1,745
Distillate fuel oil	do.	30,054	35,895	40,279	37,786	39,107
Gasoline	do.	23,470	25,567	25,058	21,181	21,883
Kerosene	do.	8,842	10,635	11,565	4,495	6,255
Liquefied petroleum gas	do.	5,164	5,874	5,814	5,272	5,783
Lubricants	do.	1,000 r	-- r	-- r	--	--
Naphtha	do.	7,545	5,993	7,693	7,841	8,512

See footnotes at end of table.

TABLE 1—Continued

ISRAEL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2017	2018	2019	2020	2021
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:—Continued						
Refinery:—Continued						
Residual fuel oil	thousand 42-gallon barrels	13,533	13,103	16,479	10,554	11,441
Other[e]	do.	20,000	23,000	24,000	23,000	23,000
Total	do.	111,000	122,000	133,000	112,000	118,000

[e]Estimated. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through December 27, 2022. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]In addition to the commodities listed, caustic soda, oil shale, secondary refined zinc, and semimanufactured steel may have been produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
ISRAEL: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Bromine		Dead Sea Bromine Co. Ltd. (DSBC) [Israel Chemicals Ltd. (ICL), 100%]	Plant at Sodom, southern end of the Dead Sea	280
Cement		Nesher Israel Cement Enterprises Ltd. (Clal Industries and Investments Ltd., 100%)	Cement plant at Ramla, 22 km southeast of Tel Aviv	5,800
Do.		do.	Clinker plant at Ramla, 22 km southeast of Tel Aviv	4,000
Do.		do.	Grinding mill at Haifa	1,200
Do.		Har Tuv Cement Ltd. (Weil family, 100%)	Cement plant at Beit Shemesh, 35 km west of Jerusalem	1,000
Do.		do.	Clinker plant at Beit Shemesh, 35 km west of Jerusalem	700
Clay		Negev Industrial Minerals Ltd. (RINA Group)	Mine at Ramon Crater in the Negev Desert	NA
Lead, refined, secondary		Hakurnas Lead Works Ltd.	Plant at Ashdod, 40 km south of Tel Aviv	50
Lime		Negev Industrial Minerals Ltd. (RINA Group)	Plant at Mishor Rotem in the Negev Desert	180
Do.		Lime & Stone Production Co. Ltd. [Readymix (Israel) Ltd., 100%]	Plant at Shfeya, 35 km south of Haifa	150
Magnesium:				
Magnesia		Dead Sea Periclase Ltd. [Israel Chemicals Ltd. (ICL), 100%]	do.	75
Magnesium metal, refined		Dead Sea Magnesium Ltd. (DSM) [Israel Chemicals Ltd. (ICL), 100%]	Plant at Sodom, southern end of the Dead Sea	24
Natural gas	million cubic meters	Delek Group, 45.34%; Chevron Corp., 39.66%; Ratio Energies Ltd., 15%	Leviathan gasfield (offshore), 130–140 km west of Haifa	12,000
Do.	do.	Isramco Negev 2 LLP, 28.75%; Chevron Corp., 25%; Mubadala Investment Co. PJSC, 22%; Tamar Petroleum Ltd., 16.75%; Dor Gas Exploration Ltd., 4%; Everest Infrastructures LLP, 3.5%	Tamar gasfield (offshore), 90 km west of Haifa	11,400
Petroleum:				
Crude	thousand 42-gallon barrels	Lapidoth Israel Oil Prospectors Corp.	Heletz oilfield (onshore), 70 km south of Tel Aviv	700 e
Refined	do.	Bazan Group Ltd. (Private investors, 51.4%; Israel Corp., 33.06%; Israel Petrochemical Enterprises Ltd., 15.50%)	Refinery at Haifa Bay	71,900
Do.	do.	Paz Oil Co. Ltd.	Refinery at Ashdod, 40 km south of Tel Aviv	40,200
Phosphate:				
Phosphate rock		Rotem Amfert Negev Ltd. [Israel Chemicals Ltd. (ICL), 100%]	Oron, Rotem, and Zin Mines[2] in the Negev Desert	4,700
Phosphatic fertilizers		do.	Plant at Mishor Rotem in the Negev Desert	1,900
Phosphoric acid[3]		do.	do.	760
Potash		Dead Sea Works (DSW) [Israel Chemicals Ltd. (ICL), 100%]	Plant at Sodom, southern end of the Dead Sea	4,200 e
Salt		do.	do.	700
Do.		Israel Salt Industries Ltd. (Danker Group)	Plant at Eilat, northern end of the Gulf of Aqaba	150
Do.		do.	Plant at Atlit, 20 km south of Haifa	14
Silica sand		Negev Industrial Minerals Ltd. (RINA Group)	Quarry at Mactesh Hatira in the Negev Desert	300

See footnotes at end of table.

TABLE 2—Continued
ISRAEL: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Steel, products:			
Billet	Hod Metal Products & Manufacturing Co. Ltd.	Plant at Acre, 25 km north of Haifa	250
Do.	Yehuda Steel Ltd.	Plant at Bene Ayish, 42 km south of Tel Aviv	200
Do.	do.	Plant at Ashdod, 40 km south of Tel Aviv	180
Rebar	Neuman Steel Industries Group Ltd.	Plant at Petah Tikva, 15 km east of Tel Aviv	300
Do.	Hod Metal Products & Manufacturing Co. Ltd.	Rolling plant at Kiryat Gat, 70 km south of Tel Aviv	250
Do.	Yehuda Steel Ltd.	Plant at Bene Ayish, 42 km south of Tel Aviv	200
Do.	do.	Plant at Ashdod, 40 km south of Tel Aviv	120
Stone, sand, and gravel	Hanson Israel (HeidelbergCement AG)	Migdal Zedek and other quarries, about 40 km east of Tel Aviv	8,000 e
Do.	Lime & Stone Production Co. Ltd. [Readymix (Israel) Ltd., 100%]	Modiim quarry, about 40 km southeast of Tel Aviv	6,000 e
Do.	do.	Dragot, Ein Harod, Eilat, Golani Junction, Kadarim, Revivim, Segev, and Shefar'am quarries	5,000 e
Do.	Shapir Civil and Marine Engineering Ltd.	Etziona quarry, Beit Shemesh, 35 km west of Jerusalem	2,500 e
Do.	do.	Natuf quarry, near Nili in the Occupied West Bank	2,500 e
Do.	do.	Vered quarry, near Barkai, 50 km southeast of Haifa	2,500 e
Do.	do.	Zanuach quarry, near Beit Shemesh 35 km west of Jerusalem	2,500 e
Do.	Negev Industrial Minerals Ltd. (RINA Group)	Quarry at Mishor Rotem in the Negev Desert	NA
Sulfur	Bazan Group Ltd. (Private investors, 51.4%; Israel Corp., 33.06%; Israel Petrochemical Enterprises Ltd., 15.50%)	Refinery at Haifa	40
Do.	Paz Oil Co. Ltd.	Refinery at Ashdod, 40 km south of Tel Aviv	33
Sulfuric acid	Rotem Amfert Negev Ltd. [Israel Chemicals Ltd. (ICL), 100%]	Plant at Mishor Rotem in the Negev Desert	2,400
Zinc, refined, secondary	Numinor Chemical Industries Ltd.	Plant at Ma'a lot-Tarshiha, 55 km northeast of Haifa	NA

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
[1]Abbreviation(s) used for unit(s) of measure in this table include the following: km—kilometer.
[2]The Zin Mine closed in 2020.
[3]P_2O_5 equivalent.