



2011 Minerals Yearbook

ISRAEL

THE MINERAL INDUSTRY OF ISRAEL

By Thomas R. Yager

In 2011, Israel played a significant role in the world's production of bromine, magnesium metal, phosphate rock, and potash. The country's share of the world's estimated bromine production amounted to 43%; potash, 5%; magnesium metal, 4%; and phosphate rock, 2%. Israel also accounted for 5% of the value of the world's polished diamond production. Other domestically significant mining and mineral processing operations included the production of cement, crushed stone, natural gas, and petroleum products. Israel consumed substantial amounts of bromine and phosphate rock in downstream processing operations; most of the final products of these operations were exported. Domestic sulfur consumption amounted to an estimated 1% of world sulfur production in 2010 (the latest year for which data were available) (Apodaca, 2012; Even-Zohar, 2012; Jasinski, 2012a, b; Kramer, 2012; Ober, 2012).

Minerals in the National Economy

In 2011, the mining and quarrying and the nonmetallic mineral products sectors accounted for about 0.8% of the gross domestic product (GDP), and the manufacture of iron, steel, and other metals, about 0.3%. The remainder of the manufacturing sector (which included diamond cutting and polishing, fertilizer production, and petroleum refining) accounted for 14.4% of the GDP. The nonmetallic minerals sector employed about 9,600 workers; mining and quarrying, about 3,700; and diamond cutting and polishing, about 2,900. Israel's total exports amounted to \$58.1 billion in 2011, of which diamond accounted for 19%, and mining and quarrying, 3.3%. Total imports were valued at about \$72.7 billion, of which mineral fuels accounted for 18.8%, and diamond, 14% (Central Bureau of Statistics, 2012, p. 610, 660, 732, 754, 782, 853, 855).

Production

In 2011, the production of complex fertilizers (which contained at least two out of the following three: nitrogen, phosphorus, and potassium) increased by 76%; natural gas, 33%; and magnesium metal, an estimated 20%. Phosphate fertilizer production decreased by 14% (table 1).

Structure of the Mineral Industry

Most of Israel's mining and mineral processing operations were privately owned, including the producers of aggregates, bromine, cement, lime, magnesium, natural gas, phosphate rock, potash, and salt. Bromine, cement, lead, magnesium, phosphate rock, potash, potassium nitrate, and sulfuric acid were produced by only one domestic company each. The diamond cutting and polishing industry was composed of many small producers.

Commodity Review

Metals

Copper.—Altos Hornos de México S.A. de C.V. (AHMSA) planned to reopen the Timna copper mines near Eliat and to build a new solvent extraction and electrowinning plant with a capacity of 24,000 metric tons per year (t/yr). In 2011, the Government approved AHMSA's plans to build the plant and operate the mine, which gave the company operating rights for 25 years. AHMSA planned to start construction on its new plant in the third quarter of 2012 (Altos Hornos de México S.A. de C.V., 2012, p. 17).

Magnesium.—Dead Sea Magnesium Ltd. (DSM) [a subsidiary of Israel Chemicals Ltd. (ICL)] was a producer of magnesium metal and magnesium alloys. In the first quarter of 2011, the company was engaged in debottlenecking operations that were expected to increase its capacity of 34,000 t/yr by between 7% and 10%. DSM planned to complete the expansion by the end of the first quarter of 2011 (Riley, 2011).

Industrial Minerals

Bromine.—Brines and carnallite from the Dead Sea were extracted by Dead Sea Bromine Company Ltd. (DSBC) (a subsidiary of ICL) at DSBC's plant at Sdom, which had a capacity of 280,000 t/yr. Bromine production increased to about 202,000 metric tons (t) from 184,696 t in 2010. DSBC consumed about 76% of its bromine for the manufacture of bromine compounds at its plants in China, Israel, and the Netherlands. Domestic consumers accounted for 2% of the value of the company's external sales in 2011. Bromine compounds produced by DSBC were used in such applications as flame retardants, natural gas and crude petroleum production, pharmaceuticals, and water treatment (Israel Chemicals Ltd., 2012, p. 66, 73, 75).

Diamond.—Israel did not produce rough diamond, but the country was one of the world's leading diamond cutting and trading centers. Domestic diamond cutting and polishing companies specialized in large, high-value gemstones. In 2011, the value of Israel's cut and polished diamond exports increased to \$7.2 billion from \$5.8 billion in 2010; however, the value of Israel's cut and polished diamond exports produced from domestic cutting and polishing operations decreased to \$1.5 billion from \$1.6 billion. The United States received 39% of Israel's polished diamond exports; Hong Kong, 26%; Switzerland, 6%; and India, 5% (Israel Diamond Institute Group of Companies, 2012).

Israel's cut and polished diamond production declined in recent years because of competition from Indian producers with lower labor costs. In 2011, the domestic diamond cutting and polishing industry employed 2,900 workers compared with 3,000 in 2010 and 5,400 in 2001. Leo Schachter Diamonds Ltd.,

which was the leading manufacturer in the industry, employed fewer than 100 workers in 2011 (Central Bureau of Statistics, 2003, p. 12.62; Knowledge@Wharton, 2011).

Magnesium Compounds.—Dead Sea Periclase Ltd. (a subsidiary of ICL) produced magnesia from brines in the Dead Sea; the company's production capacity was 53,000 t/yr. In 2011, magnesia production amounted to about 40,000 t. ICL also produced magnesium chloride for use in deicing (Israel Chemicals Ltd., 2012, p. 13, 75).

Phosphate Rock.—Rotem Amfert Negev Ltd. (a subsidiary of ICL) produced phosphate rock at the Arad, the Oron, and the Zin Mines in the Negev Desert. Mining of phosphate rock decreased to nearly 3.11 million metric tons (Mt) in 2011 from 3.14 Mt in 2010. Rotem consumed 79% of its output for the manufacture of phosphate fertilizers and phosphoric acid at its plants in Israel and European countries. In 2011, Israel's exports of phosphate fertilizers decreased to 787,000 t from 917,000 t in 2010, and exports of complex fertilizers increased to nearly 1.54 Mt from 875,000 t (table 1; Israel Chemicals Ltd., 2012, p. 49).

Potash.—Dead Sea Works (DSW) (a subsidiary of ICL) used carnallite from the Dead Sea as raw material for its potash plants. The company planned to increase capacity in increments by removing bottlenecks and improving technology at existing plants. By the end of 2014, the total planned increase in capacity was expected to be 500,000 t/yr. Production remained nearly unchanged in 2011 (Israel Chemicals Ltd., 2012, p. 49).

Global production (excluding China) of potassium nitrate for agricultural use amounted to about 1 Mt in 2011, of which an estimated 32% was produced by Haifa Chemicals Ltd. Most of Haifa's production was in Israel; the company consumed 0.8 metric tons of potash for every metric ton of potassium nitrate produced. Haifa also produced potassium nitrate for industrial applications (Gabison, 2009; Sociedad Quimica y Minera de Chile S.A., 2012, p. 22, 26, 31).

Sulfur.—Most of Israel's sulfur demand was met by imports from sources that included Canada, Germany, Kazakhstan, and Russia. In 2010, ICL purchased about 630,000 t of sulfur for use in fertilizer manufacturing compared with 522,000 t in 2009. Sulfur was also recovered domestically by Oil Refineries Ltd. and Paz Oil Company Ltd., which had capacities of 40,000 t/yr and 33,000 t/yr, respectively. In mid-2011, Oil Refineries was producing at the rate of 33,000 t/yr, and Paz Oil, at the rate of 27,000 t/yr (Israel Chemicals Ltd., 2011, p. 48; Koottungal, 2011).

Mineral Fuels

Natural Gas.—Noble Energy Inc. of the United States operated the Mari-B offshore gasfield in the Mediterranean Sea through its subsidiary Samedan Mediterranean Sea Inc. In 2011, Noble increased its production of dry natural gas to about 1.79 billion cubic meters from 1.34 billion cubic meters in 2010. The company discovered the Tamar prospect in 2009 and the Leviathan prospect in 2010. At the end of 2011, Noble's total reserves were estimated to be about 64 billion cubic meters (Noble Energy, Inc., 2012, p. 10, 14).

Noble planned to start production at Tamar in the second quarter of 2013. The company planned to produce at Mari-B

until production started at Tamar. In 2011, Noble engaged in drilling at Leviathan (Noble Energy, Inc., 2012, p. 13–14).

About 40% of the electricity generated in Israel was attributable to natural gas. The Mari-B gasfield accounted for 57% of Israel's natural gas consumption in terms of power generation, and imports from Egypt accounted for 43%. In 2011, Egyptian imports were limited by repeated sabotage of the natural gas pipeline in Sinai (New York Times, The, 2012).

In September 2011, Adira Energy Ltd. of Canada announced that resources at the Gabriella and the Sarah offshore prospects were estimated to be 101 billion cubic meters and 28 billion cubic meters, respectively. Zion Oil & Gas Inc. of the United States drilled the Ma'anit-Joseph #3 well at its onshore Joseph license in 2011 (Adira Energy Ltd., 2011).

Petroleum.—In 2011, Oil Refineries and Paz Oil had petroleum refineries with capacities of 197,000 barrels per day (bbl/d) and 95,000 bbl/d, respectively. Paz Oil planned to increase its capacity by nearly 16% by 2012; the cost of the expansion was estimated to be \$118 million (Paz Oil Company Ltd., 2012, p. A-137, A-155).

Outlook

The production of potash is likely to increase from 2012 to 2014 because of ICL's expansion. Magnesium metal production is expected to increase in 2012 and 2013 because of DSM's expansion in 2011. The output of petroleum products is likely to increase after 2012. The production trends for the cement, crushed stone, and sand industries will depend on the strength of the domestic economy. The outlook for bromine, diamond, and phosphate rock and fertilizers will depend on market conditions in the world economy.

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TABLE 1
 ISRAEL: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2007	2008	2009	2010	2011 ^c	
METALS						
Iron and steel, steel, crude ^e	480,000	480,000	380,000	430,000	430,000	
Lead, refined secondary	25,000	27,000	26,000	27,000 ^e	27,000	
Magnesium metal	29,618	32,051	19,405	23,309	28,000	
INDUSTRIAL MINERALS						
Bromine, elemental	159,395	164,042	127,689	184,696	202,000 ³	
Cement, hydraulic	thousand metric tons	5,000	4,819	4,759	5,139	5,200
Clays:						
Brick clay ⁴	29,474	63,499	53,581	58,896	60,000	
Common clay	982,000	1,017,000	578,000	677,900	680,000	
Kaolin	--	151	--	--	--	
Diamond ⁵	thousand carats	521	400 ^e	299	245	240
Gypsum	82,974	9,975	9,152	99,730	100,000	
Lime	282,000	480,554	428,552	657,897	660,000	
Magnesium chloride	103,023	108,852	132,636	135,930	140,000	
Phosphate:						
Phosphate rock, mine output:						
Beneficiated	thousand metric tons	3,069	3,088	2,697	3,135	3,105 ³
P ₂ O ₅ content	do.	840	850	740	860 ^e	850
Phosphatic fertilizers, P ₂ O ₅ equivalent: ^e						
Monoammonium phosphate	NA ^r	NA ^r	NA ^r	NA ^r	NA	
Triple superphosphate	NA ^r	NA ^r	NA ^r	NA ^r	NA	
Phosphoric acid, P ₂ O ₅ equivalent ^e	NA ^r	NA ^r	NA ^r	NA ^r	NA	
Fertilizers: ⁶						
Phosphatic	thousand metric tons	1,351	1,000 ^e	726	917	787 ³
Complex ⁷	do.	362	470 ^e	580	875	1,538 ³
Potash, K ₂ O equivalent	do.	2,182	2,170	1,900	2,080	2,100
Salt, marketed	do.	400	421	357	421	430
Sand:						
Silica sand	220,000	194,771	163,206	197,699	200,000	
Other ^e	thousand metric tons	6,000	6,000	5,000	4,000	4,000
Stone: ^e						
Crushed	do.	42,000	46,000	45,000	50,000	50,000
Dimension, marble	75,000	75,000	68,000	72,000	72,000	
Sulfur:						
Byproduct from petroleum	thousand metric tons	34	50	50	55 ^{r,e}	60
Sulfuric acid: ^e						
Gross weight	do.	2,050	1,900	1,600	1,930	1,930
S content	do.	670	620	520	630	630
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross	million cubic meters	2,758	3,436	2,825	3,234	4,300
Dry	do.	1,145	1,437	1,178	1,344	1,788 ³
Petroleum:						
Oil shale	428,700 ^r	426,800 ^r	443,900 ^r	430,000 ^e	430,000	
Crude	42-gallon barrels	8,200	15,715	14,738	12,359	12,000

See footnotes at end of table.

TABLE 1—Continued
ISRAEL: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2007	2008	2009	2010	2011 ^e	
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum—Continued:						
Refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	6,218	5,580	8,352 ^r	8,000 ^{r,e}	8,000
Gasoline	do.	25,172	22,596	25,744 ^r	24,600 ^{r,e}	24,600
Naphtha	do.	3,905	3,502	5,491 ^r	5,200 ^{r,e}	5,200
Kerosene	do.	10,296	10,057	10,760 ^r	10,300 ^{r,e}	10,300
Distillate fuel oil	do.	27,438	24,633	25,446 ^r	24,300	24,300
Residual fuel oil	do.	24,435	21,745	16,950 ^r	16,200 ^{r,e}	16,200
Other	do.	6,313	3,502 ^r	3,700 ^r	3,500 ^{r,e}	3,500
Total	do.	103,777	91,615 ^r	96,400 ^{r,e}	92,100 ^{r,e}	92,100

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

¹Table includes data available through January 10, 2013.

²In addition to the commodities listed, caustic soda, secondary refined zinc, and semimanufactured steel are produced, but available information is inadequate to make reliable estimates of output.

³Reported figure.

⁴Includes flint clay.

⁵Imported diamond cut in Israel.

⁶Reported exports.

⁷Contain at least two of the following: nitrogen, phosphorus, or potassium.

TABLE 2
ISRAEL: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Aggregates	Lime & Stone Production Company Ltd. [Housing & Construction Holding Company Ltd., 50%, and Readymix (Israel) Ltd., 50%]	Modiim	6,000 ^e	
Do.	do.	Dragot, Ein Harod, Eliat, Golani Junction, Kadarim, Revivim, Segev, and Shefar'am	5,000 ^e	
Bromine	Dead Sea Bromine Group (DSBG) [Israel Chemicals Ltd. (ICL), 100%]	Sdom	280	
Cement	Nesher Israel Cement Enterprises Ltd. (Clal Industries and Investments Ltd., 75%)	Plants at Haifa, Har Tuv, and Ramla	6,000	
Lead, refined, secondary	Hakurnas Lead Works Ltd.	Ashdod	25	
Lime	Lime & Stone Production Co. Ltd.	Shefeya	100	
Do.	Negev Industrial Minerals Ltd.	Mishor Rotem	90	
Magnesium:				
Magnesia	Dead Sea Periclase Ltd. (DSP) [Israel Chemicals Ltd. (ICL), 100%]	do.	35	
Magnesium, refined	Dead Sea Magnesium Ltd. [Israel Chemicals Ltd. (ICL), 100%]	Sdom	37 ^e	
Natural gas	million cubic meters	Delek Energy Group, 53%, and Noble Energy Inc., 47%	Mari-B gasfield	6,200
Petroleum:				
Crude	thousand 42-gallon barrels	Lapidoth Israel Oil Prospectors Corp.	Heletz-Brur	8
Do.	do.	do.	Kochav	3
Refined	do.	Oil Refineries Ltd. (Israel Corp., 45.1%)	Haifa	71,900
Do.	do.	Paz Oil Company Ltd.	Ashdod	32,900
Phosphate:				
Phosphate rock	Rotem Amfert Negev Ltd. [Israel Chemicals Ltd. (ICL), 100%]	Arad, Oron, and Zin	4,500	
Phosphatic fertilizers	do.	Rotem	1,800	
Do.	Haifa Chemicals Ltd.	Haifa	NA	
Phosphoric acid ¹	Rotem Amfert Negev Ltd.	Rotem	640	
Do.	Haifa Chemicals Ltd.	Haifa	NA	
Potash	Dead Sea Works (DSW) (Israel Chemicals Ltd. (ICL), 100%)	Sdom	3,200	
Salt	do.	do.	700	
Do.	Israel Salt Industries Ltd. (subsidiary of Danker Group)	Eliat	150	
Do.	do.	Kalia	60	
Do.	do.	Atlit	16	
Sand	Negev Industrial Minerals Ltd.	Mactesh Htira	300	
Steel:				
Crude	Hod Metal Products & Manufacturing Co. Ltd.	Akko	300	
Do.	Yehuda Steel Ltd.	Ashdod	180	
Billet	do.	Bene Ayish	200	
Do.	do.	Ashdod	180	
Do.	Hod Metal Products & Manufacturing Co. Ltd.	Akko	300	
Rebar	Yehuda Steel Ltd.	Bene Ayish	200	
Do.	do.	Ashdod	120	
Do.	Hod Metal Products & Manufacturing Co. Ltd.	Kiryat Gat	300	
Sulfur	Oil Refineries Ltd.	Ashdod	40	
Do.	Paz Oil Company Ltd.	Haifa	33	
Sulfuric acid	Rotem Amfert Negev Ltd.	Rotem	2,400	
Zinc	Numinor Chemical Industries Ltd.	Maalot	NA	

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

¹P₂O₅ equivalent.