

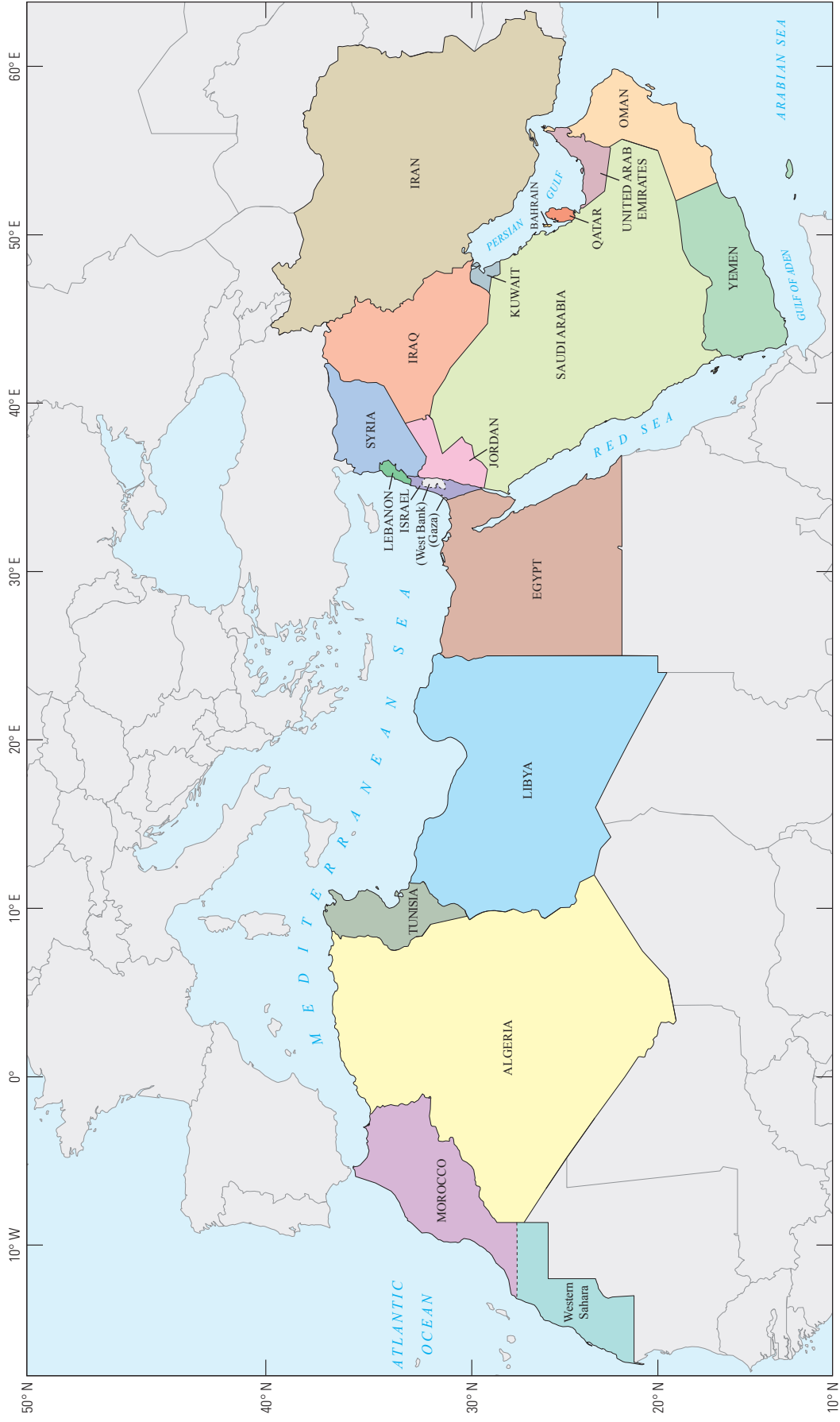


# 2014 Minerals Yearbook

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## MIDDLE EAST AND NORTH AFRICA

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Base modified from ESI/ ArcGIS online world countries (generalized) map data, 2017  
 Mercator Auxiliary Sphere projection  
 World Geodetic System 1984 datum

**Figure 1.** Map of the Middle East and North Africa region. The countries covered in this report are labeled on the map; bordering countries are shown in gray and not labeled.

# THE MINERAL INDUSTRIES OF THE MIDDLE EAST AND NORTH AFRICA

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The 20 countries and territories of the Middle East and North Africa (MENA) region that are covered in this volume include the following: Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, the United Arab Emirates (UAE), the West Bank and Gaza Strip, Western Sahara, and Yemen (fig. 1, facing page). The region covers an area of about 11.5 million square kilometers, or about 2.3% of the world's total surface area. In 2014, the MENA region was home to about 417 million people, or 5.7% of the world's population (table 1).

## Acknowledgments

The U.S. Geological Survey (USGS) acknowledges and expresses its sincere appreciation to the Government agencies and international organizations listed below for providing mineral production statistics and basic economic data.

For mineral production statistics—

- Algeria—Ministry of Industry and Mines;
- 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;
- Morocco—Ministry of Energy, Mines, Water and the Environment;
- 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; 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 2014, the gross domestic product (GDP) of the MENA region based on purchasing power parity was about \$7.0 trillion, which accounted for 6.4% of the world's GDP. The region's GDP per capita averaged \$16,777, which was 11% higher than the world average of \$15,034. The higher than average GDP

per capita in the region was attributed to the Gulf Cooperation Council (GCC) countries, which had some of the highest GDP per capita in the world owing to the wealth generated by hydrocarbon exports and small populations. The rate of growth of the GDP in the MENA region was 0.3% in 2014 compared with 0.1% in 2013 and 2.1% in 2012. The rates of growth for individual countries within the region varied greatly, with Bahrain, Iran, and the UAE achieving the highest rates of economic growth and Iraq, Libya, and Syria having the lowest rates of growth in 2014 (table 2).

The hydrocarbon industry continued to be the main driver of growth in the economies of the entire region, directly through the wealth it created in net petroleum-exporting countries and indirectly through the infrastructure projects being built in most of the MENA countries, as well as through the remittances of expatriates working in the GCC net-petroleum-importing countries, such as Egypt, Jordan, Lebanon, Syria, and Yemen. Production of metals and industrial minerals was an important component of the economy of Iran and Morocco; metal smelting also was an important part of the nonfuel economies of Bahrain, Egypt, Oman, Qatar, Saudi Arabia, and the UAE. For most of the countries of the region, the value of trade continued to be driven mainly by the exports of hydrocarbons to the world market. The economies of most of the oil-exporting countries in the region were negatively affected by the lower international market prices for crude oil during 2014 compared with those of 2013.

The abundant supply of crude oil and natural gas and its geographic location, with easy access to ocean transportation, continued to give the MENA region a competitive advantage for developing energy-intensive mineral industries to produce aluminum, cement, crude steel, direct-reduced iron (DRI), fertilizers, petrochemicals, and rolled steel. In 2014, crude steel trade was important for the region. Saudi Arabia, whose net imports of crude steel were 6.5 million metric tons (Mt), was the world's 6th-ranked net importer of crude steel; Algeria, which imported 6.0 Mt of steel products, was the 8th-ranked; the UAE and Egypt, whose net imports were 5.8 Mt each, were the world's 9th and 10th-ranked importers; and Iran, whose net imports of crude steel were 3.7 Mt, was the world's 13th-ranked net importer of crude steel (World Steel Association, 2015, p. 27).

In 2014, several MENA countries were under various levels of political instability and civil unrest in the aftermath of uprisings, which started in Tunisia in December 2010 and extended to Egypt, Iraq, Libya, Syria, and Yemen from 2011 to the present. Libya, Syria, and Yemen, which were among the countries that were most affected by armed conflicts, suffered significant economic losses owing to reductions in their hydrocarbon production and exports. The armed conflict

between the Government and the self-proclaimed Islamic State of Iraq and the Levant (ISIL) in the second half of 2014 disturbed Iraq's petroleum production, exports, and refining activities at the northern oilfields owing to several attacks on the facilities and refineries in the cities of Baiji and Kirkuk. ISIL captured the Mishraq State sulfur mine, which was undergoing a \$78 million rehabilitation and capacity expansion by Devco Inc. of the United States to increase its capacity to 500,000 metric tons per year (t/yr) of sulfur by 2015 (Gaven, 2014).

In Syria, ISIL and other groups took control of some of the natural gas fields and oilfields in the central and eastern parts of the country, which were operated by state-owned companies and their international partners. In September 2014, production at some state-owned and the two privately owned cement plants (Al-Badia Cement J.S.C. and Lafarge Cement Syria) was stopped and employees were evacuated for security reasons (Al-Badia Cement J.S.C., 2015, p. 14, 26; International Cement Review, 2015, p. 336).

The mining sector in Tunisia continued to be adversely affected by the ongoing civil unrest in the country, which reduced phosphate rock and phosphate-based fertilizer production by more than 50% in 2014 compared with that of 2010. The stagnation in the mining sector since 2011 was attributed to the ongoing social tension and strikes (which caused disturbances at phosphate rock production sites and on transportation routes) by locals rallying for employment and compensation (Central Bank of Tunisia, 2015, p. 48–50).

Despite political instability, the MENA region has strong fundamentals for economic development, such as a large, young population; abundant raw materials; and low production costs. These factors are expected eventually to attract increased public and private investment into infrastructure and fuel and nonfuel mineral industries, which would likely boost demand for aluminum, cement, iron and steel, and other mineral commodities.

## Legislation

In Algeria, the Government issued a new mining law, law No. 14 of February 24, 2014, which replaced Ordinance No. 07–02 of March 1, 2007. The ordinance had amended and supplemented Mining Law 1–10 of July 3, 2001 (EY, 2015, p. 11).

In Egypt, the President signed law No. 198, which became Egypt's new mining law, on December 8, 2014. The new law was intended to address problems associated with the current mining law, which was based on law No. 66 of 1953 and law No. 86 of 1956, which had been amended only twice (in 1957 and 1964). Investment law No. 8 of 1997 provided the legal framework for several mining companies that were established in the country in the early 2000s. Law No. 198 of 2014 protects investments in the country of both foreign and domestic companies against nationalization and provides incentives for investing in mining and in the manufacturing of fertilizer and petrochemicals in the country's free trade zones (Egyptian Mineral Resources Authority, 2015).

In Morocco, the new mining law (Bill 33–13) had not been approved by the country's legislative body as of yearend 2014. The Moroccan Council of Government approved Bill 33–13

in 2013 (Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, 2015).

In Oman, Royal Decree No. 49, which was issued in September 2014, affirmed the establishment of the Public Authority for Mining (PAM) and its organizational system. According to the Decree, PAM falls under the authority of the Ministry of Commerce and Industry and was assigned to monitor mineral industry activities, prepare plans and strategies relevant to the development of the mineral industry, and oversee the country's mineral policies (Times of Oman, 2015).

## Exploration

Local and international exploration companies explored for such nonfuel minerals as bauxite, copper, gold, lead, silver, and zinc in Algeria, Egypt, Iran, Israel, Morocco, Oman, Saudi Arabia, Tunisia, and Yemen (table 3). State-owned and international oil companies explored for hydrocarbons in many of the countries in the region. Exploration activities continued in such countries as Algeria, Iran, Iraq, Israel, Kuwait, and Saudi Arabia. Sixty-five crude oil discoveries were reported in the MENA region in 2014, including Egypt (34), Algeria (15), Kuwait (7), Iraq (6), and Morocco, Oman, and Tunisia (1 each). Forty-two natural gas discoveries were reported in the MENA region in 2014, including Egypt (23), Algeria (17), and Morocco and the UAE (1 each) (Organization of Arab Petroleum Exporting Countries, 2015, p. 20, 22).

In Egypt, Thani Stratex Resources Ltd. was focused on gold mine development at the Wadi Kareem Block, which is located 45 kilometers (km) southwest of Marsa Alam, and at the Hodine Block, which is located 45 km southwest of Bernice on the Red Sea coast in southeastern Egypt. Alexander Nubia Inc. of Canada was developing the gold resources of the Arabian-Nubian Shield. The company had been exploring for gold at four blocks in eastern Egypt, including the Abu Marwat, the Abu Zawal, the Hamama, and the Rouh Al Hadid (Stratex International Plc, 2014; Alexander Nubia Inc., 2015; Egyptian Mineral Resources Authority, 2015, p. 13).

In Iran, National Iranian Copper Industries Co. (NICICO) was developing additional copper mine capacity at the Chah-Firoozeh, the Chah-Mesi, the Daraloo, the Darreh Zar, the Ijoo, and the Nouchoon Mines in Kerman Province; the Chehel-Kureh Mine in Sistan-Baluchestan Province; the Masjed Daghi and Haft-Cheshmeh Mines in East Azerbaijan Province; the Kahang Mine in Isfahan Province; and the Taft copper mine in Yazd Province (table 3; National Iranian Copper Industries Co., 2015, p. 19, 21, 23; Hastorun and others, 2016, p. 9).

In Saudi Arabia, the Khnaiguiyah Mining Co. LLC (KMC) was a 50–50 joint venture of Alara Resources Ltd. of Australia and Managem to develop copper and zinc deposits at the Khnaiguiyah project, which is located 200 km west of Riyadh. KMC completed a definitive feasibility study (DFS) for the Khnaiguiyah copper-zinc deposit in 2013. The DFS established the financial and technical feasibility for producing 2 million metric tons per year (Mt/yr) of copper and zinc ores for 13 years. Production was expected to begin in the fourth quarter of 2015 at an annual rate of 5,800 t/yr of copper in concentrate and 90,000 t/yr of zinc.

Joint Ore Reserves Committee (JORC)-compliant proved and probable reserves were estimated to be 26.08 Mt grading 0.24% copper and 3.3% zinc. The JORC-compliant measured and indicated resources in domain 1 (zinc) and domain 2 (copper-zinc) were 25.32 Mt grading 0.17% copper and 4.03% zinc at a cutoff grade of 1.5% zinc. The JORC-compliant measured and indicated resources in domain 3 (copper) was 8.53 Mt grading 0.64% copper (Alara Resources Ltd., 2016a–c).

Ma'aden and Barrick Gold Corp. of Canada signed an agreement with Saudi Arabian Mining Co. (Ma'aden) to create a 50–50 joint-venture company to develop copper deposits at Jabal Sayid, which is located 350 km northeast of Jeddah. The Jabal Sayid deposit was estimated to have about 650 Mt of measured and indicated copper resources. The company planned to begin production in 2015 and to ship its first concentrate in early 2016. Copper production from the mine was expected to be 43,359 t/yr by 2017 and to peak at 51,000 t/yr sometime later. In addition to copper and zinc, the Jabal Sayid project was expected to produce unspecified quantities of cobalt, lead, nickel, silver, and sulfur (Saudi Arabian Mining Co., 2015, p. 13).

In Morocco, the Office National des Hydrocarbures et des Mines (ONHYM) conducted 43 exploration studies throughout the country; 27 were its own projects and 16 were carried out in partnership with domestic and international mining companies. The ONHYM studies included 16 metals studies (gold, molybdenum, niobium, and rare-earth elements), 18 base-metal and energy substances studies (cobalt, copper, iron ore, nickel, lead, zinc, and uranium), 6 industrial mineral studies (barite, bentonite, diatomite, magnesite, and metallurgical silica), 2 mineral research studies, and 1 geothermal study (Office National des Hydrocarbures et des Mines, 2015, p. 11, 36).

Zgounder Millennium Silver Mining, which was a joint venture of Maya Gold and Silver of Canada Inc. (85%) and ONHYM (15%), held exploration and exploitation licenses for six properties in Morocco—the Amizmiz Mine, the Azegour Mine, the Boumadine polymetallic mine, Permit 233263, the Touchkat Mine, and the Zgounder silver mine. In 2014, Kasbah Resources Ltd. of Australia continued working on the DFS of the Achmmach tin project, which was expected to be completed in 2015. The project consisted of two exploitation permits (PE No. 2912 and PE No. 193172). Kasbah sought to increase the size of the deposit's resource, to prove the economic viability of the project, and to advance Achmmach to a development decision (Kasbah Resources Ltd., 2014, p. 6–18; 2015; Maya Gold and Silver Inc., 2015a–d).

## Commodity Overview

The main contributions of the MENA region to the world's supply of mineral commodities were crude oil and condensate (32.6%), helium (31.1%), phosphate rock (22.0%), natural gas (21.5%), ammonia (12.5%), aluminum (11.7%), gypsum (10.8%), refinery petroleum products (10.1%), potash (8.3%), cement (7.2%), chromium (3.8%), and crude steel (2.4%) (table 4; fig. 2, at the end of the chapter; BP p.l.c., 2015, p. 20; Hamak, 2016).

Tables 5 through 18 include the MENA region's historical production data for major mineral commodities for 2005, 2010, 2012, 2013, and 2014, and estimates for metal production in the

region for 2016, 2018, and 2020. Estimates for the production of major mineral commodities for 2016 and beyond have been based upon supply-side assumptions, such as announced plans for increased production and (or) new capacity construction and bankable feasibility studies. The outlook tables in this summary chapter show historic production and projected production trends; no indication is made about whether the historical data are estimated or reported, and revisions are not identified. Data on individual mineral commodities in the tables within 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 (2014) producing facilities and (or) 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.

## Metals

**Aluminum and Bauxite and Alumina.**—Iran and Saudi Arabia were the only producers of bauxite in the MENA region in 2014. Iran produced 540,000 metric tons (t) of bauxite and Saudi Arabia produced 879,000 t of metallurgical bauxite for the first time in 2014. The region's bauxite output was expected to increase to 5.2 Mt by 2020 (table 5).

Iran was the sole alumina producer in the region in 2014. Production at the Jajarm refinery, which was operated by Iran Aluminum Co., increased by 3% in 2014 compared with that of 2013. The MENA region's production of alumina was expected to increase to 8.2 Mt in 2020 from 252,000 t in 2014. In 2014, Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO) was building a new alumina plant, Persian Gulf Alumina, which was expected to produce 800,000 t/yr of alumina. IMIDRO also planned to produce 70,000 t/yr of alumina from the nepheline syenite deposit at Sarab in northwestern Iran (table 6; Iranian Mines and Mining Industries Development and Renovation Organization, 2015, p. 53).

In Saudi Arabia, construction of the Ras Al Khair alumina refinery was completed by yearend 2014. The refinery was the first in the GCC region, and it had the capacity to produce 1.8 Mt of alumina (Saudi Arabian Mining Co., 2015, p. 26).

In the UAE, Emirates Global Aluminium (EGA) was expected to build a \$3 billion alumina refinery in Abu Dhabi that would have the capacity to produce 4 Mt/yr. EGA would use imported bauxite from its mines in Guinea for alumina production. The Abu Dhabi refinery was expected to be built in two phases; each phase expansion would increase production capacity by 2 Mt/yr. Production from the first phase was expected to begin in 2017 (Emirates Global Aluminium Co., 2014; Kassem, 2014).

The MENA region produced 5.6 Mt of aluminum in 2014, and its share of world production was about 11.7% in 2014 (table 4). The region's production of primary aluminum increased by about 23% in 2014 compared with that of 2013. The increase was mainly attributed to the start of the second phase of the Emal aluminum smelter in Abu Dhabi and the first full year of production at the Ras Al Khair aluminum smelter in Saudi Arabia. The UAE was the region's leading producer of aluminum and accounted for 4.9% of world production, followed by Bahrain, 1.9%; Saudi Arabia, 1.4%; and Qatar, 1.3% (table 7; fig. 2).

With the exception of Kuwait, all GCC countries were the MENA region's major producers of primary and secondary aluminum. In 2014, aluminum smelting companies in the GCC sourced their alumina from outside the region; Bahrain Aluminium BSC (Alba) imported more than 1.5 Mt/yr of alumina from Australia. Ma'aden Aluminium Co. of Saudi Arabia sourced alumina from its Bunbury Port facility in Western Australia before the startup of its refinery by Alcoa Inc. of the United States. Sohar Aluminium in Oman sourced its alumina from Rio Tinto's refineries in Australia; Rio Tinto held a 20% share in Sohar Aluminium. Qatar Aluminium Ltd. sourced alumina for its smelter at Maesaieed Industrial City from Brazil and Australia through its partner Norsk Hydro ASA of Norway. Emirates Global Aluminium of the UAE had sourced its alumina from Brazil and Australia but was constructing refineries in Guinea in West Africa and in the UAE.

Aluminum production in the MENA region was projected to increase by 30% to about 7.2 Mt/yr by 2020 from 5.6 Mt/yr in 2014 following the completion of new smelters in the region, including those that were being built in Iran, and the planned expansion of smelters in Bahrain, Oman, and the UAE (table 7; Bahrain Aluminium B.S.C., 2015; Saudi Arabian Mining Co., 2015; Sohar Aluminium Co. L.L.C., 2015).

**Copper.**—The MENA region was a minor contributor to the world's copper supply. Copper mine production was carried out by Iran, Morocco, Oman, and Saudi Arabia. Iran was the leading copper producer in the region (table 10). Copper mine production in the region was expected to increase by 20% in 2020 compared with that of 2014; most of the increase would be from new projects in Iran, which expected to expand its primary copper smelting and refining capacity during the next 5 years (table 11). New copper production projects by National Iranian Copper Industries Co. (NICICO) were expected to increase the company's copper output to 300,000 t of cathode copper by 2020. NICICO was developing additional copper mine capacity at the Chah-Firooz, the Chah-Mesi, the Daraloo, the Darreh Zar, the Ijoo, and the Nouchoon Mines in Kerman Province; the Chehel-Kureh Mine in Sistan-Baluchestan Province; the Masjed Daghi and Haft-Cheshmeh Mines in East Azerbaijan Province; the Kahang Mine in Isfahan Province; and the Taft copper complex in Yazd Province. NICICO planned to build copper refineries at the Shahre Babak copper complex, which included the Meyduk leaching plant and the Khatoonabad smelter, and at the Sungun copper complex in East Azerbaijan Province (tables 3, 10, 11; National Iranian Copper Industries Co., 2015, p. 19, 21, 23; Hastorun and others, 2016, p. 9).

In Israel, Altos Hornos de México S.A.B. de C.V. (AHMSA) planned to reopen the Timna copper mines near the city of Eliat

on the Red Sea. In 2014, the company was constructing a new solvent extraction-electrowinning plant with a capacity of 30,000 t/yr (Altos Hornos de México S.A.B. de C.V., 2014, p. 3).

In Morocco, the output of mined copper increased by 44% in 2014 to 66,480 t from 46,320 t in 2013 and copper in concentrate increased by 63% to 16,279 t in 2014 from 10,172 t in 2013. The increase was attributed to the start of production at the Oumjrane Mine and to a 22% increase in output at the Akka Mine. Managem S.A. completed the DFS for the Bouskour copper project and progressed in developing a DFS for the Tizert copper project, where mineral resources were estimated to contain 238,000 t of copper (Managem S.A., 2016, p. 26, 62, 114).

In Saudi Arabia, the Jabal Sayid project, which was a 50–50 joint venture of Ma'aden and Barrick Gold Corp. of Canada, was developing the Jabal Sayid copper mine, which is located 350 km northeast of Jeddah. The joint venture expected to begin production at the mine in 2016 at a capacity of 45,000 t/yr of copper in concentrate (Barrick Gold Corp., 2015).

**Gold.**—The MENA region was a modest contributor to the world's supply of gold. Egypt and Saudi Arabia were the major gold producers in the region in 2014. The region's gold production increased by 11% in 2014 compared with that of 2013. The region's gold output was projected to increase by 89% to about 38 t by 2020 from about 20 t in 2014 following the completion of phase 2 of the Sukari Mine in Egypt and the new mines in Iran and Saudi Arabia (table 12).

**Iron and Steel.**—Continued regional demand for steel reinforcing bar (rebar) for concrete by the construction industry for commercial projects, civil institutions, industrial buildings, and residential housing spurred most of the planned expansions of steel production capacity. In 2014, the MENA region's iron ore output increased by about 4% compared with that of 2013. Iran was the leading producer of iron ore in the region. The increase in iron ore production was attributed to a new iron ore mine at Chah Gaz, which started production in 2013. Iran planned capacity expansion projects at the iron ore mines of the Chadormalu Mining and Industrial Co., the Gol-e-Gohar Iron Ore Co., and the Sangan Iron Ore Co. The projects were expected to be completed by 2016 (table 13).

In 2014, the region produced 32.8 Mt of DRI, which accounted for 44% of global production. Iran was the region's leading producer of DRI (14.55 Mt), followed by Saudi Arabia (6.46 Mt), Egypt (2.88 Mt), and Qatar (2.64 Mt). With the exception of Iran, which used its own mined iron ore, other producers in the region imported iron ore from outside the region for use in the DRI plants (Midrex Technologies Inc., 2015, p. 3, 6, 8).

The MENA region was a minor contributor to the world's steel output (2.4% of total world production) in 2014. The region's total crude steel production increased by 11% in 2014 compared with that of 2013. Iran was the region's leading steel producer, followed by Egypt, Saudi Arabia, and Qatar (tables 4, 14).

Crude steel production was expected to double in the region between 2014 and 2020. Most of the countries in the MENA region were planning to increase existing capacities and to add new steel plants, especially in Algeria, Iran, and Oman (table 14).

In Algeria, Algerian Qatari Solb Co. (a joint venture of the Governments of Algeria and Qatar) was building a \$2 billion steel complex in the Bellara Industrial Zone, which is located in Jijel Province. The project would have the capacity to produce 2 Mt/yr of steel and would be completed by 2017 (Med Africa Times, 2015).

In Egypt, several DRI projects were underway in 2014; however, the country was experiencing a shortage of natural gas allocation, which had delayed the launch of a number of steelworks. Ezz Steel, which was the leading steel producer in North Africa, was expected to commission a 1.8-Mt/yr DRI plant and an 850,000-t/yr electric arc furnace (EAF) by yearend 2014. Beshay Steel, the second-ranked steelmaker in Egypt, was building a 1.76-Mt/yr DRI plant and a 1.3-Mt/yr EAF. Egyptian Steel was also constructing EAF-based steelworks in Beni Suef and Ain Al Sokhna that would increase the company's production by 850,000 t/yr of billet at each site (Organisation for Economic Co-operation and Development, 2015, p. 27).

Based on an ambitious development plan that goes back to 2003, Iran sought to expand its steelmaking capacity to 55 Mt/yr by 2025. Although eight new plants had been under construction by IMIDRO since 2006 and numerous other projects had been announced, many projects were put on hold because of financing constraints caused by economic sanctions. The Middle East Mines Industries Development Holding Co. was building three greenfield projects in the country—Butia Steel Co., Sirjan Iranian Steel Co., and Zarand Iron and Steel Co. (Hastorun and others, 2016, p. 11).

In Oman, Jindal Shadeed Iron and Steel was expanding its steel production capacity to 2 Mt/yr at its EAF steel plant in Sohar, including a DRI module. Sun Metals and Moon Iron & Steel (MISCO) also planned to install an EAF steel plant, which would have the capacity to produce 1.2 Mt/yr of billet by 2015 at the Sohar Industrial Estate (Watts, 2014).

In Saudi Arabia, although a shortage in natural gas allocation and electricity generation capacity had delayed the launch of a number of steelworks in the country, many EAF projects were underway in 2014 to offset steel imports. Al-Ittefaq Steel Products Co. was building a 2.5-Mt/yr iron pelletization plant at its complex in Dammam (Al-Ittefaq Steel Products Co., 2015).

**Silver, Tin, and Zinc.**—Morocco was the region's leading producer of silver in 2014, followed by Iran and Saudi Arabia (table 15). Silver output in Morocco increased following the commissioning of the Zgounder Mine by Zgounder Millennium Silver Mining in July 2014. The mine was expected to have the capacity to produce 43,540 kilograms per year (Maya Gold and Silver, 2015d). Egypt produced a small quantity of alluvial tin in 2014. Production was halted in September owing to low ore grade at the Abu Dabbab alluvial tin deposit. Kasbah Resources Ltd. of Australia was developing tin resources at the Achmmach and the Bou El Jaj deposits in Morocco. The company planned to produce 5,300 t/yr of tin by 2018 (table 16; Kasbah Resources Ltd., 2014, p. 2).

Iran was the MENA region's leading producer of zinc in 2014. Other zinc producers in the region were Morocco and Saudi Arabia (table 17). Algeria was expected to have the capacity to produce up to 220,000 t/yr of mined zinc in the near future following the development of the Tala Hamza zinc

project by Western Mediterranean Zinc Spa by 2018 (Terramin Australia Ltd., 2016).

## *Industrial Minerals*

**Barite.**—The MENA region was an important supplier of barite to the world; it was responsible for more than 18% of world barite production in 2014. Morocco was the leading producer of barite in the region; it produced more than 1 Mt and accounted for 15% of the world total. Two other countries that produced barite in the region in 2014 were Iran, which produced 537,000 t, and Algeria, which produced about 57,000 t in 2014 (table 4; McRae, 2016).

Société des Mines de Baryte d'Algérie S.p.A. (SOMIBAR) produced barite from the Amin Mimoun Mine in Khenchela Province, the Boucaid Mine in Tissemsilt Province, and the Mellal Mine in Tlemcen Province. Production from the newly established company, Société Nationale de la Baryte S.p.A. (Barytal), was expected in 2017. Barytal was expected to increase the country's capacity by 100,000 t/yr (Bariyo and O'Driscoll, 2013).

**Bromine and Potash.**—Jordan and Israel produced bromine and potash by extracting them from the waters of the Dead Sea in 2014. Combined, the two countries were responsible for 65.9% of world bromine output (excluding that of the United States) and 8.3% of world production of potash (table 4; fig. 2; Schnebele, 2016).

**Cement.**—With the exception of the West Bank and Gaza Strip, all countries and territories of the MENA region produced cement in 2014. The region's cement output was 307 Mt, or 7.2% of world output, and about 17.1% of world output (excluding China). Iran was the region's leading producer of cement (66 Mt), followed by Saudi Arabia (57 Mt), Egypt (49 Mt), the UAE (28 Mt), and Algeria (21 Mt). Natural gas shortages and subsequent Government-reduced natural gas allocations to cement plants negatively affected cement production in both Egypt and Iran in 2014. Some cement companies in Egypt had to go back to using coal as a source of energy after switching to natural gas in recent years (table 4; fig. 2; van Oss, 2016).

Cement production in the region was carried out mainly by domestic private and public companies, but international cement companies, such as Italcementi Group of Italy and Lafarge Group of France, operated cement plants in countries across the MENA region. Italcementi owned shares in cement plants in Egypt, Morocco, and Syria. Lafarge operated three plants each in Iraq and Morocco, two in Algeria, and one each in Egypt, Jordan, Syria, and the UAE (Lafarge S.A., 2015, p. 40; Italcementi Group, 2016, p. 6–7).

**Gypsum.**—Most of the countries in the region produced gypsum in 2014. The region produced about 29 Mt of gypsum and accounted for about 11% of the world's total production in 2014. Iran, which was the leading producer in the region, accounted for 51% of the region's output, followed by Oman, about 12%; Egypt, about 8%; and Algeria, 7% (table 4; fig. 2).

**Nitrogen.**—In 2014, the MENA region produced 16 Mt of ammonia (N content), which was 12.4% of world production. The entire output of ammonia in the region was manufactured

from natural gas feedstock using the Haber-Bosch process. Saudi Arabia was the leading producer of ammonia in the region, followed by Qatar, Iran, and Egypt. Government-owned petroleum companies owned majority stakes in ammonia and urea plants in the region with the exception of Egypt and Oman, in which ownership of nitrogen fertilizer plants was a mix of private and public companies; all fertilizer companies however, were dependent on the Government for natural gas allocations and pricing (table 4; fig. 2).

Suhail Bahwan Group of Oman operated one plant in Oman and was building a second plant in Algeria. Oman Fertilizer Co. (Sharika El Djazairia El Omania lil Asmida S.p.A.), which was a 50–50 joint venture with state-owned Sonatrach S.p.A. of Algeria, completed the construction of a nitrogen fertilizer plant at the Arzew Industrial Zone near Oran in northwestern Algeria. The plant had the capacity to produce 1.5 Mt/yr of ammonia and 2.6 Mt/yr of urea. The Suhail Bahwan Group also owned Sohar International Urea & Chemical Industries S.A.O.G.'s (SIUCI's) nitrogen fertilizer plant at Sohar in Oman. The plant had the capacity to produce 730,000 t/yr of ammonia and 1.3 Mt/yr of urea (Suhail Bahwan Group Holding L.L.C., 2015).

OCI N.A. of the Netherlands owned the majority interest in two nitrogen fertilizer companies in Egypt and one in Algeria. The Egyptian Basic Industries Corp. (EBIC) plant (in which OCI had a 60% interest) at Ain Al-Sokhna had the capacity to produce 730,000 t/yr of anhydrous ammonia. The Egyptian Fertilizers Co. (EFC) plant (in which OCI had a 100% interest) completed a debottlenecking project that increased the production capacity to 1.55 Mt/yr of urea from 1.3 Mt/yr. Sorfert Algeria Spa (in which OCI had a 51% interest) had its first full year of production in 2014; it produced 1.0 Mt of ammonia and about 1.3 Mt of urea at its fertilizer complex in the Arzew Industrial Zone that included two plants—a 1-Mt/yr-capacity anhydrous ammonia plant and a 1.4-Mt/yr-capacity granulated urea plant. Sorfert was expected to supply 1.1 Mt/yr of urea to the domestic market and 700,000 t/yr of ammonia for export, mainly to Western Europe (Arab Fertilizer Association, 2015, p. 35, 40; OCI N.V., 2015).

In 2014, several ammonium and urea plants were being constructed in the region. The Government of Algeria and Fertiberia S.A. planned to reactivate the construction of the El Bahia fertilizer plant at Arzew that had been proposed in 2007. The \$1.5 billion plant was expected to produce 1.1 Mt/yr of ammonia for export and would require 3 to 4 years to complete. In Oman, Takamul Investment awarded the front-end engineering and design of its new ammonia plant at Salalah in southern Oman to Linde Group of Germany. The project was expected to have the capacity to produce 365,000 t/yr of ammonia using feedstock from the adjacent Salalah methanol plant. The project was expected to be completed by 2017. In Saudi Arabia, the Saudi Arabian Fertilizer Co. (Safco) continued the construction of its urea plant, which is located 100 km north of Dammam in eastern Saudi Arabia. The plant (Safco-5) would have the capacity to produce 1.2 Mt/yr of urea when completed in 2015 (ICIS News, 2014; Watts, 2014; Saudi Arabian Fertilizer Co., 2015, p. 10–12).

**Phosphate Rock.**—The MENA region accounted for about 60% of the world's phosphate rock trade and about 22% of the

world's phosphate rock production in 2014. Morocco, which accounted for 11% of world phosphate rock output, was the region's leading producer, followed by Jordan, Egypt, Tunisia, Saudi Arabia, Israel, Algeria, Syria, and Iran (table 4; fig. 2). Morocco held more than 50 billion metric tons of phosphate rock reserves, which was about 75% of global phosphate reserves, including deposits in the disputed Western Sahara region. In 2014, OCP Group had the capacity to produce 32.2 Mt/yr of phosphate rock, 7.5 Mt/yr (in terms of  $P_2O_5$ ) of phosphate-based fertilizers, and 5.2 Mt/yr of phosphoric acid. The company's share of the phosphate rock trade market was 50% for phosphoric acid, 40% for phosphate rock, and 21% for phosphate-based fertilizers. OCP planned to increase its production of phosphate rock to 50 Mt/yr by 2020 (OCP Group, 2015, p. 10, 52, 55, 58, 41, 81).

Saudi Arabia, which produced 3.4 Mt of phosphate rock for the first time in 2014, was expected to become the region's second-ranked producer (after Morocco), with the capacity to produce 11.6 Mt/yr of phosphate rock following the completion of the Al Jalamid phosphate mine, the Ras Al Khair fertilizer plant, and the Wa'ad Al Shamal project. Ma'aden's 3-Mt/yr-capacity diammonium phosphate fertilizer complex at Ras Al Khair began commercial production in 2012. The Wa'ad Al Shamal project was expected to have the capacity to produce 1.5 Mt/yr of phosphate rock, 3 Mt/yr of phosphate fertilizers, and 440,000 t/yr of other downstream products. The project was expected to be completed in early 2017 and to include plants for ammonia, DAP granulation, phosphoric acid, and sulfuric acid (Saudi Arabian Mining Co., 2015, p. 75–77).

### *Mineral Fuels*

In 2014, the MENA region was a significant partner in the world's crude oil and natural gas trade; it was responsible for about 45.5% of the world's crude oil exports, 41.2% of the world's liquefied natural gas exports, and 4.1% of the world's natural gas pipeline exports. The region also held 9.3% of the world's petroleum refinery capacity and accounted for 12.9% of the world's refined petroleum product exports. Iran was the leading producer of salable coal in the region (table 18; BP p.l.c., 2015, p. 16, 19, 29).

**Natural Gas.**—In 2014, the MENA region held about 47% of the world's proved natural gas reserves. Iran was the region's leading country in terms of the volume of its natural gas reserves, which accounted for 18.2% of the world's total, followed by Qatar, 13.1%; Saudi Arabia, 4.4%; the UAE, 3.3%; Algeria, 2.4%; Iraq, 1.9%; Egypt, 1.0%; and Libya 0.8%. In 2014, the region produced 725.2 billion cubic meters of natural gas and accounted for 21.5% of the world total. Qatar was the leading producer in the region and accounted for 5.1% of world production, followed by Iran (5.0%), Saudi Arabia (3.1%), and Algeria (2.4%). Natural gas production increased in 2014 compared with that of 2013 in most of the countries in the region, with the exception of Egypt, Syria, Yemen, and Oman, whose output decreased by 13.1%, 7.9%, 6.3%, and 4.9%, respectively (BP p.l.c., 2015, p. 20, 22).

**Petroleum.**—In 2014, the MENA region's share of the world's crude oil output was 32.6%. Saudi Arabia was the



world's leading crude-oil-producing country, in terms of the volume of production, with output of 3.5 billion barrels (Gbbbl), or 12.9% of world production. Other notable crude-oil-producing countries in the region (based on production volume) included Algeria, Iran, Iraq, Kuwait, Qatar. The region's proven crude oil reserves were estimated to be 808.5 Gbbbl, or 47.9% of the world's total crude oil reserves. Saudi Arabia held 15.7% of the world's proven crude oil reserves; Iran, 9.3%; Iraq, 8.8%; Kuwait, 6.0%; the UAE, 5.8%; Libya, 2.8%; Qatar, 1.5%; and Algeria, 0.7% (table 4; BP p.l.c., 2015, p. 6, 8, 20, 22).

The MENA region was responsible for 10.1% of the world's total output of refinery products in 2014. The region's total output of refined petroleum products was about 3.3 Gbbbl. With the exception of Lebanon and the West Bank and Gaza Strip, all countries and territories in the region carried out petroleum refining activities (table 4).

## Outlook

Several countries in the MENA region were focused on developing their mining sectors in the midst of economic and political challenges that engulfed the region in 2014. The Governments of Algeria, Egypt, Morocco, and Oman, in particular, overhauled their mining laws to attract domestic and international investors. The region's production of aluminum, copper, gold, iron and steel, tin, and zinc were expected to increase during the next 5 years. Production of such industrial mineral commodities as barite, bromine, gypsum, nitrogen, phosphate rock, and potash was expected to increase in the region along with their associated manufactured products.

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TABLE 1  
MIDDLE EAST AND NORTH AFRICA: AREA AND POPULATION IN 2014

Country/Territory	Area <sup>1</sup> (square kilometers)	Estimated population <sup>2</sup> (millions)
Algeria	2,381,741	38,934
Bahrain	760	1,362
Egypt	1,001,450	89,580
Iran	1,648,195	78,144
Iraq	438,317	34,812
Israel	20,770	8,216
Jordan	89,342	6,607
Kuwait	17,818	3,753
Lebanon	10,400	4,547
Libya	1,759,540	6,259
Morocco	446,550	33,921
Oman	309,500	4,236
Qatar	11,586	2,172
Saudi Arabia	2,149,690	30,887
Syria	185,180	22,158
Tunisia	163,610	10,997
United Arab Emirates	83,600	9,086
West Bank and Gaza Strip	6,220	4,295
Western Sahara	266,000	571 <sup>1</sup>
Yemen	527,968	26,184
Total	11,518,237	416,721
World total	510,072,000	7,259,692

<sup>1</sup>Source: U.S. Central Intelligence Agency, The World Factbook.

<sup>2</sup>Source: The World Bank, 2016 World Development Indicators Database.

TABLE 2  
MIDDLE EAST AND NORTH AFRICA: GROSS DOMESTIC PRODUCT<sup>1,2</sup>

Country/Territory	Gross domestic product in 2014 based on purchasing power parity		Real gross domestic product growth rate (percentage)		
	Gross value	Per capita	2012	2013	2014
	(million dollars)	(dollars)			
Algeria	552,272	14,120	3.3	2.8	3.8
Bahrain	62,195	49,043	3.6	5.4	4.5
Egypt	995,752	11,485	2.2	2.1	2.2
Iran	1,357,028	17,294	-6.6	-1.9	4.3
Iraq	526,090	15,348	13.9	6.6	-2.1
Israel	272,112	33,136	2.9	3.3	2.6
Jordan	79,907	11,970	2.7	2.8	3.1
Kuwait	282,971	70,769	7.7	1.0	0.0
Lebanon	81,419	18,052	2.8	2.5	2.0
Libya	97,938	15,648	104.5	-13.6	-24.0
Morocco	259,240	7,813	3.0	4.7	2.4
Oman	162,967	43,847	5.8	4.7	2.9
Qatar	306,616	137,162	4.9	4.6	4.0
Saudi Arabia	1,612,287	52,397	5.4	2.7	3.6
Syria	35,164 <sup>3</sup>	1,606 <sup>3</sup>	-30.9 <sup>4</sup>	-36.5 <sup>4</sup>	-30.9 <sup>4</sup>
Tunisia	124,711	11,340	3.9	2.4	2.3
United Arab Emirates	617,138	66,347	7.2	4.3	4.6
West Bank and Gaza Strip <sup>5</sup>	12,716	2,960	6.3	2.2	0.0
Western Sahara	906.5 <sup>6</sup>	2,500 <sup>6</sup>	NA	NA	NA
Yemen	104,008	3,788	2.4	4.8	-0.2
Total	6,991,166	16,777 <sup>7</sup>	2.1 <sup>8</sup>	0.1 <sup>8</sup>	0.3 <sup>8</sup>
World total	109,142,513	15,034 <sup>7</sup>	3.5	3.3	3.4

NA Not available.

<sup>1</sup>Source: International Monetary Fund, World Economic Outlook Database, April 2016.

<sup>2</sup>Gross domestic product listed may differ from that reported in individual country chapters owing to differences in the source or date of reporting.

<sup>3</sup>Source: United Nations data 2013.

<sup>4</sup>Source: U.S. Central Intelligence Agency, The World Factbook.

<sup>5</sup>Source: Palestinian Central Bureau of Statistics.

<sup>6</sup>Source: U.S. Central Intelligence Agency, The World Factbook 2007 estimate.

<sup>7</sup>Equals gross domestic product ÷ population.

<sup>8</sup>Annual change in regional gross domestic product.

TABLE 3  
MIDDLE EAST AND NORTH AFRICA: SELECTED EXPLORATION ACTIVITY IN 2014

Country	Type <sup>1</sup>	Prospect	Commodity <sup>2</sup>	Companies	Resource notes <sup>2,3</sup>	Exploration notes
Algeria	F	Oued Amizour/Tala Hamza	Zn, Pb	Terramin Australia Ltd.	1.8 Mt Zn, 518,000 t Pb (R)	Completed feasibility study of Tala Hamza.
Egypt	E	Abu Marawat/Hamama	Au, Ag, Cu, Zn	Alexander Nubia Int'l. Inc.	162,000 oz Au, 2.7 Moz Ag, 22,000 t Cu, 33 Mt Zn (IF)	Ongoing exploration.
Do.	P	Sukari	Au	Centamin plc.	8.8 Moz Au (R)	Ongoing drilling to expand resources.
Iran	D	Chah Firoozeh	Cu	National Iranian Copper Corp.	611,000 t Cu (R)	Development postponed.
Do.	D	Chehel Kooreh	Cu	do.	71,000 t Cu (R)	Development ongoing.
Do.	D	Daraloo	Cu	do.	670,000 t Cu (R)	Development ongoing.
Do.	F	Haft Cheshmeh	Cu	do.	478,000 t Cu (R)	Development postponed.
Do.	F	Kahang	Cu	do.	229,000 t Cu (R)	Development postponed.
Do.	D	Masjed Daqhi	Cu	do.	694,000 t Cu (R)	Development postponed.
Do.	F	Mehdiabad	Zn, Pb, Ag	KDD Group	15 Mt Zn, 5.8 Mt Pb, 410 Moz Ag (D)	On hold awaiting financing.
Do.	P	Meydounk (Shahre Babak)	Cu	National Iranian Copper Corp.	1.1 Mt Cu (R)	Expansion postponed.
Do.	D	Nochoon	Cu	do.	1.4 Mt Cu (R)	Development ongoing.
Do.	P	Sarcheshmeh	Cu, Au, Ag, Mo	do.	8.9 Mt Cu, 10 Moz Au, 150 Moz Ag, 360,000 t Mo (R)	Ongoing drilling.
Do.	P	SungunCopper Complex	Cu	do.	5.1 Mt Cu (R)	Planned expansion postponed.
Do.	D	Taft Copper Complex	Cu	do.	717,000 t Cu (R)	Construction started.
Israel	D	Arava (Timna)	Cu	Altos Hornos de Mexico SA	Data not released	Development postponed.
Morocco	F	Achmmach	Sn	Kasbah Resources Corp.	65,000 t Sn (R)	Completed feasibility study.
Do.	P	Zgounder	Ag	Maya Gold & Silver Inc.	5.8 Moz Ag (R)	Commenced production.
Oman	E	Block 5	Cu, Zn, Au, Ag	Savannah Resources plc.	25,600 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.	7,000 t Cu, 3,800 oz Au (D)	Completed scoping study.
Do.	E	Washih	Cu, Au	do.	62,000 t Cu, 37,000 oz Au (D)	Completed scoping study.
Saudi Arabia	D	Ad Duwayhi	Au	Saudi Arabian Mining Co.	1.76 Moz Au (R)	Ongoing construction.
Do.	P	Al Ba'itha	Bauxite	Ma'aden Saudi Arabian Mining Co.	106 Mt bauxite ore (R)	Ongoing production.
Do.	E	Atlantis II Deeps	Zn, Cu, Ag, Mn	Diamond Fields Int'l. Ltd.	1.6 Moz Zn, 368,000 t Cu, 107 Moz Ag, 2.2 Mt Mn (IF)	Ongoing exploration.
Do.	D	Jabal Sayid	Cu, Zn	Saudi Arabian Mining Co.	734,000 t Cu (R)	Ongoing exploration and development.
Do.	E	Jibal Qutman	Au	KEFI Minerals plc.	633,000 oz Au (IF)	Ongoing exploration.
Do.	F	Khnaiguyah	Zn, Cu	Alara Resources Ltd.	862,000 t Zn, 62,000 t Cu (R)	Ongoing prefeasibility study.
Do.	D	Umm Wual (Northern Promise)	P <sub>2</sub> O <sub>5</sub>	Ma'aden Saudi Arabian Mining Co.	104 Mt P <sub>2</sub> O <sub>5</sub> (R)	Ongoing exploration.
Tunisia	E	Oued El Maden	Pb, Zn	Celamin Holdings NL	20 Mt Pb, 680,000 t Zn (IF)	Ongoing exploration.
Yemen	D	Jabali	Zn, Pb, Ag	Ansan Wikfs Ltd.	800,000 t Zn, 104,000 t Pb, 19 Moz Ag (R)	Ongoing drilling.
Do., do.	Ditto.					

<sup>1</sup>D—Approved for development; E—Active exploration; F—Feasibility work ongoing/completed; P—Exploration associated with producing site.

<sup>2</sup>Abbreviations used for commodities in this table include the following: Ag—silver; Au—gold; Cu—copper; Mn—manganese; Mo—molybdenum; P<sub>2</sub>O<sub>5</sub>—phosphate; Pb—lead; Sn—tin; 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.

<sup>3</sup>Based on 2014 data reported from various sources; D—demonstrated (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 AND NORTH AFRICA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2014<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Country	Metals				Industrial minerals				Mineral fuels and related materials		
	Aluminum, metal, primary	Chromite, mine output, gross weight	Steel, crude	Ammonia, N content	Cement, hydraulic	Gypsum	Phosphate rock, gross weight	Potash, K <sub>2</sub> O equivalent	Petroleum		Refinery products (thousand 42-gallon barrels)
									Crude, (thousand 42-gallon barrels)	556,625	
Algeria	--	--	415	1,130	21,000	2,130	1,418	--	556,625	312,000	--
Bahrain	931	--	--	372	1,500 <sup>e</sup>	--	--	--	73,882 <sup>2</sup>	100,233	--
Egypt	300	--	6,485	2,200	49,000	2,200	5,400	--	261,705	210,317	--
Iran	354	474	16,331	2,500 <sup>e</sup>	66,400 <sup>e</sup>	16,000 <sup>e</sup>	385 <sup>e</sup>	--	1,137,742	647,729	--
Iraq	--	--	1,015	105	16,000 <sup>e</sup>	1,400 <sup>e</sup>	200 <sup>e</sup>	--	1,199,025	175,309	--
Israel	--	--	500 <sup>e</sup>	--	6,603	82 <sup>e</sup>	3,357 <sup>3</sup>	2,213	440	106,000 <sup>e</sup>	--
Jordan	--	--	150	--	4,450	900	7,144	1,255	8,000	22,405	--
Kuwait	--	--	1,500 <sup>e</sup>	540	6,400	--	--	--	1,139,900	335,178	--
Lebanon	--	--	--	--	5,517	--	--	--	--	--	--
Libya	--	--	968	108	2,000 <sup>e</sup>	80 <sup>e</sup>	--	--	181,770	47,047	--
Morocco and Western Sahara	--	--	500	--	15,710	--	27,390	--	1,847	48,000	--
Oman	364	751	160 <sup>e</sup>	1,700 <sup>e</sup>	5,500 <sup>e</sup>	3,387	--	--	344,400	63,250	--
Qatar	640	--	3,474	2,952	6,100	200 <sup>e</sup>	--	--	723,430	168,794	--
Saudi Arabia	665	--	6,291	3,400 <sup>e</sup>	57,223	1,780	3,425	--	3,545,000	803,830	--
Syria	--	--	10 <sup>e</sup>	50 <sup>e</sup>	3,800	181	1,234	--	12,045	NA	--
Tunisia	--	--	101	--	9,127	850	3,784	--	19,345	12,720	--
United Arab Emirates	2,341	--	2,400	988	28,000 <sup>e</sup>	700 <sup>e</sup>	--	--	1,354,880	146,803	--
Yemen	--	--	--	--	2,500 <sup>e</sup>	100 <sup>e</sup>	--	--	52,925	31,080	--
Total	5,600	1,225	40,300	16,000	307,000	30,000	54,000	3,468	10,600,000	3,230,000	--
Share of world total	11.7%	4.2%	2.3%	12.4%	7.2%	11.3%	22.1%	8.3%	32.5%	10.0%	--
United States	1,710	--	88,200	9,300 <sup>4</sup>	77,400	11,000	25,300	850	3,160,000	4,350,000	--
Share of world total	3.6%	--	5.0%	7.2%	1.8%	4.2%	10.4%	2.0%	9.7%	13.4%	--
World total	47,800	29,000	1,750,000	129,000	4,270,000	265,000	244,000	42,000	32,600,000	32,400,000 <sup>5</sup>	--

<sup>e</sup>Estimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits. NA Not available. -- Zero.

<sup>1</sup>Totals may not add owing to independent rounding. Percentages are calculated on unrounded data. Includes data available as of September 28, 2016.

<sup>2</sup>Includes the country's share of production from the Abu Saafa field.

<sup>3</sup>Beneficiated.

<sup>4</sup>Synthetic anhydrous ammonia; excludes coke oven byproduct ammonia.

<sup>5</sup>Total includes 32,341,039 thousand 42-gallon barrels and 7,463,152 metric tons of production.

TABLE 5  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED BAUXITE MINE PRODUCTION, 2005–2020<sup>1</sup>

(Metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	437,600	687,000	892,000	788,600	540,000	800,000	1,000,000	1,200,000
Saudi Arabia <sup>2</sup>	--	--	--	--	879,000	4,000,000	4,000,000	4,000,000
Total	438,000	687,000	892,000	789,000	1,419,000	4,800,000	5,000,000	5,200,000

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Does not include production of low-grade bauxite for cement, which began in 2008.

TABLE 6  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED ALUMINA PRODUCTION, 2005–2020<sup>1</sup>

(Metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	200,000	236,000	227,000	245,000	252,000	450,000	2,400,000	2,400,000
Saudi Arabia	--	--	--	--	--	1,800,000	1,800,000	1,800,000
United Arab Emirates	--	--	--	--	--	--	2,000,000	4,000,000
Total	200,000	236,000	227,000	245,000	252,000	2,250,000	6,200,000	8,200,000

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 7  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED PRIMARY ALUMINUM METAL PRODUCTION, 2005–2020<sup>1</sup>

(Metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Bahrain <sup>2</sup>	750,700	850,700	890,000	913,000	931,000	931,000	931,000	1,450,000
Egypt <sup>2</sup>	245,000	319,000	336,500	307,000	300,000	350,000	400,000	400,000
Iran	220,000	303,000	336,500	295,000	354,000	487,000	770,000	1,000,000
Oman	--	367,000	360,000	354,000	364,000	375,000	375,000	400,000
Qatar	--	126,000	628,000	634,000	640,000	630,000	630,000	630,000
Saudi Arabia	--	--	--	187,000	665,000	760,000	760,000	760,000
United Arab Emirates	722,000	1,400,000	1,820,000	1,864,000	2,341,000	2,400,000	2,400,000	2,600,000
Total	1,940,000	3,370,000	4,370,000	4,550,000	5,600,000	5,930,000	6,270,000	7,240,000

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>May include some secondary aluminum produced from used beverage cans.

TABLE 8  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED CHROMITE MINE PRODUCTION, 2005–2020<sup>1</sup>

(Chromium content in metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	110,000	169,000	192,210	191,100	158,000	200,000	200,000	200,000
Oman	18,000	303,000	211,000	276,000	263,000	300,000	300,000	300,000
Total	128,000	472,000	403,000	467,000	421,000	500,000	500,000	500,000

<sup>c</sup>Estimated.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 9  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED COBALT MINE PRODUCTION, 2005–2020<sup>1</sup>

(Cobalt content in metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Morocco	1,100	1,582	1,314	1,353	1,391	1,500	1,500	1,500

<sup>c</sup>Estimated.

<sup>1</sup>Estimated data are rounded to no more than three significant digits.

TABLE 10  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 2005–2020<sup>1</sup>

(Copper content of concentrate in metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	190,000	256,700	238,000	222,900	216,800	260,000	420,000	420,000
Israel	--	--	--	--	--	8,000	24,000	24,000
Morocco	3,800	2,900	17,700	10,200	16,600	40,000	40,000	40,000
Oman	2,000	2,000	2,000	1,000	1,000	2,000	2,000	2,000
Saudi Arabia	700	1,600	6,000	10,000	11,000	20,000	20,000	20,000
Total	197,000	263,000	264,000	244,000	245,000	330,000	506,000	506,000

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 11  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED REFINED COPPER METAL PRODUCTION, 2005–2020<sup>1</sup>

(Metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Egypt <sup>2</sup>	14,000	3,000	126,000	3,000	3,000	4,000	4,000	4,000
Iran	178,000	221,000	213,000	189,000	194,000	300,000	350,000	420,000
Israel	--	--	--	--	--	8,000	24,000	24,000
Oman	24,543	15,000	16,000	16,000	15,000	32,000	32,000	32,000
Total	219,000	239,000	355,000	208,000	212,000	344,000	410,000	480,000

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>May include secondary production.

TABLE 12  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 2005–2020<sup>1</sup>

(Gold content in kilograms)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Algeria	637	723	264	140	85	200	200	200
Egypt	--	9,847	8,148	11,101	11,733	15,000	15,000	15,000
Iran	200	2,000	2,800	2,500	3,300	5,000	6,000	7,000
Morocco	1,786	650	519	463	337	--	--	--
Oman	384	82	19	20	20	--	--	--
Saudi Arabia	7,456	4,477	5,215	4,655	4,790	7,000	15,600	15,600
Total	10,500	17,800	17,000	18,900	23,300	27,200	36,800	37,800

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.



TABLE 13  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED IRON ORE PRODUCTION, 2005–2020<sup>1</sup>

(Iron content in thousand metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Algeria	800	771	946	565	483	800	1,600	1,600
Egypt	880	700	1,500	1,500	2,216	2,000	2,000	2,000
Iran	9,162	15,200	19,500	23,600	23,700	25,000	28,000	30,000
Morocco	4	24	141	163	13	100	100	100
Tunisia	108	94	117	127	160	200	200	200
Total	10,800	16,700	22,000	25,700	26,400	27,800	31,600	33,600

<sup>c</sup>Estimated.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 14  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 2005–2020<sup>1</sup>

(Thousand metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Algeria	1,007	662	557	440	415	1,000	3,000	4,000
Bahrain	--	950	950	970	970	1,000	10,000	10,000
Egypt	5,565	6,700	6,627	6,754	6,627	12,000	12,000	12,000
Iran	9,400	11,995	14,463	15,422	16,331	20,000	22,000	25,000
Iraq	--	--	--	--	1,015	2,000	2,000	2,000
Israel	480	430	500	500	500	620	850	850
Jordan	150	160	160	160	160	390	390	390
Kuwait	450	500	1,300	1,500	1,300	1,300	1,300	1,300
Libya	1,255	825	315	715	968	1,000	2,000	2,000
Morocco	205	485	539	558	539	600	600	600
Oman	84	84	160	160	1,500	4,000	6,000	6,000
Qatar	1,057	1,705	2,100	2,236	3,474	4,000	4,000	4,000
Saudi Arabia	4,185	5,000	5,200	5,471	6,291	10,200	10,200	10,200
Syria	70	70	10	10	10	100	100	100
Tunisia	66	115	109	109	101	200	200	200
United Arab Emirates	90	1,180	2,408	2,878	2,408	5,500	5,500	5,500
Total	24,100	30,900	35,400	37,900	42,600	63,900	80,100	84,100

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 15  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED SILVER MINE PRODUCTION, 2005–2020<sup>1</sup>

(Silver content in kilograms)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Algeria	110	147	42	27	16	20	20	20
Iran	1,000	106,000	96,000	85,000	80,000	100,000	120,000	120,000
Morocco	185,700	243,000	173,400	254,000	276,000	295,000	320,000	320,000
Oman	122	10	--	--	--	--	--	--
Saudi Arabia	13,500	7,670	5,212	4,655	4,888	7,000	7,000	7,000
Total	200,000	357,000	275,000	344,000	361,000	402,000	447,000	447,000

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 16  
MIDDLE EAST AND AFRICA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 2005–2020<sup>1</sup>

(Tin content in metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Egypt	--	--	100	111	100	--	--	--
Morocco	--	--	--	--	--	5,300	5,300	5,300

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data are rounded to no more than three significant digits.

TABLE 17  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED ZINC MINE PRODUCTION, 2005–2020<sup>1</sup>

(Zinc content in metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Algeria	--	--	--	--	--	--	100,000	220,000
Iran	1,000	120,000	132,000	120,000	142,000	150,000	180,000	200,000
Morocco	77,320	43,680	45,800	47,600	45,000	50,000	50,000	50,000
Saudi Arabia	--	4,900	21,200	39,800	41,800	80,000	80,000	80,000
Total	78,300	169,000	199,000	207,000	229,000	280,000	410,000	550,000

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 18  
MIDDLE EAST AND NORTH AFRICA: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 2005–2020<sup>1,2</sup>

(Thousand metric tons)

Country	2005	2010	2012	2013	2014	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	1,900	2,324	2,820	2,800	2,700	4,000	4,600	6,000

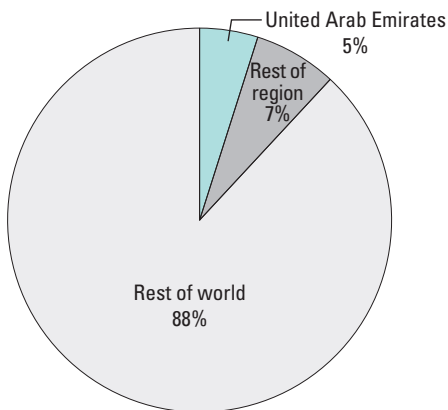
<sup>c</sup>Estimated.

<sup>1</sup>Estimated data are rounded to no more than three significant digits; may not add to totals shown.

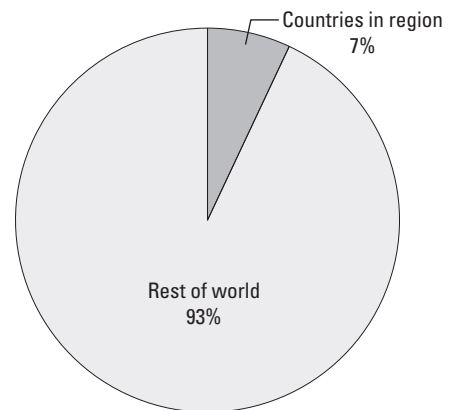
<sup>2</sup>Includes anthracite, bituminous, and lignite.

## Middle East and North Africa region

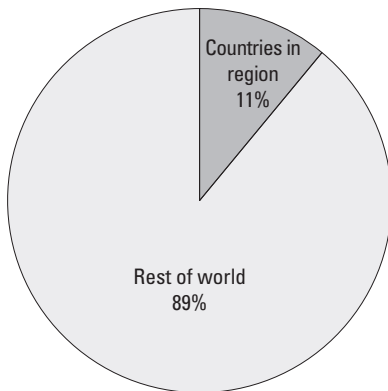
### Aluminum, primary



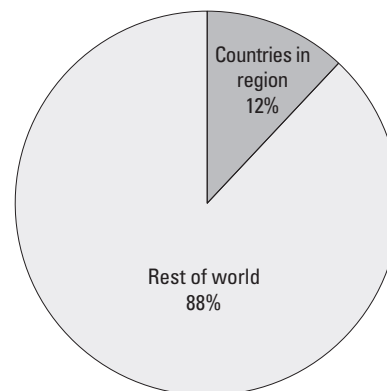
### Cement, hydraulic



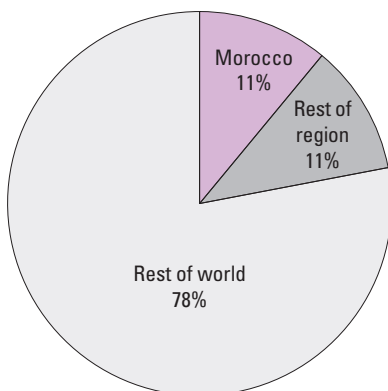
### Gypsum (mine output, gross weight)



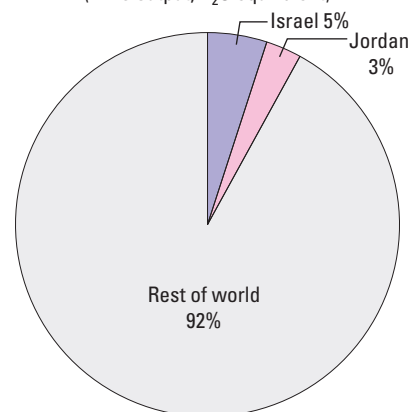
### Nitrogen (fixed)—Ammonia (N content)



### Phosphate rock (mine output, gross weight)



### Potash (mine output, K<sub>2</sub>O equivalent)



**Figure 2.** Pie charts showing percentage of world production of selected mineral commodities by countries of the Middle East and North Africa region in 2014. Individual countries of the region are labeled if they accounted for at least 3% of world production. Data are from table 4. Percentages are rounded and may not add to 100%. Also, percentages may differ from those reported in individual country chapters owing to differences in source or date of reporting.