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The Mineral Industries of the Middle East

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The Middle East region that is covered in this volume includes the following countries and territories: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, the United Arab Emirates (UAE), the West Bank and Gaza Strip, and Yemen. The region covers an area of about 6.3 million square kilometers. In 2012, the population of the Middle East region was estimated to be about 300 million, or 4.2% of the world's population (table 1). Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE were members of the Cooperation Council for the Arab States of the Gulf, also known as the Gulf Cooperation Council (GCC). The Middle East region also includes 6 of the 12 member countries that make up the Organization of the Petroleum Exporting Countries (Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the UAE), and 7 of the 11 member countries that make up the Organization of Arab Petroleum Exporting Countries (Bahrain, Iraq, Kuwait, Qatar, Saudi Arabia, Syria, and the UAE). Israel and Turkey were members of the Organisation for Economic Co-operation and Development (table 1).

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For mineral production statistics—

- Egypt—Arab Fertilizer Association;
- Iraq—State Company of Geological Survey and Mining (GEOSURV-IRAQ), Ministry of Industry and Minerals, and Ministry of Oil;
- Israel—Department of Quarries and Mines of the Ministry of Energy and Water Resources;
- Jordan—Department of Statistics, Ministry of Energy and Mineral Resources, and the Natural Resources Authority;
- Kuwait—Central Statistical Office of the Ministry of Planning;
- Oman—Ministry of Commerce and Industry;
- Saudi Arabia—Central Department of Statistics and Information of the Ministry of Economy and Planning, and Deputy Ministry for Mineral Resources of the Ministry of Petroleum and Mineral Resources;
- Turkey—General Directorate of Mining Affairs of the Ministry of Energy and Natural Resources; and
- United Arab Emirates—National Bureau of Statistics;

For basic economic and population data—

- International Monetary Fund, and
- The World Bank Group.

General Economic Conditions

In 2012, the gross domestic product (GDP) based on purchasing power parity of the Middle East region was about $4.4 trillion, which accounted for 5.2% of the world's GDP. The GDP growth rate of many of the countries in the Middle East decreased in 2012 compared with that of 2011. The GDP growth rates for Bahrain, Jordan, and Yemen, however, increased during the period of comparison. The countries with the greatest change in the GDP growth rate between the years 2011 and 2012 were Syria, where the GDP growth rate contracted by 19.5% (owing to the ongoing civil war), followed by Yemen, where the GDP expanded by 15% (owing to the end of political unrest, which continued throughout 2011). Iraq was the country with the fastest economic growth rate (8.4%) in the Middle East region in 2012. The increase was owing to increases in the production and export of crude oil. Decreases in the GDP, which were attributed to the effects of civil conflict, disruption of production, and international sanctions, were noted for Syria (-21.8%) and Iran (-1.9%) in 2012. For most of the countries of the region, economic growth was driven mainly by the exports of hydrocarbons to the world market. The economies of most of the oil-producing nations in the region were sustained by the high international market prices for crude oil (table 2; U.S. Energy Information Administration, 2012).

The hydrocarbon industry continued to be a significant factor in the economies of the entire region, directly through the wealth it created in the producing countries and indirectly through the generation of a higher disposable income in the hands of expatriates working in the hydrocarbon industry. Most of the countries in the region were diversifying their economies. Production of metals and industrial minerals was a significant factor in the economies of Iran and Turkey; metal production also was a factor in the nonfuel economies of Bahrain, Oman, Qatar, Saudi Arabia, and the UAE.

Competitively priced electric energy from the region's abundant supply of crude oil and natural gas (especially in Iran and most of the GCC countries) and the region's geographic location (which allows for access to ocean transportation) continued to provide a basis for the region's development of energy-intensive mineral industries to produce aluminum, cement, crude steel, direct-reduced iron (DRI), fertilizers, petrochemicals, and rolled steel.

Legislation

Iran and Syria were subject to numerous sanctions by the European Union and the United States. The United States extended Executive Orders 13574 and 13590, which authorized the implementation of additional sanctions against Iran because of concerns about the possible goals of Iran's nuclear program. Additional Executive orders issued by the President of the United States in 2012 that concerned Iranian sanctions included Executive Order 13599 of February 5, Executive Order 13606 of April 22, Executive Order 13608

of May 1, Executive Order 13622 of July 30, and Executive Order 13628 of October 9. Public Law 112–239 of January 2, 2013 [National Defense Authorization Act for Fiscal Year 2013 (NDAA–2013)] included additional sanctions that would take effect in July 2013. Mineral sector activities affected by the subsection of NDAA–2013 that was titled the Iran Freedom and Counter-Proliferation Act of 2012 included the sale, supply, or transfer (directly or indirectly to or from Iran) of coal, graphite, precious metals, raw metals (which may include ore) or semifinished metals (such as aluminum and steel), and software for integrating industrial processes (U.S. Department of the Treasury, undated).

In Iran, to offset the increased cost of domestically produced minerals, which was attributed to the effect of inflation on the Iranian rial, several mining companies and the Ministry of Industries and Mines agreed that mineral products would be sold on the Iran Mercantile Exchange at prices determined by using the foreign currency room rate instead of the official exchange rate. The change resulted in a 15% to 20% decrease in the domestic prices of metal products and petrochemicals. In October, the Government of Iran implemented a ban on the export of about 50 products, which included several mineral products, to maintain a domestic supply of the products. The ban affected the local demand for and prices of mineral products (Watanabe, 2012; Turquoise Partners, 2013, p. 3).

Three types of economic sanctions imposed against Syria by the United States in previous years continued throughout 2012. The most comprehensive sanction was called the Syria Accountability Act of 2004, which prohibits the export of most goods containing more than 10% U.S.-manufactured component parts to Syria. Another type of sanction, resulting from the USA Patriot Act, was levied specifically against the Commercial Bank of Syria in 2006. The third type of sanction is contained in Executive Orders 13224, 13315, 13338, 13382, 13399, 13441, 13460, and 13572 from the President of the United States; these Executive orders specifically deny certain Syrian citizens and entities access to the U.S. financial system because of their participation in the proliferation of weapons of mass destruction; their association with Al Qaida or the Taliban; and (or) their association with destabilizing activities in Iraq and Lebanon (Obama, 2011; U.S. Department of State, 2012).

The Council of the European Union (EU Council) extended its sanctions against Syria until June 2014; these sanctions include an oil embargo and other trade bans as well as restrictions on investments, financial activity, and transport sector activity. Additional actions by the EU Council included freezing assets of a number of entities and individuals associated with the violent repression in Syria, including the Central Bank of Syria (Council of the European Union, 2012).

As of yearend 2012, Iraq's draft gas and oil legislation known as the Hydrocarbon Law, which was first proposed in 2007 and had been under examination in the Council of Ministers since October 2008, remained stalled because of disagreements among Iraqi parties on wider political issues, including revenue sharing. The proposed law would create an oil and gas council to oversee the country's oil and gas sector and would establish the Iraq National Oil Co. (U.S. Energy Information Administration, 2013).

In Yemen, a new mining law became effective in 2012. The Mines and Quarries Law (law No. 22 of 2010) regulates artisanal mining operations, mineral exploration and prospecting, and mine production in the country.

Exploration

Local and international exploration companies explored for minerals in most of the countries of the region. In 2012, nonfuel mineral exploration in the Middle East was most notable in Turkey. Mineral exploration continued also in Iran, Oman, Saudi Arabia, and Yemen. Metal exploration in the region focused on chromium, copper, gold, lead, manganese, silver, and zinc (table 3).

Exploration activities for crude oil and natural gas continued in such countries as Iran, Iraq, Israel, and Saudi Arabia. State-owned and international oil companies explored for hydrocarbons in many of the countries in the region. Crude oil discoveries were reported in Iran, Iraq, Israel, Saudi Arabia, and Syria, and natural gas discoveries were reported in Iran, Syria, and Yemen (Organization of Arab Petroleum Exporting Countries, 2013, p. 20, 22; U.S. Energy Information Administration, 2014a).

Commodity Overview

In tables 5 through 13, estimates for the production of major mineral commodities for 2015 and beyond have been based upon supply-side assumptions, such as announced plans for increased production/new capacity construction and bankable feasibility studies. The outlook tables in this summary chapter show historic production and projected production trends; therefore, no indication is made about whether the data are estimated or reported, and revisions are not identified. Data on individual mineral commodities in the tables in the individual country chapters are labeled to indicate estimates and revisions. The outlook segments of the mineral commodity tables are based on projected trends that could affect current (2012) producing facilities and on planned new facilities that operating companies, consortia, or Governments have projected to come online within indicated timeframes. Forward-looking information, which includes estimates of future production, exploration and mine development, cost of capital projects, and timing of the start of operations, are subject to a variety of risks and uncertainties that could cause actual events or results to differ significantly from expected outcomes. Projects listed in the following section are presented as an indication of industry plans and are not a USGS prediction of what will take place.

In 2012, the main contributions of the Middle East region to the world's supply of mineral commodities included crude oil (33%), gypsum (31%), natural gas (16.3%), potash (13%), chromite and refined petroleum products (11% each), ammonia (9%), aluminum (8%), cement and phosphate rock (6% each), and crude steel (4%) (table 4; BP p.l.c., 2013, p. 20).

Metals

Bauxite and Alumina and Aluminum.—In 2012, the Middle East region's share in world aluminum production

was about 8% (table 4). Aluminum production in the region is projected to increase by 58% to about 6.3 million metric tons per year (Mt/yr) by 2019 from about 4.0 Mt/yr in 2012 following the completion of new smelters in the region (including those that were being built by South Aluminum Corp. in Iran and Saudi Arabian Mining Co. (Ma'aden) in Saudi Arabia, and the planned expansion of smelters in Bahrain, Oman, Turkey, and the UAE. In addition to primary aluminum production, a number of downstream facilities in such countries as Bahrain, Oman, Qatar, and the UAE produced value-added aluminum products (table 6).

In Saudi Arabia, Ma'aden Bauxite and Alumina Co., which was a joint venture of Ma'aden (74.9% interest) and Alcoa Inc. of the United States (25.1% interest), continued to develop a metallurgical-grade bauxite mine at Al Baitha. Initial mine production was expected to begin in 2014. Bauxite would be shipped by rail to Ma'aden's alumina refinery at Ras Al-Khair, which also was under construction. Ma'aden also produced low-grade bauxite from the Az Zabirah Mine that was used by the construction industry. When the Al Baitha Mine reaches full production in 2017, Saudi Arabia's bauxite output was expected to exceed the combined capacity of the region's other bauxite producers in Iran and Turkey, and Saudi Arabia was expected to become the region's leading producer of bauxite. Bauxite production in the Middle East region is projected to increase by 91% by 2015 and by 179% by 2017 (tables 5, 6; Saudi Arabian Mining Co., 2013, p. 10).

Ma'aden Aluminium Co. initiated production from Saudi Arabia's first aluminum smelter, which was located at Ras Al-Khair about 90 kilometers northwest of Jubail. Ma'aden Aluminium was owned by Ma'aden (74.9% equity interest) and Alcoa (25.1% interest) (Saudi Arabian Mining Co., 2013, p. 69).

The UAE is expected to become a major producer of aluminum because of the merger of Dubai Aluminium Co. Ltd. and Emirates Aluminium Co. Ltd. (EMAL) into one entity named Emirates Global Aluminium (EGA) in 2013. With this merger, EGA would become the world's fifth-ranked aluminum company (valued at $15 billion). When the construction of EMAL's phase 2 expansion project is completed in 2014, EGA would have 2.4 Mt/yr of primary aluminum production capacity and a combined power-generation capacity of 5,350 megawatts (MW). In 2013, Mubadala Development Co. P.J.S.C. acquired the share of Guinea Alumina Corp. previously owned by BHP Billiton of Australia and became the sole owner, as well as the holder of Guinea Alumina's 50-year mining concession on an approximately 1.3-billion-metric-ton (Gt) bauxite deposit in Guinea. Mubadala and Zhenjiang Coking Gas Group Co. of China created a joint venture, Jiangsu Suyadi Tancai Company Ltd., to produce 500,000 metric tons (t) of anode-grade calcined petroleum coke in China. Most of the production would be used to supply Mubadala's aluminum smelters in the UAE (Mubadala Development Co. P.J.S.C., 2013).

Chromium.—In 2012, the Middle East region accounted for 11% of the world's production of chromite. Turkey was the leading producer of chromite in the region followed by Oman and Iran (table 4).

Chromite production in Oman decreased for the second year to 555,000 t from 617,000 t in 2011 and 865,000 t (revised) in 2010. The decrease was attributed to efforts by the Government of Oman and chromite producers to restrict ore exports and increase exports of more highly concentrated chromium oxide. In 2012, four ferrochrome smelters were at different stages of construction in the Freezone Sohar. Muscat Overseas Group, which was the parent company of Al Tamman, and Indsil Group of India were building two ferrochrome smelters in Oman that would each have the capacity to produce 75,000 metric tons per year (t/yr) of ferrochrome. The first ferrochrome smelter was expected to be completed in 2013, and the second, by the end of 2014. Metkore Alloys & Industries Ltd. of India had started preparation work to build a 165,000-t/yr-capacity ferrochrome smelter at the Freezone Sohar. The $80 million smelter, which was expected to commence production in 2014, would use chromite mined in Oman; the smelter's entire output would be exported to India. Gulf Mining Group was also building a $30 million ferrochrome smelter in Oman that would have the capacity to produce 50,000 t/yr of ferrochrome (Al Tamman Trading Establishment L.L.C., 2012; Watts, 2012).

Copper.—The Middle East region was a minor contributor to the world's copper supply. Iran was the most notable copper producer in the region. New copper production projects included those of National Iranian Copper Industries Co. (NICICO), which, in accordance with the latest Iranian 5-year plan, planned to increase the company's copper ore output. NICICO proposed to develop additional copper mine capacity with the construction of the Chah Firooz, the Chah Mesi, the Dareh Alo (also transliterated as Daraloo or Dar Alou), the Darreh Zar, the Haft, the Cheshmeh, the Ijoo, the Kahang, the Masjed Daghi, the Nochun, and the Taft copper mines (table 7; National Iranian Copper Industries Co., 2012, slides 1–32).

Iran was expected to expand its primary copper smelting and refining capacity (table 8). NICICO planned to build copper refineries at the Shahre Babak copper complex (which included the Miduk copper mine and the Khatoonabad smelter) and at the Sungun copper complex. Solvent extraction and electrowinning (SX/EW) facilities were planned for the Chah Firooz, the Dareh Alo, the Miduk, the Sungun, and the Taft Mines. Iran also had significant secondary copper refining capacity. The availability of international funding for capital-intensive development of mineral-related projects by companies operating in Iran, however, was impaired by international economic sanctions, which were a response to the Government's nuclear programs.

In Israel, Altos Hornos de México S.A.B. de C.V. (AHMSA) planned to reopen the Timna copper mines near Eliat and to build a new SX/EW plant with a capacity of 24,000 t/yr. The company started construction of the new plant in 2012 (Altos Hornos de México S.A.B. de C.V., 2013, p. 2).

In Saudi Arabia, Al Masane Al Kobra Mining Co. (AMAK), which was a joint venture of local investors and the Arabian American Development Co. of the United States, began production of copper and zinc concentrates from the Al Masane Mine. Copper mine production in the Middle East region is expected to increase from the current (2012) level by 62% in 2015 and by about 84% in 2019.

Gold.—The Middle East's gold mines were modest contributors to the world's supply of precious metals. Turkey

and Saudi Arabia were the major gold producers in the region, and Iran was a minor producer. The completion of planned increases in the production capacity of gold mines in Iran, Saudi Arabia, and Turkey could result in the production of about 66 t of mined gold by 2019 (table 9).

Gold refining in the Middle East region took place mainly in the UAE. The country had eight gold refineries that had a combined capacity of 3,125 t/yr. The UAE's gold trade was significant regionally and globally in terms of the volume and value of its gold trade. In 2012, gold exports from the UAE increased in value but decreased in amount compared with those of 2011. The value of gold exports increased to $14.7 billion in 2012 from $13.9 billion in 2011. The quantity of gold exports, however, decreased to 287 t from 356 t in 2011. The UAE's gold imports increased significantly in both value and volume in 2012 compared with those of 2011. The UAE imported 2,428 t of gold worth $8.2 billion compared with 822 t worth $3.1 billion in 2011. India remained the UAE's leading gold trading partner (Dubai Multi Commodities Centre Authority, 2013).

Iron and Steel.—Continued demand for steel reinforcing bar (rebar) for concrete by the construction industry for residential housing and commercial projects spurred most of the planned expansions of steel production capacity in the Middle East. As a region, the Middle East was a minor contributor to the world's steel production (4% of total world production). Turkey was the region's leading steel producer and exporter and was ranked 10th among steel-producing countries. Turkey was responsible for about 58% of the region's total production of steel followed by Iran, which produced about 23%, and Saudi Arabia, which produced 8%. Crude steel production was expected to increase by 54% in the Middle East region from 2012 to 2019 (table 11; World Steel Association, 2013).

For many countries of the region, a large segment of the fast-growing population was young in age. In Iraq and Yemen, about 40% of the population was estimated to be younger than 14 years of age, as was about 30% of the population of Saudi Arabia and more than 20% of the population of Iran and Turkey. New household creation was expected to increase the demand for housing significantly, and many of the Middle East region's new housing units were expected to be located in urban areas, which would increase the demand for steel construction products, especially steel rebar. In Saudi Arabia, the Government planned to add 500,000 housing units by 2015. In addition to housing, planned industrial and infrastructure projects in the region were expected to absorb additional volumes of construction material (such as aggregates, cement, copper, silica sand, and steel) (Global Investment House, 2011, p. 10–11; 2012, p. 19–20; United Nations, undated).

A significant proportion of Turkey's steel was produced from steel scrap in electric arc furnaces. The Bureau of International Recycling reported that Turkey's steel scrap consumption increased by 5.1% in 2012 to 32.4 million metric tons (Mt). Much of the steel scrap was imported from the United States. Erdemir's rolling mills produced 3.2 Mt of crude steel at the Eregli plant in 2012, where blast furnace No. 1 was relined and the rolling mills of hot-strip mill No. 1 were replaced. Erdemir also produced 2 Mt of hot-rolled coil and about 1.6 Mt of cold-rolled coil at the plant, which is located in Zonguldak Province. İskenderun Demir ve Çelik A.Ş. (Isdemir), which was a subsidiary of Erdemir, produced 4.6 Mt of crude steel at the Iskenderun plant, which is located in Hatay Province. Isdemir completed the renovation of coke oven battery No. 4 in 2012 and produced about 2.4 Mt of hot-rolled coil and rolled 1.5 Mt of long products in 2012 (Ereğli Demir ve Çelik Fabrikalari T.A.Ş., 2013, p. 10–13; 2013b; Scrap Register, 2013).

Iron Ore.—In the Middle East, iron ore was mined only in Iran and Turkey. Iran was the region's leading iron ore producer, and increases in Iranian iron ore production capacity were planned. In 2012 in Iran, National Iranian Steel Co. (NISCO) inaugurated the 2-Mt/yr-capacity Zarand iron ore concentrator, which was built by China Nonferrous Metal Industry's Foreign Engineering and Construction Company, Ltd. Also in 2012, a 300,000-t/yr-capacity iron ore concentrator was commissioned in Yazd Province, and Outotec was awarded a contract to design a 5-Mt/yr-capacity iron ore pelletizing plant in Kerman Province. A new iron ore mine was expected to be opened at Chah Gaz in 2013. Additionally, the expansions in the production capacities of the iron ore mines of Chadormalu Mining and Industrial Co., Gol-e-Gohar Iron Ore Co., and Sangan Iron Ore Co. were expected to be completed by 2016 (table 10; Outotec Oyj, 2012; Tehran Times, 2012).

National Mining Co. of Saudi Arabia and STX Heavy Industries of the Republic of Korea signed a contract to advance the development of the Wadi Sawawin deposit in northwestern Saudi Arabia. The Wadi Sawawin project's planned iron ore mine and 5-Mt/yr-capacity iron ore pelletizing DRI plant were scheduled to begin production by 2016, but a subsequent dispute delayed the start of construction of the Wadi Sawawin Mine and the associated pelletizing DRI plant indefinitely. Beneficiated iron ore production the Middle East region by Iran and Turkey is expected to increase by 27% by 2017 (table 10; London Mining p.l.c., 2011).

Nickel.—Turkey was the only country that produced nickel in the Middle East in 2012. Nickel production in Turkey is expected to more than double by 2015 (table 12). Meta Nikel Kobalt A.Ş. of Turkey (a subsidiary of Meta Madencilik Limited Şti.) started construction of the Gordes nickel refinery in Manisa Province. The refinery was expected to process about 1.5 Mt/yr of ore in 2013, and output was expected to be 10,000 t/yr of nickel and 500 to 800 t/yr of cobalt salts (Kalkinmaforum.com, 2012; Kobiden News, 2012).

Industrial Minerals

Diamond.—No rough diamond was produced from mines in the Middle East region. Diamond cutting and trading, however, was a notable segment of the mineral economies of Israel, Lebanon, and the UAE, all of which were Kimberley Process Certification Scheme participants.

Israel was one of the world's leading diamond cutting and trading centers; its diamond cutting and polishing companies specialized in large, high-value gemstones. In 2012, the value of Israel's cut and polished diamond exports decreased to $5.6 billion from $7.2 billion in 2011. Of that amount, the

value of Israel's cut and polished diamond exports produced from domestic cutting and polishing operations decreased to $1.3 billion from $1.5 billion in 2011. Israel's cut and polished diamond production declined in recent years because of competition from Chinese and Indian producers, which had lower labor costs (Israel Diamond Institute Group of Companies, 2012; Kimberley Process Certification Scheme, 2012, 2013).

Lebanon's diamond exports decreased by about 58% in value and 36% in volume in 2012 compared with that of 2011. Rough and polished diamond exports totaled 704,390 carats valued at more than $125 million in 2012 compared with 1,104,935 carats valued at more $296 million in 2011. Similarly, diamond imports decreased by 48% in volume and 45% in value compared with those of 2012. Lebanon imported 683,390 carats of diamond worth $112.8 million in 2012 compared with 1,177,960 carats worth about $205 million in 2011 (Kimberley Process Certification Scheme, 2012, 2013).

In 2012, the UAE's diamond exports accounted for 15% by volume and 14% by value of the total world diamond exports, and its imports accounted for 15% by volume and 9% by value of the world's total diamond imports. The country exported 60.4 million carats of rough and polished diamond valued at $6.8 billion compared with 47.4 million carats valued at $5.9 billion in 2011; it imported 59.7 million carats of rough and polished diamond valued at about $4.6 billion compared with 52.4 million carats valued at about $3.8 billion in 2011. The UAE's top diamond trading partners included Belgium, Hong Kong, India, and Switzerland, and its other trading partners were Angola and the Democratic Republic of the Congo [Congo (Kinshasa)] (Kimberley Process Certification Scheme, 2012, 2013; Dubai Multi Commodities Centre Authority, 2013).

Phosphate Rock.—Jordan was the region's leading producer of phosphate rock in 2012. Other countries that produced phosphate rock in the Middle East were Iran, Iraq, Israel, Syria, and Turkey (table 4). Saudi Arabia was expected to become the region's leading phosphate rock producer following the completion of the Al Jalamid phosphate mine, the Ras Al-Khair fertilizer plant, and the Wa'ad Al Shamal project. In 2012, Saudi Arabia began phosphate rock mining from Al Jalamid deposit. The output was transferred by rail to a fertilizer manufacturing plant at Ras Al-Khair. In February, Ma'aden's 3-Mt/yr-capacity diammonium phosphate fertilizer complex at Ras Al-Khair (formerly known as Ras Az Zawr) began commercial production. About 1.43 Mt of fertilizer was produced in 2012. Saudi Arabia was planning to develop another phosphate mining and fertilizer manufacturing complex at Wa'ad Al Shammal. The project was also known as the King Abdullah Project for the Development of the Promise of the North (Saudi Arabian Mining Co., 2013, p. 66–67).

Mineral Fuels

Coal.—Iran and Turkey were the only countries in the Middle East region that produced coal. Turkey was the region's predominant coal miner; it produced 81 Mt of coal in 2012 compared with 78 Mt in 2010 (table 13). In Turkey, coal production was used primarily for electrical power generation. The Turkish Government encouraged the use of natural gas for new electrical power generation projects and retained control of hydroelectric generating facilities; however, many of Turkey's lignite and subbituminous coal operations and associated mine-mouth electrical power generating plants had been divested to the private sector in the past decade. As a result, the level of the coal production could vary, depending on the demand for electric power not met by imported natural gas. Imports of natural gas by pipeline came mainly from, in order of volume, Russia, Iran, and Azerbaijan and imports by ship as liquefied natural gas came from Algeria and Qatar (U.S. Energy Information Administration, 2014b).

Spurred in part by the effects of international economic sanctions, which limited coal imports, Iran planned to double its domestic coal-production capacity to more than 4.5 Mt/yr by yearend 2013. Salable coal production in Iran and Turkey is projected to increase by 28% by 2017, and most of the increase would be in Turkey (table 13).

Natural Gas and Petroleum.—The Middle East region accounted for 43% of the world's natural gas reserves at the end of 2012. Iran held 18.0% of the world's reserves and Qatar held 13.4%. The share of the Middle East region in the world's crude oil production was about 33% of the world's total production in both 2011 and 2012. Saudi Arabia was the leading petroleum producing country in the world, in terms of the volume of production, with output of 4.2 billion 42-gallon barrels (Gbbl) in 2012. Other notable crude oil-producing countries in the region (based on production volume) included Iran (ranked sixth in the world), the UAE (seventh), Kuwait (eighth), and Iraq (ninth). According to the BP Statistical Review of World Energy, the region's proved crude oil reserves were estimated to be 808 Gbbl, or 48.4% of the world's total crude oil reserves. Saudi Arabia held 15.9% of proved oil reserves worldwide; Iran, 9.4%; Iraq, 9.0%; Kuwait, 6.1%, and the UAE, 5.9% (BP p.l.c., 2013, p. 6, 20).

In Saudi Arabia, Saudi Aramco reported drilling 199 oil exploration and development wells and 100 gas exploration and development wells. The company announced discoveries of a new oilfield at Aslaf and new gas reservoirs at Sha'ur and Umm Ramil. Development of the offshore Karan sour (high sulfur content) gasfield in the Persian Gulf was completed in 2012 and full production capacity of 18.6 billion cubic meters per year was reached. Work continued on the development of the Manifa oilfield, which was expected to be completed by 2013. Construction of the Wasit Gas plant, which would handle output from the Arabiyah and the Hasbah gasfields, was expected to be completed by 2014 (Saudi Arabian Oil Co., 2012, p. 23; 2013, p. 16, 21–22).

Three crude oil refineries were under construction in Saudi Arabia in 2012. They were the 400,000-barrel-per-day (bbl/d)-capacity heavy-crude-oil refinery of Saudi Aramco Total Refining and Petrochemical Co. (SATORP) at Jubail, which began pre-commissioning in late 2012 and was expected to begin initial operations in 2013; the 400,000-bbl/d-capacity heavy-crude-oil refinery of Yanbu Aramco Sinopec Refining Company Ltd. (YASREF), which was expected to be completed by 2014 for the joint venture of Saudi Aramco and China Petrochemical Corp. (Sinopec); and the proposed 400,000-bbl/d-capacity heavy-crude-oil Jazan Refinery and Terminal project,

which was scheduled to be operational by 2016. Development of the proposed Rabigh Phase II project, which would expand the Rabigh Refining & Petrochemical Co. (PetroRabigh) refinery and petrochemical plant, was approved in 2012. Hydrocarbon production in the region is expected to increase gradually, especially in Iran, Iraq, Saudi Arabia, and the UAE (Saudi Arabian Oil Co., 2013, p. 32).

The UAE's petroleum refining capacity increased slightly in 2012 to 471,300 bbl/d from 466,300 bbl/d in 2011. Abu Dhabi Oil Refining Co. (Takreer) was implementing a $10 billion plan that encompassed three large expansion projects for the Ruwais oil refinery. Takreer was also building Group III base oils production facilities at the Ruwais refinery with a capacity to produce 500,000 t/yr of Group III base oils and 100,000 t/yr of Group II base oils (Abu Dhabi Oil Refining Co., 2013).

In 2012, the Middle East region was a significant partner in the world's crude oil and natural gas trade; it was responsible for about one-half of the world's crude oil exports, 40.0% of the world's liquefied natural gas exports, and 3.9% of the world's natural gas pipeline exports. The region also had 8.9% of the world's petroleum refinery capacity and accounted for 12.2% of the world's refined petroleum products exports (BP p.l.c., 2013, p. 16, 19, 29).

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TABLE 1
MIDDLE EAST: AREA AND POPULATION IN 2012

Country/Territory	Area[1] (square kilometers)	Estimated population[2] (millions)
Bahrain	760	1.3
Iran	1,648,195	76.4
Iraq	438,317	32.6
Israel	20,770	7.9
Jordan	89,342	6.3
Kuwait	17,818	3.3
Lebanon	10,400	4.4
Oman	309,500	3.3
Qatar	11,586	2.1
Saudi Arabia	2,149,690	28.3
Syria	185,180	22.4
Turkey	783,562	74.0
United Arab Emirates	83,600	9.2
West Bank and Gaza Strip	6,220	4.0
Yemen	527,968	23.9
Total	6,282,908	299.4
World total	510,072,000	7,046.4

[1]Source: U.S. Central Intelligence Agency, The World Factbook 2013.
[2]Source: The World Bank, 2013 World Development Indicators Database.

TABLE 2
MIDDLE EAST: GROSS DOMESTIC PRODUCT[1, 2]

Country/Territory	Gross domestic product in 2012 based on purchasing power parity		Real gross domestic product growth rate (percentage)		
	Gross value (million dollars)	Per capita (dollars)	2010	2011	2012
Bahrain	33,029	28,691	4.7	2.1	4.8
Iran	988,437	12,986	5.9	2.0	-1.9
Iraq	236,044	7,004	5.9	8.9	8.4
Israel	260,909	33,878	5.7	4.6	3.4
Jordan	38,236	5,977	2.3	2.6	2.8
Kuwait	150,905	39,874	-2.3	8.2	6.2
Lebanon	62,501	15,587	7.0	1.5	1.5
Oman	89,057	28,843	5.6	5.4	5.0
Qatar	185,300	100,889	16.7	14.1	6.2
Saudi Arabia	883,666	30,477	7.4	7.1	5.1
Syria	NA	NA	3.4	-2.3	-21.8
Turkey	1,109,173	14,812	9.2	8.5	2.2
United Arab Emirates	255,812	29,176	1.7	5.2	4.4
West Bank and Gaza Strip	10,225	2,389	9.3	12.2	5.9
Yemen	58,272	2,251	7.7	-12.7	2.4
Total	4,361,566	XX	XX	XX	XX
World total	83,193,418	XX	5.1	3.8	3.2

NA Not available. XX Not applicable.
[1]Source: International Monetary Fund, World Economic Outlook Database, October 2013.
[2]Gross domestic product listed may differ from that reported in individual country chapters owing to differences in the source or date of reporting.

TABLE 3
SELECTED MIDDLE EAST EXPLORATION ACTIVITY IN 2012

Country	Type[1]	Prospect	Commodity	Company	Resource notes[2, 3]	Exploration notes
Iran	E	Chah Mesi	Cu	National Iranian Copper Corp.	15,000 t Cu (R)	Ongoing property evaluation.
Do.	D	Masjed Daqi	Cu, Au	do.	694,000 t Cu (R)	Ongoing construction.
Do.	D	Zarshoran	Au	Government of Iran	2.9 Moz Au (R)	Ongoing construction.
Oman	E	Block 5	Cu, Zn, Au, Ag	Gentor Resources Inc.	26,000 t Cu, 4,900 t Zn, 5,300 oz Au, 250,000 oz Ag (ID)	Ongoing exploration.
Do.	E	Daris	Cu, Au	Alara Resources Ltd.	68,000 t Cu, 37,000 oz Au (D)	Ongoing exploration.
Saudi Arabia	E	Atlantis II deeps	Au, Zn, Cu, Ag, Mn	Diamond Fields International Ltd.	1.6 Mt Zn, 372,000 t Cu, 107 Moz Ag, 2.2 Mt Mn (IF)	Ongoing exploration.
Do.	F	Khnaiguiyah	Zn, Cu	Alara Resources Ltd.	1 Mt Zn, 98,000 t Cu (D)	Ongoing exploration.
Do.	D	King Abdullah	P_2O_5	Ma'aden Saudi Arabian Mining Co.	Data not released	Development ongoing.
Do.	E	Miskah	Au	do.	2.1 Moz Au (ID)	Ongoing exploration.
Turkey	E	Agi Dagi	Au, Ag	Alamos Gold Inc.	1.7 Moz Au, 10.8 Moz Ag (D)	Ongoing exploration.
Do.	E	Akarca	Au, Ag	Eurasian Minerals Inc.	Data not released	Ongoing exploration.
Do.	E	Anatolia/Aldridge	U_3O_8	Anatolia Energy Ltd.	4,900 t U_3O_8 (ID)	Ongoing exploration.
Do.	E	Ardala	Au, Cu, Mo	Eldorado Gold Corp.	314,000 oz Au, 10,000 t Cu, 2,400 t Mo (IF)	Ongoing exploration.
Do.	E	Balya	Zn, Pb, Ag	Dedeman Madencilik San Ve Tic AS	Data not released	Ongoing exploration.
Do.	E	Beyagac	Cr_2O_3	Ruukki Group	7,000 t Cr_2O_3 (R)	Ongoing exploration.
Do.	E	Bursa	Cu, Mo, Au, Ag	First Quantum Minerals Ltd.	Data not released	Ongoing exploration.
Do.	P	Copler	Au, Ag, Cu	Alacer Gold Corp.	4.3 Moz Au, 11.7 Moz Ag, 44,000 t Cu (R)	Ongoing drilling.
Do.	P	Efemçukuru	Au	Eldorado Gold Corp.	1.3 Moz Au (R)	Ongoing drilling.
Do.	E	Fethiye	Cr_2O_3	Ruukki Group	7,000 t Cr_2O_3 (R)	Ongoing drilling.
Do.	E	Golcuk	Cu, Ag	Pasinex Resources Ltd.	Data not released	Ongoing exploration.
Do.	E	Halilaga	Au, Cu, Mo	Teck Resources Ltd.	505,000 t Cu, 1.7 Moz Au, 10,000 t Mo (ID)	Completed prefeasibility work.
Do.	D	Himmetdede	Au	Koza Altin Isletmeleri	582,000 oz Au (R)	Started construction.
Do.	E	Himmetdede South	Au	Invictus Gold Ltd.	698,000 oz Au (IF)	Ongoing exploration.
Do.	E	Karakartal	Au, Cu	Alacer Gold Corp.	222,000 oz Au, 40,000 t Cu (ID)	Ongoing exploration.
Do.	E	Kavak	Cr_2O_3	Ruukki Group	463,000 t Cr_2O_3 (R)	Ongoing exploration.
Do.	E	Kavaklitepe	Au	Columbus Copper Corp.	Data not released	Ongoing exploration.
Do.	E	Kestanelik	Au, Ag	Chesser Resources Ltd.	460,000 oz Au, 350,000 oz Ag (IF)	Ongoing exploration.
Do.	E	Kirazli	Au, Ag	Alamos Gold Inc.	Included in Agi Dagi resource	Ongoing exploration.
Do.	P	Kisladag	Au	Eldorado Gold Corp.	10 Moz Au (R)	Ongoing drilling.
Do.	E	Sindirgi	Au, Ag	Ariana Resources plc.	114,000 oz Au, 1.5 Moz Ag (R)	Ongoing feasibility drilling.
Do.	E	Muratdere	Cu, Au, Ag, Mo, Re	Stratex International. P.l.c.	186,000 t Cu, 204,000 oz Au, 3.9 Moz Ag, 6,400 t Mo,	Ongoing exploration.
Do.	E	Oksut	Au	Centerra Gold Inc.	693,000 oz Au (ID)	Ongoing exploration.
Do.	P	Ovacik	Au, Ag	Koza Altin Isletmeleri	1.9 Moz Au, 775,000 oz Ag (R)	Ongoing drilling.

See footnotes at end of table.

TABLE 3—Continued
SELECTED MIDDLE EAST EXPLORATION ACTIVITY IN 2012

Country	Type[1]	Prospect	Commodity	Company	Resource notes[2, 3]	Exploration notes
Turkey—Continued	E	Salinbas	Au, Ag	Eldorado Gold Corp.	180,000 oz Au, 820,000 oz Ag (ID)	Ongoing exploration.
Do.	E	Sarp Ikiztepe	Au, Cu	Valhalla Resources Ltd.	Data not released	Ongoing exploration.
Do.	E	Sivas	Cu, Au	Red Crescent Resources Ltd.	Data not released	Ongoing exploration.
Do.	E	Red Mountain/Yusufeli/ Taç/Çorak	Au, Cu	Mediterranean Resources Ltd.	1.58 Moz Au, 59,000 t Cu (ID)	Ongoing exploration.
Do.	E	Tufanbeyli	Zn, Pb, Ag	Red Crescent Resources Ltd.	105,000 t Zn, 300 t Pb, 307,000 oz Ag (IF)	Ongoing exploration.
Do.	E	TV Tower	Au, Cu, Ag	Pilot Gold Inc.	Data not released	Ongoing exploration.
Do.	E	Yenipazar	Au, Ag, Cu, Pb, Zn	Aldridge Minerals Inc.	906,000 oz Au, 30 Moz Ag, 92,000 t Cu, 300,000 t Pb, 436,000 t Zn (ID)	Ongoing exploration.
Yemen	E	Al Hariqah	Au	Cantex Mine Development Corp.	1.9 Moz Au (ID)	Ongoing exploration.

Do. Ditto.

[1]Abbreviations used for commodities in this table include the following: Ag—silver; Au—gold; Cr_2O_3—chromite; Cu—copper; Mn—manganese; Mo—molybdenum; Pb—lead; P_2O_5— phosphate; Re—rhenium; U_3O_8—uranium oxide; Zn—zinc.

Abbreviations used for units of measure include the following: Moz—million troy ounces; Mt—million metric tons; oz—troy ounces; t—metric tons.

[2]D—Approved for development; E—Active exploration; F—Feasibility work ongoing/completed; P—Exploration associated with producing site.

[3]Based on 2012 data reported from various sources; D—measured + indicated; ID—indicated; IF—inferred; R—proven + probable.

Resource data have not been verified by the U.S. Geological Survey.

TABLE 4
MIDDLE EAST: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2012[1]

(Thousand metric tons unless otherwise specified)

	Metals			Industrial minerals					Mineral fuels and related materials: Petroleum	
Country	Aluminum, metal, primary	Chromite, mine output, gross weight	Steel, crude	Ammonia, N content	Cement, hydraulic	Gypsum	Phosphate rock, gross weight	Potash, K_2O equivalent	Crude, including condensate (thousand 42-gallon barrels)	Refinery products (thousand 42-gallon barrels)
Bahrain	890	--	--	341	800	--	--	--	63,302	101,103
Iran[e]	230 [2]	400	14,000	2,500	70,000	15,000	100	--	1,340,000	596,000
Iraq	--	--	--	143	10,000	13,531	250	--	1,136,975	211,869
Israel[e]	--	--	430	--	5,900	45	3,513 [2]	3,060	32	95,800
Jordan	--	--	150 [e]	--	5,588	255	6,383	1,355	9	34
Kuwait[e]	--	--	1,300	470	2,250	--	--	--	1,100,000	316,000
Lebanon	--	--	--	--	5,500	105	--	--	--	--
Oman	360	555	160 [e]	1,700	5,200	1,915	--	--	336,530	74,280
Qatar	604	--	2,100	2,665	5,500	145 [e]	--	--	717,590	163,306
Saudi Arabia[e]	--	--	5,200	3,700	50,000	2,351	--	--	3,479,000	674,000 [2]
Syria[e]	--	--	10	50	4,000	328	1,534	--	59,860 [2]	62,200 [2]
Turkey[e]	60	2,500	36,000	280	63,879 [2]	8,302	30	--	16,200	156,000
United Arab Emirates	1,820	--	2,408	330	17,000	680 [e]	--	--	1,233,700	227,321
Yemen	--	--	--	--	2,000 [e]	100 [e]	--	--	75,190	29,900
Total	3,960	3,460	61,800	12,200	24,800	42,800	11,800	4,420	9,560,000	2,710,000
Share of world total	8%	11%	4%	9%	6%	31%	6%	13%	33%	11%
United States	2,070	--	88,700	8,730 [3]	74,900	15,800	30,100	900	2,370,000	1,640,000
World total	46,800	31,200	1,560,000	135,000	3,810,000	137,000	209,000	35,200	28,600,000	25,600,000

[e]Estimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits. -- Zero.
[1]Totals may not add due to independent rounding. Percentages are calculated on unrounded data. Table includes data available as of May 7, 2014.
[2]Reported figure.
[3]Synthetic anhydrous ammonia; excludes coke oven byproduct ammonia.

TABLE 5
MIDDLE EAST: HISTORIC AND PROJECTED BAUXITE MINE PRODUCTION, 2005–2019[1]

(Metric tons)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Iran	437,595	681,235	820,000	800,000	800,000	800,000
Saudi Arabia[2]	--	--	--	2,000,000	4,000,000	4,000,000
Turkey	475,349	1,311,064	1,473,695	1,600,000	1,600,000	1,600,000
Total	910,000	1,990,000	2,290,000	4,400,000	6,400,000	6,400,000

[e]Estimated. -- Negligible or no production.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.
[2]Does not include production of low-grade bauxite for cement, which began in 2008.

TABLE 6
MIDDLE EAST: HISTORIC AND PROJECTED PRIMARY AND SECONDARY ALUMINUM METAL PRODUCTION, 2005–2019[1]

(Metric tons)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Bahrain[2]	750,710	850,700	890,000	1,000,000	1,300,000	1,300,000
Iran	220,000	192,000	230,000	400,000	770,000	770,000
Oman	--	367,000	360,000	375,000	375,000	400,000
Qatar	--	190,000	604,000	604,000	585,000	585,000
Saudi Arabia	--	--	--	740,000	740,000	740,000
Turkey	60,000	60,000	60,000	60,000	80,000	80,000
United Arab Emirates	722,000	1,400,000	1,820,000	2,400,000	2,400,000	2,400,000
Total	1,750,000	3,060,000	3,960,000	5,580,000	6,250,000	6,300,000

[e]Estimated. -- Negligible or no production.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.
[2]May include some secondary aluminum produced from used beverage cans.

TABLE 7
MIDDLE EAST: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 2005–2019[1]

(Metal content of concentrate in thousand metric tons)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Iran	190	255	260	430	500	500
Israel	--	--	--	8	20	20
Oman	--	2	2	4	4	4
Saudi Arabia	1	2	6	10	10	10
Turkey[2]	46	97	100	150	150	150
Total	240	360	370	600	680	680

[e]Estimated. -- Negligible or no production.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.
[2]Concentrate production estimated to be about 85% of mined ore (gross weight).

TABLE 8
MIDDLE EAST: HISTORIC AND PROJECTED REFINED COPPER METAL PRODUCTION, 2005–2019[1, 2]

(Metric tons)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Iran	178,000	220,000	225,000	250,000	350,000	450,000
Israel	--	--	--	4,000	20,000	20,000
Oman	24,543	15,000	16,000	32,000	32,000	32,000
Turkey	95,000	47,000	80,000	200,000	200,000	200,000
Total	300,000	280,000	320,000	486,000	600,000	700,000

[e]Estimated. -- Negligible or no production.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.
[2]May include secondary production.

TABLE 9
MIDDLE EAST: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 2005–2019[1]

(Metal content in kilograms)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Iran	1,000	2,000	2,500	6,000	10,000	10,000
Oman	384	82	--	100	100	100
Saudi Arabia	7,456	4,476	4,347	7,000	7,000	6,000
Turkey	4,170	16,890	29,370	45,000	50,000	50,000
Total	13,000	23,000	36,000	58,000	67,000	66,000

[e]Estimated. -- Negligible or no production.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 10
MIDDLE EAST: HISTORIC AND PROJECTED BENEFICIATED IRON ORE PRODUCTION, 2005–2019[1]

(Metal content in thousand metric tons)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Iran	9,162	16,500	24,000	26,000	30,000	30,000
Turkey	2,450	2,700	2,300	3,000	3,000	3,000
Total	12,000	19,000	26,000	29,000	33,000	33,000

[e]Estimated.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 11
MIDDLE EAST: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 2005–2019[1]

(Thousand metric tons)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Iran	9,400	12,000	14,000	17,000	20,000	20,000
Iraq	--	--	--	1,500	2,000	2,000
Israel	480	430	430	480	480	480
Jordan	150	150	150	390	390	390
Kuwait	450	500	1,300	1,300	1,300	1,300
Oman	84	84	160	1,200	4,000	4,000
Qatar	1,057	1,975	2,100	2,000	2,000	2,000
Saudi Arabia	4,185	5,000	5,200	10,200	10,200	10,200
Syria	70	70	10	400	400	400
Turkey	2,960	29,030	36,000	42,000	47,000	50,000
United Arab Emirates	90	1,180	2,408	4,700	5,000	5,000
Total	19,000	50,000	62,000	81,000	93,000	96,000

[e]Estimated. -- Negligible or no production.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 12
AFRICA: HISTORIC AND PROJECTED NICKEL MINE PRODUCTION, 2005–2019

(Metal content in metric tons)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Turkey	1,000	1,400	2,400	10,000	10,000	10,000

[e]Estimated; estimated data are rounded to no more than three significant digits.

TABLE 13
MIDDLE EAST: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 2005–2019[1, 2]

(Thousand metric tons)

Country	2005	2010	2012	2015[e]	2017[e]	2019[e]
Iran	1,898	2,300	1,300	4,500	4,500	4,500
Turkey	58,676	78,104	81,200	90,000	100,000	100,000
Total	61,000	80,000	82,000	95,000	105,000	105,000

[e]Estimated.
[1]Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes anthracite, bituminous, and lignite.