

JORDAN, LEBANON, AND SYRIA

By Thomas R. Yager

JORDAN

In recent years, Jordan has been a major producer and exporter of potash and phosphate rock. It has also produced such industrial minerals as feldspar, gypsum, kaolin, salt, and silica sand and such building materials as cement, dimension stone, limestone, and marble. Natural gas and petroleum products have been produced for domestic consumption. Deposits of copper, gold, iron, sulfur, and titanium were found in Jordan, and bromine and magnesium occur in the Dead Sea.

In 2001, Jordan's gross domestic product (GDP) amounted to about \$19.4 billion at purchasing power parity, and per capita income at purchasing power parity was nearly \$3,800. GDP at market exchange rates was \$8.8 billion. Jordan's GDP grew by 4.2% in 2001 after increasing by 4% in 2000, 3.1% in 1999, and 3% in 1998. The output of the manufacturing sector amounted to 15.9% of the GDP; construction, 5.5%; electricity and water, 2.6%; and mining and quarrying, 3% (Central Bank of Jordan, 2002, p. 83; International Monetary Fund, 2002, p. 165; 2002a§¹-c§).

In 2001, the mining and quarrying sector grew by 4.1%, and the construction sector, by 11.1%. From 1997 to 2001, the mining and quarrying and construction sectors have grown by an average of 1.8% per year and 0.1%, respectively (Central Bank of Jordan, 2002, p. 83).

In 2001, total exports were valued at \$1.91 billion; including stone, cement, fertilizers, phosphate rock, phosphoric acid, potash, and sulfuric acid totaled \$541 million of the \$1.91 billion. In the same year, total imports were valued at \$4.85 billion. Imports of crude petroleum amounted to \$544.9 million; refined petroleum products, \$114 million; iron and steel products, \$213.7 million; crude minerals and crude fertilizers, \$34.8 million; and ammonia, \$25.8 million (Central Bank of Jordan, 2002, p. 64-67).

Metals

Magnesium.—Jordan Magnesia Company [a subsidiary of Arab Potash Company (APC)] was building a plant to produce about 50,000 metric tons per year (t/yr) of refractory grade magnesia and 10,000 t/yr of other grades of magnesia for chemical, environmental, fertilizer, and plastic applications. Magnesium will be extracted from the Dead Sea's plentiful resources of magnesium chloride. The \$80 million plant was expected to start production by mid-2002 (Dougherty, 2001).

APC was engaged in a feasibility study for a magnesium chloride flakes plant with a capacity of from 100,000 to 300,000 t/yr. The company was also considering the possibility of

producing magnesium metal, but Jordan's high energy costs may render its production uneconomic (Scott, 2001).

Steel.—A new antitrust law was expected to come into effect in November 2002. This law would force increased competition in the Jordanian steel industry, which was plagued by severe overcapacity. The country's total rolling capacity was estimated to be 1 million metric tons per year (Mt/yr), but production was only 270,000 metric tons (t) in 2000 (table 1). Most of Jordan's steel companies reported losses from 1996 to 1999 (Metal Bulletin, 2002).

The International Iron and Steel Institute (2001, p. 82, 92) estimated that Jordan's imports of semimanufactured and finished steel products amounted to 387,000 t in 2000. This was an increase from 354,000 t in 1999, but a decrease from 554,000 t in 1995. From 1995 to 2000, Jordan's apparent consumption of finished steel fell from 572,000 t to 405,000 t. Most of the billet needed to produce Jordan's rebar was sourced from Russia, Turkey, and Ukraine.

Industrial Minerals

Bromine.—In 2001, Jordan Bromine Co. Ltd. (a joint venture of APC and the U.S.-based Albemarle Holding Co. Ltd.) started building a plant to produce bromine and bromine compounds. The \$150 million plant was expected to be operational at the end of 2003. It would have a production capacity of 50,000 t/yr of elemental bromine; caustic soda, 49,000 t/yr; calcium bromide, 30,000 t/yr; chlorine, 30,000 t/yr; and hydrochloric acid, 12,000 t/yr. Jordan Bromine also started construction on a tetrabromobisphenol-A (TBBA) plant with an initial production capacity of 12,500 t/yr. This plant could be quickly expanded to 37,500 t/yr (Arab Petroleum Research Center, 2001a, p. 202-203; Arab Potash Company, 2001§).

Cement.—Lafarge Group held a 44% share in Jordan Cement Factories Co. Ltd. (JCF), which was Jordan's largest producer of cement. JCF had two plants in Fuhia and Rashadia with a combined capacity of 4.5 Mt/yr of cement and 3.8 Mt/yr of clinker. Lafarge planned to reduce production costs by substituting petroleum coke for diesel. The Arab Company for White Cement Industry operated a plant with a capacity of 130,000 t/yr; about 50% of the company's product was exported (International Cement Review, 2001a).

Jordan's cement consumption averaged about 2.25 Mt/yr from 1998 to 2000. In 2001, consumption was estimated to have increased to about 2.4 million metric tons (Mt). Housing accounted for 69% of domestic cement consumption; commercial building projects, 20%; and industrial uses, 11%. In recent years, cement has been exported to Bangladesh, Egypt, Eritrea, Palestine, Saudi Arabia, Sudan, and Yemen. From 1997

¹References that include a section twist (§) are found in the Internet References Cited section.

to 2001, cement exports fell from \$47.2 million to \$35.7 million (International Cement Review, 2001a; Central Bank of Jordan, 2002, p. 64-65).

Phosphate.—Jordan Phosphate Mines Company (JPMC) produced phosphate rock from three mines. JPMC planned to increase production at the Shiyada Mine, which was the largest, to 7.4 Mt/yr in 2003. Conditions in the global phosphate markets and technical problems at Shiyada's beneficiation plant forced these plans to be delayed. The Al-Abiad and the Al-Hasa Mines were expected to be subeconomic by 2006, and resources at the Al-Rusaifa Mine have already been depleted. In January 2001, the Government approved the privatization of JPMC, which was scheduled to be completed by March 2002 (Arab Petroleum Research Center, 2001a, p. 201-202; Goussous, 2001; Kendall, 2000).

Phosphoric acid was produced by Indo-Jordan Chemicals Company (IJC) and Jordan Fertilizer Industry Company (JFIC). In 2000, Southern Petrochemicals Industry Corp., which was the largest shareholder in IJC, discussed the possibility of increasing phosphoric acid production capacity to 462,000 t/yr from 225,000 t/yr. JFIC and IJC accounted for 24% and 16%, respectively, of JPMC's phosphate rock sales. The two companies also produced such fertilizers as diammonium phosphate (DAP); from 1998 to 2000, JFIC's production of DAP fell by about 36% (Kendall, 2000; Goussous, 2001).

In December 2000, Norsk Hydro decided to discontinue its joint venture with JPMC in the Hydro Agri Jordan phosphoric acid and fertilizer project. The two companies had originally planned to build a phosphoric acid plant with a capacity of 440,000 t/yr and a fertilizer plant with a capacity of 1.2 Mt/yr. Norsk Hydro indicated that it planned to give higher priority to other investment opportunities in its core business areas (Industrial Minerals, 2001a).

Exports of phosphate rock fell to \$129.9 million in 2001 from \$190 million in 1997. In 2000, about 60% of JPMC's sales were to export markets; of that 60%, India absorbed 61.5%, and Indonesia, 14%. In 2001, exports of phosphoric acid rose to \$52.3 million from \$3.1 million in 1997. During the same period, exports of fertilizers fell to \$86.3 million from \$134.9 million (Goussous, 2001; Central Bank of Jordan, 2002, p. 64-65).

Potash.—APC recovered potassium from the Dead Sea to produce potash; the company was one of the world's largest potash producers with a capacity of 2.0 Mt/yr. Capacity was expected to increase to 2.4 Mt/yr of potash in 2004. In January 2001, the Government approved the privatization of APC, which was scheduled to be completed in March 2002. In 2001, exports of potash increased to \$195.4 million from \$139.2 million in 1997 (Arab Petroleum Research Center, 2001a, p. 201-202; Central Bank of Jordan, 2002, p. 64-65).

In 1998, APC and Kemira Agro OY formed a joint venture to produce 150,000 t/yr of potassium nitrate fertilizer and 75,000 t/yr of dicalcium phosphate animal feed supplement. Production was expected to start in 2002.

Salt.—The salt deposit in the Azraq depression was exploited by Al Azraq, and Dead Sea salt was exploited by the Jordan Safi Salt Company (JOSSCO), which was 52.7% owned by

APC. JOSSCO's plant had a capacity of 1.2 Mt/yr of industrial salt and 32,000 t/yr of table salt. At the end of 2000, APC agreed to sell a 40% stake in JOSSCO to Qatari Salt Processing and Production Company. The agreement was not finalized; in May 2001, APC announced that it would acquire a 100% interest in JOSSCO (Arab Petroleum Research Center, 2001a, p. 202).

Sulfur.—Jordan's domestic sulfur resources occur mostly in unexploited oil shale; IJC and JFIC produced sulfuric acid from imported sulfur. Saudi Arabia accounted for 82% of sulfur imports, and the United Arab Emirates, 18%. In 2000, Jordan consumed about 1.76 Mt of sulfuric acid, which was an decrease from 1.8 Mt in 1999 and an increase from 987,000 t in 1995. About 86% of Jordan's sulfuric acid was consumed in the manufacture of fertilizers.

Mineral Fuels

Natural Gas.—National Petroleum Company planned to explore for additional resources at Risha, which was Jordan's only known gasfield. The Governments of Cyprus, Egypt, Jordan, Lebanon, and Syria agreed to build a pipeline that would supply Egyptian and Syrian natural gas to Jordan, Lebanon, and Cyprus. Jordan would purchase 1 billion cubic meters per year of natural gas for 15 years starting in 2003 (Lidstone, 2002).

Petroleum.—Although minimal production at the Hamza oilfield continued in 2001, Jordan depended upon Iraq for most of its supplies of crude petroleum. Imports of crude petroleum increased to \$544.8 million in 2001 from \$410.8 million in 1997. In November 2000, the Governments of Iraq and Jordan revived their plan to build a pipeline to transport Iraqi oil to Jordan's refinery at Zarqa. Work on the pipeline was expected to start in late 2001 (Arab Petroleum Research Center, 2001a, p. 195, 200; Central Bank of Jordan, 2002, p. 67-68).

In May 2001, Suncor Energy Inc. resumed negotiations with the Government to develop the Lejjun oil shale reserves. If Suncor proceeds with the project, then it would plan to produce 17,000 barrels per day (bbl/d) of crude petroleum in 2006, 67,000 bbl/d in 2011, and 210,000 bbl/d in 2014 (Arab Petroleum Research Center, 2001a, p. 196).

Jordan Petroleum Refinery Company (JPRC) operated the country's only refinery at Zarqa, which had a nominal capacity of 90,400 bbl/d. The JPRC was studying a proposal for a \$400 million to \$500 million upgrade and expansion of the refinery. About \$200 million to \$300 million would be needed to reduce the sulfur content of the refinery's products and \$200 million to increase capacity to 150,000 bbl/d. Imports of petroleum products increased to \$114 million from \$96.7 million (Arab Petroleum Research Center, 2001a, p. 196; Central Bank of Jordan, 2002, p. 67-68).

Infrastructure

Jordan produced 7,366 gigawatt-hours (GWh) of electricity in 2001, which was an increase from 7,208 GWh in 2000 and 6,180 GWh in 1997. Fossil fuels accounted for 99.6% of electricity production, and hydroelectric sources, 0.4%. About

11% of Jordan's electricity was generated from natural gas. The country's electricity demand was expected to increase to 10,000 GWh in 2005 and 12,500 GWh in 2010 (Arab Petroleum Research Center, 2001a, p. 198; Central Bank of Jordan, 2002, p. 88).

Installed generating capacity was 1,578 megawatts (MW) in 2000. Jordan's largest powerplants were the 650-MW Aqaba plant and the 400-MW Zarqa plant. Planned expansions of capacity included a new 450-MW plant at al-Samra; a 100- to 300-MW oil shale plant in the Sultani area; a 100- to 150-MW gas-powered plant; three 25- to 30-MW wind-powered plants; a 30-MW solar plant at Wadi Rum; and a hydroelectric plant at Wihdeh. Jordan's known exploitable potential hydroelectric energy was 87 MW (World Resources Institute and others, 1996, p. 288; Arab Petroleum Research Center, 2001a, p. 199).

Outlook

Jordan did not consume substantial quantities of bromine or magnesium; the success of APC's projects would depend upon world market conditions for these commodities. Global demand for bromine was expected to grow by 2% to 3% per year, but much stronger growth has been forecast for bromine compounds, such as TBBA. Although world demand for magnesium was expected to grow by 6% per year through 2010, the market was likely to be oversupplied for several years (Kendall, 2000; Burstow, 2001; Twidale, 2001).

From 2001-02 to 2005-06, phosphate supply available for fertilizer was expected to increase by 1.6% per year, and phosphate fertilizer consumption, by nearly 2.6% per year. During the same period, potash supply available for fertilizer was expected to increase by nearly 0.7% per year, and potash fertilizer consumption, by 2.5% per year (Food and Agricultural Organization of the United Nations, 2001). The majority of JPMC's production was exported; in addition to the growth in world markets, the company was also expected to benefit from its impending privatization.

Jordan's economy was expected to grow by 5.1% in 2002 and 6% in 2003. The strength of the domestic economy could lead to higher demand for consumer durables, as well as cement and other building materials.

LEBANON

The Lebanese minerals industry continued its historically small contribution to the country's economy. In recent years, Lebanon has been known to produce cement, gypsum, lime, phosphatic fertilizers, phosphoric acid, salt, semimanufactured steel, and sulfuric acid for domestic consumption. Modest deposits of asphalt, coal, and iron ore occur in Lebanon.

In 2001, Lebanon's GDP amounted to about \$28.4 billion at purchasing power parity; per capita income at purchasing power parity was nearly \$8,100. The GDP at market exchange rates was \$16.7 billion. The GDP grew by 1.3% in 2001 after not changing in 2000 and increasing by 1% in 1999 and 3% in 1998 (International Monetary Fund, 2002, p. 165; 2002a\$,b\$,c\$).

In 2000 and the first half of 2001, exports of cement amounted to about 3% of Lebanon's total exports. The country's cement factories were owned by Société des Ciments Libanais, which had a capacity of 2.2 Mt/yr; Cimenterie

Nationale SAL, 1.6 Mt/yr; and Ciment de Sibline, 1.2 Mt/yr. In 2001, Cimenterie Nationale decided to increase capacity at two of its cement mills by adding a primary grinding circuit (International Cement Review, 2001b).

Lebanon imported phosphate rock from Syria to produce phosphoric acid and fertilizers, such as triple superphosphate. From 1998 to 2000, Lebanese imports of phosphate rock increased by about 21%. The country also imported sulfur to manufacture sulfuric acid. Spain accounted for 30% of sulfur imports; France, 26%; Saudi Arabia, 24%; and Lebanon, 20%. From 1995 to 2000, Lebanon's consumption of sulfuric acid increased from 189,000 t to 357,000 t; 77% was consumed in the production of fertilizers.

In 2000, the production of semimanufactured steel increased to 80,000 t from 55,000 t in 1999. The International Iron and Steel Institute (2001, p. 92) estimated that Lebanon's consumption of finished steel increased to 454,000 t in 2000 from 170,000 t in 1995.

Because Lebanon has no petroleum or gas reserves, the country relies on imports for its energy requirements. In 2000, the value of imported petroleum products amounted to nearly \$1.14 billion, which was an increase from \$810 million in 1999 and \$624 million in 1998. About 34 million barrels (Mbbbl) of petroleum products were imported in 2000, of which fuel oil accounted for 58%; gasoline, 32%; and other, 10% (Arab Petroleum Research Center, 2001b, p. 241).

In 2001, the Government revived plans to rebuild the Tripoli and the Zahrani refineries. The Tripoli refinery would produce from 50,000 to 60,000 bbl/d by the end of 2003 and 150,000 bbl/d in 2005. The Zahrani refinery was also expected to produce 150,000 bbl/d by the end of 2005 (Middle East Economic Digest, 2001b).

Electricité du Liban (EdL), which was a state-owned company, estimated that converting diesel power stations to natural gas could save Lebanon \$100 million per year and improve the country's environment. Under the agreement signed with the Governments of Egypt, Jordan, and Syria, Lebanon would import 4.4 billion cubic meters per year of natural gas. Egypt would supply 75% of the gas, and Syria, 25% (Arab Petroleum Research Center, 2001b, p. 242).

Lebanon's known exploitable potential hydroelectric energy is 1,000 MW. The production of electricity amounted to 9,111 GWh in 2000. Fossil fuels accounted for 91% of the electricity generated and hydroelectric power, 9%. Lebanon's installed generating capacity was 2,150 MW at the beginning of 2001, although effective operating capacity was estimated to be no more than 1,450 MW. In 2000, total consumption amounted to 1,600 MW of capacity; EdL was forced to ration electricity and to import about 150 MW of capacity from Syria (World Resources Institute and others, 1996, p. 289, Arab Petroleum Research Center, 2001b, p. 243).

EdL estimated that the rising demand for electricity and the decommissioning of the 331-MW Jieh and 65-MW Al Haricha powerplants would necessitate the installation of 750 MW of new capacity by 2005. In February 2001, the need to finance new powerplants and EdL's losses of \$64 million per year spurred the Government to endorse the privatization of EdL. The sale was scheduled to take place in 2003. In November 2001, Enel Group of Italy signed contracts with EdL for the operation and maintenance of the Deir Ammar and the Zahrani

powerplants (Arab Petroleum Research Center, 2001b, p. 243; Middle East Economic Digest, 2001a).

Lebanon's transportation network comprised about 7,300 kilometers (km) of roads, of which 6,200 km was paved. Railroad track totaled 399 km, most of which was damaged during the civil war. The country had 72 km of crude oil pipelines, but none was operational. Ports and harbors were Beirut, Sidon, Tripoli, and Tyre.

The success of the Lebanese minerals industry depends upon the long-term restoration of peace and stability to the country. The short-term outlook is for slow economic growth; the domestic consumption of cement and steel is not likely to change substantially. Rising cement demand in Syria may provide opportunities for exports. See the section on Jordan for a discussion of the world market outlook for phosphate fertilizers.

SYRIA

The Middle Eastern nation of Syria was a producer of dimension stone, fertilizers, industrial minerals, natural gas, oil, sand and gravel, and semimanufactured goods. Industrial minerals produced in recent years include gypsum, phosphate rock, salt, silica sand, and sulfur. Semimanufactured goods included cement, glass, phosphoric acid, steel, and sulfuric acid.

Syria's 2001 GDP at purchasing power parity was estimated to be \$57.9 billion; per capita GDP at purchasing power parity was nearly \$3,500. GDP at market exchange rates was \$19.5 billion. In 2001, Syria's GDP increased by 3.5% after rising by 2.5% in 2000 and falling by 2% in 1999. The oil and gas industry accounted for nearly three-quarters of Syria's total export earnings and more than one-third of its GDP (International Monetary Fund, 2002, p. 165; 2002a§, b§, c§).

In 2001, the Government of Syria announced its intentions to open the country's mineral industry to local and foreign private investors. Planned incentives for investors included a 7-year tax holiday and reduced duties on imported raw materials (Industrial Minerals, 2001b).

Commodity Review

Metals

Syria's need for infrastructure development led the Government to open the steel industry to private investment. Joud International was building the Joudco Steel plant, which was a \$12 million to \$15 million rebar and sections rolling mill with a capacity of 150,000 t/yr. Saudi financiers provided the funds for Arab Steel Co., which was a proposed rolling mill with a capacity of 250,000 t/yr. The Joudco Steel plant was expected to start production at the end of 2001, and Arab Steel, in April 2002. A third project with a capacity of 300,000 t/yr of rebar and sections was financed from several sources, which included Jordan (Metal Bulletin, 2001).

The International Iron and Steel Institute (2001, p. 82, 92) estimated that Syria's imports of semimanufactured and finished steel products amounted to 1.26 Mt in 2000, which was an increase from 888,000 t in 1999 and 369,000 t in 1995. From 1995 to 2000, Syria's apparent consumption of finished steel rose from 329,000 t to about 1.13 Mt.

Industrial Minerals

Cement.—The International Cement Review (2001c, p. 282) estimated that Syria's consumption of cement increased to 5.16 Mt in 2001 from 4.73 Mt in 1998. During the same period, imports increased to 300,000 t from 200,000 t. Syria's actual demand for cement was estimated to be more than 6 Mt/yr (Middle East Online, 2001§).

Seven state-owned but independently operated companies within the General Organization for Cement and Building Materials produced cement from nine plants with a combined capacity of 5.16 Mt/yr. The largest companies were Tartous Company for Cement and Building Materials with a capacity of 1.8 Mt/yr and al-Chahba Cement and Building Materials with a capacity of 920,000 t/yr (International Cement Review, 2001c, p. 283).

In July 2001, the Government announced its intentions to increase national cement production capacity to 8 Mt/yr. Edhas Sanat Company of Iran planned to build a plant with a capacity of 1 Mt/yr that would be operational in mid-2004. The Kuwaiti Fund for Arab Economic Development planned to contribute \$70 million to this project. Edhas Sanat was also involved with upgrading the capacity of the 850,000-t/yr plant operated by Adra Company for Cement and Building Materials. Hassan Allam Group and other Egyptian, Saudi, and Syrian investors planned to build a cement plant in Abu Shamat at a cost of \$540 million (International Cement Review, 2001c, p. 283; Middle East Online, 2001§).

Gravel and Other Construction Materials.—The production of dimension stone, dolomite, and gypsum fell in 2000, and the production of gravel increased (table 1). In 2000, the value of gravel produced in Syria amounted to \$5.55 million; dolomite, \$4.91 million; volcanic tuff, \$1.52 million; gypsum, \$561,000; and dimension stone, \$560,000 (Tala Ballaneh, General Establishment of Geology and Mineral Resources, written commun., 2001).

Nitrogen.—General Fertilizer Company (GFC) [a subsidiary of the General Establishment for Chemical Industries (GECI)] produced ammonia, urea, and such nitrogenous fertilizers as ammonium nitrate and calcium nitrate for domestic consumption. From 1997 to 2000, production of ammonia and urea averaged 104,000 t/yr and 66,000 t/yr, respectively. In 2001, Syria produced about 100,000 t of nitrogenous fertilizers. Financial constraints have prevented the construction of a nitrogenous fertilizer plant with a capacity of 365,000 t/yr of ammonia and 639,000 t/yr of urea (Arab Petroleum Research Center, 2001c, p. 444).

Phosphate Rock.—General Company for Phosphate and Mines (GECOPHAM) operated the Eastern A, the Eastern B, and the Kneifis phosphate rock mines, which had a combined capacity of 2.65 Mt/yr. Phosphate rock was consumed by GFC's phosphoric acid and triple superphosphate (TSP) fertilizer plants in Homs. In 2000, the value of phosphate rock production amounted to \$38.2 million (Fertilizer International, 2001; Tala Ballaneh, General Establishment of Geology and Mineral Resources, written commun., 2001).

Syria's domestic production of phosphate fertilizers met only 63% of domestic demand; Bechtel Corp. and Makad International planned to build a 500,000-t/yr TSP plant near Palmyra. Financial constraints have prevented the implementation of this project (Arab Petroleum Research Center, 2001c, p. 444).

Syria was the world's fifth largest exporter of phosphate rock; about 74% of Syria's phosphate rock was exported in 2000. Lebanon accounted for 34% of exports; Romania, 9%; Greece, 7%; Portugal, 7%; and others, 43%. Most phosphate rock exported from Syria was used to produce single superphosphate (Fertilizer International, 2001).

Salt.—GECOPHAM produced salt from the Tibni Mine and three salt lakes, which included Mamlahat al Jabbul. From 1997 to 2000, salt production averaged nearly 127,000 t/yr (table 1). In 2000, the value of salt produced in Syria amounted to \$3.5 million (Talal Ballaneh, General Establishment of Geology and Mineral Resources, written commun., 2001).

Silica.—Sand was produced by GECOPHAM for use in the construction and the manufacture of glass. A feasibility study was being carried out on the silica sand deposits at al-Qaristyn, which were estimated to have resources of 150 Mt (Industrial Minerals, 2001b). In 2000, the value of sand produced for industrial purposes amounted to \$1.29 million, and for construction, \$792,000 (Talal Ballaneh, General Establishment of Geology and Mineral Resources, written commun., 2001).

General Company for Glass Industry, General Syrian Glass & Porcelain Industries, and Royal Glass produced glass by using imported soda ash. In 2001, General Syrian Glass & Porcelain Industries (a subsidiary of GEICI) planned to expand and modernize a glass factory, which would allow it to use the float method. In 1999, Syria produced 70,000 t of glass (Central Bank of Syria, 2001, p. 57; Middle East Economic Digest, 2001d).

Sulfur.—Syria produced sulfur as a byproduct of oil refining. GEICI operated a sulfur plant in Homs with a capacity of 150 tons per day (British Sulphur Publishing, 1999, p. 32). Syria's consumption of sulfuric acid amounted to 318,000 t in 2000, which was a decrease from 192,000 t in 1999 and an increase from 81,000 t in 1995. About 78% of Syria's sulfuric acid was consumed in the manufacture of fertilizers.

Mineral Fuels

Natural Gas.—Syria's proven natural gas reserves were estimated to be 240.7 billion cubic meters. The Syrian Petroleum Company (SPC), which was a state-owned company, controlled 58% of the reserves; al-Furat Petroleum Company (AFPC), 18%; Mararthon Oil Corp., 13%; and TotalFinaElf, 8%. Most of Syria's natural gas was found at Palmyra, the al-Furat fields, Suwaidiyah, and Jibsah (Arab Petroleum Research Center, 2001c, p. 437, 439).

At the beginning of 2001, Syria had a production capacity of 7.5 billion cubic meters per year of natural gas. The country's gas processing plants at Jbeisseh, Omar, Palmyra, and Suwaidiyah had the ability to process 5.9 billion cubic meters per year of gas. In 2000, the value of natural gas produced in

Syria amounted to \$389 million; butane, \$46 million; propane, \$16.2 million; and pentanes, \$1.23 million (Arab Petroleum Research Center, 2001c, p. 438, 440; Talal Ballaneh, General Establishment of Geology and Mineral Resources, written commun., 2001).

In September 2001, the Deir ez-Zor gas project was completed. A new gas treatment plant in Deir ez-Zor with a capacity of about 1.66 billion cubic meters per year started production; this plant was established to process associated gas from the Deir ez-Zor oilfields and nonassociated gas from the newly developed Tabiyeh gasfield. A 250-km pipeline connects the processing plant to population centers in western Syria. Conoco Inc. agreed to operate the plant for the first 4 years, after which SPC would take over operations (Arab Petroleum Research Center, 2001c, p. 438-439).

In addition to the 8 million cubic meters per day of new capacity from the Tabiyeh gasfield, six other gasfields near Palmyra were under development in 2001. al-Abbas, al-Rasem, the al-Sharif, the Kom Abu Arabat, the Rasif, and the Zamlakh gasfields were estimated to have a combined production potential of 5.65 million cubic meters per day between them; production was expected to start in 2002 (Arab Petroleum Research Center, 2001c, p. 438-439).

Petroleum.—In 2000, Syria produced about 200 Mbbbl of crude petroleum, of which 52% was exported; production has been declining since 1995. The value of crude petroleum produced in Syria amounted to \$8.09 billion (Talal Ballaneh, General Establishment of Geology and Mineral Resources, written commun., 2001). In spite of recent declines in output, AFPC accounted for more than 60% of Syria's total crude petroleum production. The company's largest oilfields, which were located mostly in the Deir ez-Zor region, were al-Thayyem, al-Izba, Omar and Omar North, Maleh/Azraq, Sijan, Jarnof/Saban, al-Ward, and Tanak. AFPC was upgrading two of its crude-petroleum-gathering centers to increase effective production capacity by 35,000 bbl/d (Arab Petroleum Research Center, 2001c, p. 432).

SPC produced heavy crude from the northern fields in the Suwaidiyah-Karatchok area and at Jbeisseh; the company accounted for about 26% of Syria's production in 2000. The Deir ez-Zor Petroleum Company, which was a joint venture between SPC and TotalFinaElf, produced light crude and accounted for nearly 10% of crude petroleum production (Arab Petroleum Research Center, 2001c, p. 432).

Syria's petroleum products refining capacity amounted to 242,140 bbl/d; refineries located at Baniyas and Homs were operated by separate state-owned companies. The Government planned to upgrade the Baniyas and the Homs refineries and to build a third refinery with a capacity of 140,000 bbl/d.

The Governments of Syria and Iraq agreed to build a new 1.4 million-barrel-per-day oil pipeline to replace the existing pipeline that connects the two countries. Syria pledged to put its pipeline under the control of the United Nations to maintain compliance with international sanctions against Iraq (Iran Daily, 2001; Oil & Gas Journal, 2001). In July 2001, the Government invited international oil companies to bid for oil and gas exploration licenses in blocks II, IV, X, XII, and XIX (Middle East Economic Digest, 2001c).

Infrastructure

In 2000, Syria generated 23,946 GWh of electricity, which was an increase from 15,549 GWh in 1995 (Central Bank of Syria, 2001, p. 57). In recent years, the Public Establishment of Electricity Generation & Distribution (PEEGD) converted three oil-fired powerplants with a total capacity of 1,370 MW to dual oil-gas operations. About 25% of Syria's electricity was generated from natural gas.

In 2001, total installed Syrian electric-generating capacity amounted to 5,400 MW, of which 900 MW was hydroelectric. The effective operating capacity of the hydroelectric plants was about 200 MW owing to technical problems and low water levels in Lake Assad. A new 630-MW hydroelectric plant at Manbij was expected to be completed in 2001. Syria's known exploitable potential hydroelectric energy is 4,500 MW (World Resources Institute and others, 1996, p. 289; Arab Petroleum Research Center, 2001c, p. 441-442).

Outlook

The rapid expansion of the construction sector in the near future was expected to increase Syria's demand for cement to 11.5 Mt/yr in 2005 from more than 6 Mt/yr in 2001 (Middle East Online, 2001§). Higher demand for cement could lead to greater production of cement raw materials, such as gypsum and limestone. The consumption of other building materials, such as gravel, sand, and steel, was also likely to increase.

Syria's sulfuric acid consumption was mostly for the production of fertilizers; growth would be likely to follow the trend of phosphate fertilizer production. See the section on Jordan for a discussion of the world market outlook for phosphate fertilizers.

From 1995 to 2000, Syria's per capita consumption of petroleum products increased by nearly 10%, and natural gas, by 49%. The consumption of natural gas was likely to continue to grow more quickly than that of petroleum products. Electricity demand was expected to increase by 7% per year until 2010, and Syria's known oil reserves were insufficient to sustain such rapid increases. PEEGD planned to increase reliance on natural gas for future electricity needs (Arab Petroleum Research Center, 2001c, p. 441-442).

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TABLE 1
JORDAN, LEBANON, AND SYRIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherside specified)

Country and commodity	1997	1998	1999	2000	2001 e/
JORDAN					
Cement, hydraulic thousand tons	3,251	2,650	2,687	2,640	3,159 3/
Clay:					
Common clay	843,986	590,897	450,178	199,468	206,000
Kaolin	57,255	78,000	34,040	36,795	38,000
Zeolite tuff	NA	NA	13,086	9,797	10,100
Feldspar	--	4,008	1,000	11,112	11,500
Gypsum	193,527	175,807	244,920	157,868	163,000
Lime	4,263	4,064	4,120 e/	4,050 e/	4,100
Natural gas, gross million cubic meters	291	264	282	287	290
Petroleum:					
Crude 42-gallon barrels	14,680	14,543 r/	14,600 r/ e/	14,600 r/ e/	14,600 3/
Refinery products:					
Liquefied petroleum gas thousand 42-gallon barrels	1,542	1,660	1,505	1,684	1,750
Gasoline do.	4,469	5,429	4,685	4,957	5,160
Jet fuel do.	253	245	1,722	1,950	2,030
Kerosene do.	1,507	1,517	1,382	1,991	2,070
Distillate fuel oil do.	6,920	6,882	8,222	10,001	10,400
Residual fuel oil do.	7,326	7,105	--	--	--
Asphalt do.	866	783	830	688	690
Total do.	22,883	23,621	18,346	21,271	22,100
Phosphate:					
Mine output:					
Gross weight thousand tons	5,896	5,925	6,014	5,526 r/	5,843 3/
P ₂ O ₅ content do.	1,946	1,955	1,924	1,824 r/	1,928 3/
P ₂ O ₅ equivalent:					
Phosphatic fertilizers	576,142	579,835	613,821	409,149	443,000
Phosphoric acid	37,761	68,345	372,169	178,701	149,000
Potash:					
Crude salts thousand tons	1,416	1,527	1,800	1,936	1,963 3/
K ₂ O equivalent do.	850	916	1,080	1,160	1,180
Salt	157,830	263,314	279,135	311,189	321,000
Sand, silica cubic meters	NA	NA	52,224	47,218	49,000
Steel:					
Steel, crude e/	30,000 r/	30,000 r/	30,000 r/	30,000 r/	30,000
Steel, semimanufactured	350,000	325,000	300,000	270,000	331,000
Stone:					
Dimension, worked thousand meters	6,308	6,205	6,303	3,508	3,250
Gravel and crushed rock thousand cubic meters	NA	NA	12,180	10,381	9,620
Limestone do.	12,388	8,031	8,000	8,000	7,410
Marble cubic meters	57,550	134,670	10,250	21,575	20,000
Sulfuric acid:					
Gross weight thousand tons	1,170	1,680	1,804	1,761	1,460
S content do.	382	549	590	576	477
LEBANON					
Cement, hydraulic thousand tons	2,703	3,316 r/	2,714 r/	2,808 r/	2,700
Gypsum e/	1,530	1,870	1,540 r/	1,600 r/	1,530
Iron and steel, metal, semimanufactures	90,000 r/	70,000 r/	55,000 r/	80,000	80,000
Lime e/	11,400	14,000	13,500	13,500	13,500
P ₂ O ₅ equivalent:					
Phosphatic fertilizers	115,000	70,000	30,000	15,000	15,000
Phosphoric acid	90,000	90,000	100,000	122,000	122,000
Salt e/	3,500	3,500	3,500	3,500	3,500
Sulfuric acid:					
Gross weight	174,000	262,000	249,000	357,000	357,000
S content	56,900	85,600	81,400	117,000	117,000
SYRIA					
Cement, hydraulic thousand tons	4,840	4,607	4,781	4,830 e/	4,840
Gas, natural:					
Gross million cubic meters	5,100 r/ e/	6,600 r/ e/	6,947 r/	6,934 r/	7,000
Dry do.	2,700 r/ e/	3,500 r/ e/	3,676 r/	3,886 r/	3,900
Gypsum	330,000 r/	325,000 r/	394,000 r/	333,000 r/	345,000

See footnotes at end of table.

TABLE 1--Continued
 JORDAN, LEBANON, AND SYRIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherside specified)

Country and commodity	1997	1998	1999	2000	2001 e/	
SYRIA--Continued						
Natural gas liquids:						
Propane	thousand 42-gallon barrels	515 e/	570 e/	500	511	510
Butane	do.	1,690 e/	1,880 e/	1,630	1,666	1,670
Pentanes	do.	45 e/	50 e/	43	44	40
Total	do.	4,015 r/ e/	4,070 r/ e/	4,000 r/	4,011 r/	4,010
Nitrogen:						
N content of ammonia		83,700	129,200	111,800	91,100	138,400 3/
N content of urea		54,400	79,600	73,400	56,600	97,700 3/
Petroleum:						
Crude		208,700 r/	208,467 r/	210,000 r/	199,843 r/	194,000
Refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	2,170	2,215	1,571 r/	1,633 r/	1,630
Gasoline	do.	11,400	11,785	10,076 r/	8,678 r/	8,680
Naphtha	do.	1,700	1,710	3,156 r/	4,419 r/	4,420
Jet fuel	do.	1,725	2,029	2,218 r/	1,457 r/	1,460
Kerosene	do.	1,500	1,546	742 r/	742 r/	750
Distillate fuel oil	do.	30,600	30,772	31,704 r/	33,176 r/	33,200
Residual fuel oil	do.	35,000	34,978	28,201 r/	27,467 r/	27,500
Asphalt	do.	1,900	1,900	2,513 r/	2,332 r/	2,330
Other	do.	1,900	2,000	826 r/	826 r/	830
Total	do.	87,895	88,935	81,007 r/	80,730 r/	80,800
Phosphate rock:						
Mine output:						
Gross weight	thousand tons	2,392	2,496	2,084	2,166	2,043 3/
P ₂ O ₅ content	do.	730	765	635	646 r/	613 3/
P ₂ O ₅ equivalent:						
Phosphatic fertilizers		84,200	96,500	66,100	112,700	113,000
Phosphoric acid		65,200	75,400	52,800	88,800	89,000
Salt		119,000	178,000 r/	104,335 r/	106,130 r/	106,000
Steel:						
Crude e/		70,000	70,000	70,000	70,000	70,000
Semimanufactured		95,000	80,000	85,000	60,000	60,000
Stone, sand and gravel:						
Dimension stone	thousand tons	140 e/	155 e/	154	140	150
Dolomite, refractory grade	do.	5,280 e/	2,860 e/	2,856	4,912	5,000
Gravel and crushed rock	do.	5,750 e/	6,550 e/	6,546	5,549	6,000
Sand, construction	thousand cubic meters	490 e/	560 e/	556	395	450
Sand, industrial	thousand tons	765 e/	870 e/	869	813	840
Volcanic tuff	do.	NA	NA	510	507	550
Sulfur						
Byproduct of petroleum and natural gas		10,000 r/ e/	10,000 r/ e/	11,730 r/	16,660 r/	17,000
Sulfuric acid:						
Gross weight		214,000	256,000	193,000	318,000	320,000
S content		70,000	83,700	63,100	104,000	104,600

e/ Estimated. r/ Revised. NA not available. -- Zero.

1/ Table includes data available through April 29, 2002.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ Reported figure.

TABLE 2
JORDAN, LEBANON, AND SYRIA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2001

(Thousand metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location of main facilities	Annual capacity
JORDAN			
Cement	Jordan Cement Factories Co. Ltd. (LaFarge Group, 0.44; Jordan Investment Corp., 14.3%; Social Security Corp., 9%; others, 33%)	Fuhia and Rashadia	4,500.
Do.	Arab Company for White Cement Industry	Amman	130.
Natural gas million cubic feet	National Petroleum Company (NPC) (Government, 100%)	Risha	16,400.
Petroleum:			
Crude thousand barrels	NPC	Hamza	NA.
Refined do.	Jordan Petroleum Refining Company	Zarqa	33,000.
Phosphate: 1/			
Phospahte rock	Jordan Phosphate Mines Co. (JPMC) (Jordan Investment Corp., 41.5%; Social Security Corp., 27.8%; Kuwait Investment Corp., 15.9%; others, 14.8%)	al-Hasa	4,000.
Do.	do.	Shidiya	3,264.
Do.	do.	al-Abiad	3,000.
Phosphatic fertilizers	Jordan Fertilizer Industry Company (JFIC) (Government, 26%; JPMC, 25%; others, 49%)	Aqaba	750 DAP.
Do.	Indo-Jordan Chemicals Company (IJC) (Southern Petrochemical Industries Corp., 52.2%; JPMC, 34.8%; Arab Investment Co., 13%)	Shiyada	300 DAP and NPK.
Phosphoric acid	Nippon Jordan Fertilizer Company	Aqaba	430.
Do.	IJC	Shiyada	225.
Potash	Arab Potash Company (APC) (Government of Jordan, 52.9%; Arab Mining Co., 20.7%; Islamic Development Bank, 5.2%; other, 22.8%)	al-Safi	2,000.
Salt	Jordan Safi Salt Company (subsidiary of APC)	do.	1,232.
Do.	al-Azraq	Azraq	NA.
Steel 2/	Jordan Steel plc	Amman	250.
Do.	Arab Iron & Steel Industries Company		120.
Do.	General Specialized Steel Corporation		100.
Do.	Jordan Iron & Steel		100.
Do.	National Steel Industry Co.	Awajan	100.
Do.	Petra Steel Industries Company	Amman	100.
Do.	Philadelphia Industrial Group		50.
Do.	Middle East Steel Industries Co.		36.
Do.	Universal Iron & Steel Industrial		NA.
Do.	United Iron & Steel		NA.
Sulfuric acid	JFIC	Aqaba	1,640.
Do.	IJC	Shiyada	660.
LEBANON 3/			
Cement	Societe des Ciments Libanais	Chekka	2,200.
Do.	Ciementerie Nationale SAL	do.	1,600.
Do.	Ciment de Sibline	Sibline	1,200.
Phosphate fertilizers 4/	Lebanon Chemicals Company SAL	Selaata	NA.
Phosphoric acid 5/	do.	do.	NA.
Steel	Consolidated Steel Lebanon SAL	Amchit	300.
SYRIA			
Cement	Tartous Company for Cement & Building Materials [subsidiary of General Organization for Cement and Building Materials (GOCBM) (100% Government owned)]	Tartous	1,800.
Do.	al-Chaba Cement & Building Materials (GOCBM, 100%)	Aleppo	920.
Do.	Arabian Cement Co. for Cement (GOCBM, 100%)	do.	850.
Do.	Adra Co. for Cement and Building (GOCBM, 100%)	Adra	850.
Do.	Syrian Co. for Manufacturing Cement (GOCBM, 100%)	Hama	430.
Do.	National Co. for Manufacturing of Cement (GOCBM, 100%)	Dummar	190.
Do.	Rastan Co. for Cement and Building Materials (GOCBM, 100%)	Rastan	120.

See footnotes at end of table.

TABLE 2--Continued
 JORDAN, LEBANON, AND SYRIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2001

(Thousand metric tons unless otherwise specified)

Country and commodity		Major operating companies	Location of main facilities	Annual capacity
SYRIA--Continued				
Cement--Continued		Military Housing Cement Group (Government, 100%)	Musselemieh	NA.
Natural gas	million cubic feet	al-Furat Petroleum Company (AFPC) (Syrian Petroleum Company, 50%; Deminex GmbH, 18.8%; Pecten Syria Petroleum, 15.6%; and Royal Dutch/Shell, 15.6%)	Processing plant at Omar	2,400.
Do.	do.	Syrian Petroleum Company (SPC) (Government, 100%)	Processing plant at Palmyra	2,200.
Do.	do.	Conoco Inc.	Processing plant at Deir ez-Zor	1,660.
Do.	do.	SPC	Processing plant at Jebissa	1,060.
Do.	do.	do.	Processing plant at Suwaidiyah	240.
Nitrogen:				
Ammonia and urea		General Fertilizer Company (GFC) [Subsidiary of General Establishment for Chemical Industries (GECI) (100% Government owned)]	Homs	315.
Fertilizers		GFC	do.	122.
Petroleum:				
Crude	thousand barrels	AFPC	al-Thayyem	21,960.
Do.	do.	do.	al-Izba	20,130.
Do.	do.	do.	Omar/Omar North	16,470.
Do.	do.	do.	Maleh/Azraq	12,810.
Do.	do.	do.	Sijan	12,810.
Do.	do.	do.	Jarnof/Saban	10,980.
Do.	do.	do.	al-Ward	9,150.
Do.	do.	do.	Tanak	6,590.
Do.	do.	SPC	Suwaidiyah, Jebissa, and Karatchok	51,240.
Do.	do.	Deir-ez Zor Petroleum Company (SPC, 50%; TotalFinaElf, 50%)	Qahar	10,250.
Do.	do.	do.	Jafra	4,760.
Do.	do.	do.	al-Mazraa and Attala North	3,290.
Do.	do.	al-Khabur Petroleum Co. (SPC, 50%; others, 50%)	Kishma	6,200.
Refined	do.	Banias Refinery Company (Government, 100%)	Banias	49,280.
Do.	do.	Homs Refinery Company (Government, 100%)	Homs	39,100.
Phosphate:				
Phosphate rock		The General Company for Phosphate and Mines (GECOPHAM) (Government, 100%)	Eastern A	1,150.
Do.		do.	Kneifis	800.
Do.		do.	Eastern B	700.
Phosphatic fertilizers		GFC	Homs	207 TSP; NA other
Phosphoric acid 6/		do.	do.	NA.
Salt		GECOPHAM	Bawara, Jabboul, Jbisa, and Tibni	NA.
Steel 7/		General Company for Iron and Steel Products (Government, 100%)	Hama	NA.
Sulfur		GECI	Homs	55.
Sulfuric acid 8/		GFC	do.	NA.

NA Not available.

1/ Capacity of phosphate rock and diammonium phosphate (DAP) and other nitrogen, phosphorous, and potassium fertilizers (NPK) are expressed in gross weight, and phosphoric acid is expressed in P₂O₅ equivalent.

2/ Capacity of Universal Iron & Steel Industrial and United Iron & Steel were estimated to be at least 20,000 metric tons per year (t/yr) and 15,000 t/yr, respectively, based on recent production data.

3/ Capacity of sulfuric acid is estimated to be at least 357,000 t/yr based on recent production data.

4/ Capacity of triple superphosphate (TSP) is estimated to be at least 89,000 t/yr P₂O₅ equivalent based on recent production data.

5/ Capacity of phosphoric acid is estimated to be at least 122,000 t/yr P₂O₅ equivalent based on recent production data.

6/ Capacity of phosphoric acid is estimated to be at least 89,000 t/yr P₂O₅ equivalent based on recent production data.

7/ Capacity of semimanufactured steel is estimated to be at least 95,000 t/yr based on recent production data.

8/ Capacity of sulfuric acid is estimated to be at least 320,000 t/yr based on recent production data.