



# 2013 Minerals Yearbook

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## THE MIDDLE EAST

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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, the United Arab Emirates (UAE), the West Bank and Gaza Strip, and Yemen.<sup>2</sup> The region covers an area of about 5.7 million square kilometers or about 1.1% of the world's total surface area. In 2013, the region was home to about 230 million people, or 3.2% 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). Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the UAE were members of the Organization of the Petroleum Exporting Countries (OPEC), and Bahrain, Iraq, Kuwait, Qatar, Saudi Arabia, Syria, and the UAE were members of the Organization of Arab Petroleum Exporting Countries. Israel was a member of the Organisation for Economic Co-operation and Development.

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For mineral production statistics—

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- 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; 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 2013, the gross domestic product (GDP) of the Middle East region based on purchasing power parity was about \$5.2 trillion, which accounted for 5.1% of the world's GDP. The rate of increase in GDP of the Middle East region was 0.9% in 2013 compared with a rate decrease of 1.1% in 2012. The growth rates for individual countries in the Middle East varied considerably. In 2013, the GDP growth rates were highest in Bahrain, Qatar, and Yemen, and lowest in Iran, Kuwait, and Syria. Syria's GDP decreased by 6.8% compared with a decrease of 28.9% in 2012 and 3.7% in 2011. Iran's GDP contracted by 1.9% compared with a 6.6% contraction in 2012 and a 4.0% expansion in 2011. Kuwait's GDP decreased by 0.4% in 2013 compared with an increase of 8.3% in 2012 and 10.2% in 2011. Qatar was the country with the fastest economic growth rate in the Middle East region between 2011 and 2013 (table 2).

The hydrocarbon industry continued to be the main driver of growth in the economies of the countries in the region, directly through the wealth it created in net petroleum exporting countries and indirectly through the infrastructure projects being built in the GCC countries and in Iran in particular, as well as through the remittances of expatriates working in the GCC net-petroleum-importing countries, such as Jordan, Lebanon, Syria, and Yemen. Production of metals and industrial minerals was an important component of the economy of Iran; metal smelting also was an important part of the nonfuel economies of Bahrain, 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-producing nations in the region were sustained by the high international market prices for crude oil during 2013.

The region's abundant supply of crude oil and natural gas and its geographic location, with easy access to ocean transportation, continued to give it 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 2013, the Middle East was an important region for crude steel trade. Saudi Arabia, whose net imports of crude steel were 6.4 million metric tons (Mt), was the world's 5th-ranked net importer of crude steel; the UAE, whose net imports were 5.3 Mt, was the world's 6th-ranked net importer; Iraq, whose net imports of were 4.5 Mt, was the world's 9th-ranked net importer; and Iran, whose net imports were 2.7 Mt, was the world's 15th-ranked net importer. The region is expected to remain a net importer of crude steel for the next 5 years (World Steel Association, 2014, p. 25).

<sup>1</sup>Deceased.

<sup>2</sup>Turkey, which was included in the Middle East region in previous years of the Minerals Yearbook, is included in the Europe and Central Eurasia region in 2013.

In 2013, the Middle East 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 (BP p.l.c., 2014, p. 16, 19, 29).

## Legislation

In 2013, Iran and Syria remained subject to numerous sanctions by the European Union (EU) and the United States. The United States extended Executive Orders 13574 and 13590, which authorized the implementation of additional sanctions against Iran because of suspicion about the 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 took effect in July 2013. Mineral sector activities affected by the subsection of NDAA–2013 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 molybdenum and other mineral products, to ensure a domestic supply of the products. The ban appeared to have increased the local supply of banned products but had a limited effect on the global supply of those 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 2013. 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, 13572, 13573, and 13582 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 EU Council extended its sanctions against Syria until June 2015; these sanctions included 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, 2014).

As of yearend 2013, 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, 2015).

Lebanon's first hydrocarbon law, Offshore Petroleum Resources Law (law 132 of August 24, 2010), was approved by the Cabinet on August 17, 2011. The law implemented a production-sharing and royalty scheme applied through an exploration and production agreement between the Government and prequalified companies. In 2012, the Government created the Lebanese Petroleum Administration under the Ministry of Energy and Water to manage petroleum-related activities in the waters of the Exclusive Economic Zone and in Lebanon's territorial waters (Lebanese Petroleum Administration, 2015).

In Oman, the Government stopped accepting new applications for mining licenses in 2013 while it was conducting a comprehensive review of the country's mining industry. The Government intended to enact and give priority to mining projects that include a value-added component to any mineral commodity produced in the country. The Ministry of Commerce and Mining, which is responsible for regulating quarrying and mining activities in Oman, closed several sites that were designated for construction aggregate, chromite, and marble mining and crushing because of their alleged violations of the terms of their mining licenses, such as illegal quarrying and (or) mining for industrial minerals that were not covered by the quarrying or mining license. An advisory committee, which included representatives from nine Government agencies, was formed to investigate mining issues in the country. The committee decided that mining and quarrying licenses were to be issued only to companies jointly owned by 35 or more Omani citizens. The committee also decided that mining companies should invest 5% of their profits in welfare projects in the local communities. The Government was expected to issue a new mining law in 2015 (Khan, 2012; Gulf News, 2013; Central Bank of Oman, 2014, p. 47).

## Exploration

Local and international exploration companies explored for minerals in most of the countries of the region. In 2013, nonfuel mineral exploration in the region was carried out mainly in

Iran, Oman, and Saudi Arabia. Metal exploration in the region focused on copper, gold, lead, uranium, and zinc (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 Iran, Iraq, Israel, Kuwait, and Saudi Arabia. Five crude oil discoveries were reported in Iraq, four in Kuwait, and one each in Oman and Yemen. One natural gas discovery was reported in Qatar (Organization of Arab Petroleum Exporting Countries, 2014, p. 20, 22; U.S. Energy Information Administration, 2014).

## Commodity Overview

The main contributions of the Middle East region to the world's supply of mineral commodities were crude oil (33.9%), natural gas (16.9%), gypsum (9.4%), refinery petroleum products (9.1%), aluminum (9.0%), potash (8.7%), ammonia (8.1%), phosphate rock (5.5%), cement (4.8%), chromium (3.4%), and crude steel (1.8%) (table 4; BP p.l.c., 2014, p. 20).

Tables 5–14 include the Middle East's historical production data of major mineral commodities for 2005, 2010, 2012, and 2013, 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 (2013) 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 Middle East in 2013. Iran produced 900,000 metric tons (t) of bauxite and Saudi Arabia produced more than 1 Mt of low-grade bauxite in 2013. Saudi Arabia was expected to begin production of high-grade bauxite for use in aluminum production starting in 2014 (table 5).

The region's bauxite output is expected to increase by about 163% in 2018 to 5.0 Mt from 1.9 Mt in 2013 mainly because of the expected increase in bauxite production by the Ma'aden

Bauxite and Alumina Co. of Saudi Arabia at the Al Baitha Mine by 2014 (table 5; Saudi Arabian Mining Co., 2014, p. 81).

Iran was the only alumina producer in the Middle East region in 2013. Production at its Jajarm refinery, which was operated by Iran Aluminum Co., increased by 10% in 2013 compared with that of 2012 (table 6). In Saudi Arabia, the Ras Al Khair alumina refinery, which was under construction in 2013, was expected to begin production in 2014. The refinery would be the first in the GCC countries and would have the capacity to produce 1.8 Mt of alumina. The bauxite for the Ras Al Khair refinery would be transferred by rail from the Al Baitha Mine (Saudi Arabian Mining Co., 2014, p. 80).

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 million metric tons per year (Mt/yr). EGA would use imported bauxite for alumina production. The Abu Dhabi refinery was expected to be built in two phases; each would expand production capacity by 2 Mt/yr. Production from the first phase was expected to begin in 2017 (Kassem, 2014).

In 2013, Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO) was building a new alumina plant, the Persian Gulf Alumina plant, that would have the capacity to produce 1.5 Mt/yr of alumina when it is completed by 2025. The company also planned to produce 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).

The Middle East region produced 4.3 Mt of aluminum in 2013, and its share of world production was about 9% in 2013 (table 4). The region's production of primary and secondary aluminum increased by 6% compared with that of 2012 (table 7).

In 2013, Ma'aden Aluminium Co. began production from Saudi Arabia's first aluminum smelter, which was located at Ras Al Khair, about 90 kilometers (km) northwest of Jubail. The smelter had the capacity to produce 740,000 metric tons per year (t/yr) of primary aluminum (table 7; Saudi Arabian Mining Co., 2014, p. 80–81).

In 2013, the UAE became a major world producer of aluminum as a result of the merger of Dubai Aluminium Co. Ltd. and Emirates Aluminium Co. Ltd. (EMAL) into one entity named Emirates Global Aluminium (EGA). EGA became the world's fifth-ranked aluminum company (valued at \$15 billion), and was expected have 2.4 Mt/yr of primary aluminum production capacity and a combined power-generation capacity of 5,350 megawatts when the construction of EMAL's phase 2 expansion project is completed in 2014 (Emirates Global Aluminium, 2014).

Aluminum production in the region is projected to increase by 63% to about 6.94 Mt/yr by 2020 from about 4.30 Mt in 2013 following the completion of new smelters in the region, including those that were being built in Iran and Saudi Arabia, and the planned expansion of smelters in Bahrain, Oman, and the UAE. In addition to primary aluminum production, a number of downstream facilities in such countries as Bahrain, Iran, Oman, Qatar, and the UAE produced value-added aluminum products (table 7).

**Chromium.**—In 2013, the Middle East region accounted for 3% of the world's production of chromite. Iran and Oman were the two countries in the region that produced chromium in 2013. Oman's production of chromite (in metal content) increased by 31% in 2013 compared with 2012, whereas Iran's production remained at the same level as that of 2012. Oman's increase in production was attributed to the lifting of export restrictions, which were imposed in 2012, and the beginning of operations of chromite concentrators and ferrochrome smelters (tables 4, 8).

In 2013, four ferrochrome smelters were at various stages of construction at Freezone Sohar. Muscat Overseas Group, which was the parent company of Al Tamman Trading Establishment L.L.C., and Indsil Group of India were building two ferrochrome smelters in Oman that would each have the capacity to produce 75,000 t/yr of ferrochrome. The first ferrochrome smelter was completed in 2013, and the second was expected to be completed 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, which also would be located at Freezone Sohar. The 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 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. Copper mine production decreased in Oman and increased in Saudi Arabia in 2013 compared with that of 2012. Iran was the leading copper producer in the region. In Saudi Arabia, Al Masane Al Kobra Mining Co. began production of copper and zinc concentrates from the Al Masane Mine (table 9).

Copper mine production in the Middle East region is expected to increase by 98% in 2016 and by 133% in 2020 compared with 2013 production; most of the increase would be in new projects in Iran, which was expected to expand its primary copper smelting and refining capacity during the next 5 years (table 9). New copper production projects included those of the National Iranian Copper Industries Co. (NICICO), which were expected to increase the company's copper ore output to 700,000 t/yr of cathode copper by 2015. NICICO was developing additional copper mine capacity at the Chah-Firoozeh, the Chah-Mesi, the Daraloo, the Darreh Zar, the Ijoo, and the Nochoon Mines in Kerman Province; the Chehel-Kooreh Mine in the 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. NICICO planned to build copper refineries at the Shahre Babak copper complex, which included the Miduk leaching plant and the Khatoonabad smelter, and at the Sungun copper complex in East Azerbaijan Province (tables 9, 10; National Iranian Copper Industries Co., 2015, p. 19, 21, 23).

In Israel, Altos Hornos de México S.A.B. de C.V. (AHMSA) planned to reopen the Timna copper mines near Eliat. In 2013, the company was engaged in the construction of a new solvent extraction and electrowinning plant with a capacity of 30,000 t/yr of copper (Altos Hornos de México S.A.B. de C.V., 2014, p. 3).

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 was expected to begin production at the mine in 2016 at a capacity of 45,000 t/yr of copper in concentrate (Barrick Gold Corp., 2014).

**Gold.**—The Middle East was a modest contributor to the world's supply of gold. Saudi Arabia and Iran were the major gold producers in the region in 2013. The region's gold production decreased by 14% in 2013 compared with that of 2012 (table 11).

The region's gold output was expected to double in 2016 and again in 2018 with the completion of planned increases in the production capacity of gold mines in Iran and Saudi Arabia. Gold output is expected to increase to about 22 t of mined gold by 2020 (table 11).

**Iron and Steel.**—Continued demand for steel reinforcing bar (rebar) for concrete by the construction industry for commercial projects, educational institutions, industrial buildings, and residential housing spurred most of the planned expansions of steel production capacity in the Middle East. The Middle East region produced 38% of the world's DRI in 2013. With the exception of Iran, the iron ore used at DRI plants was imported entirely from outside the region (Midrex Technologies Inc., 2014, p. 7).

The Middle East was a minor contributor to the world's steel production (1.6% of total world production). The region's total crude steel production increased by 8% in 2013 compared with that of 2012. Iran was the region's leading steel producer (15.4 Mt), followed by Saudi Arabia (5.5 Mt), and the UAE (2.9 Mt). In terms of tonnage, Iran also was the region's leading producer of DRI (14.5 Mt), followed by Saudi Arabia (6.1 Mt), and the UAE (3.1 Mt) (table 4, 13; Midrex Technologies Inc., 2014, p. 7).

Crude steel production is expected to more than double in the region between 2013 and 2020. Most of the increase would be in Iran where the Government had set a production target of 45 Mt of crude steel by 2020. Saudi Arabia also planned to double its crude steel output during the next 5 years (table 13).

**Iron Ore.**—Iran was the sole producer of iron ore in the region. The country's production has been increasing in recent years. The 12% increase in iron ore production in 2013 compared with that of 2012 was attributed to a new iron ore mine that opened at Chah Gaz in 2013. Iran planned capacity expansion projects at the iron ore mines of Chadormalu Mining and Industrial Co., Gol-e-Gohar Iron Ore Co., and Sangan Iron Ore Co. The projects were expected to be completed by 2016 (table 12; Tehran Times, 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. Domestic diamond cutting and polishing

companies specialized in large, high-value gemstones. In 2013, the value of Israel's cut and polished diamond exports increased to \$6.2 billion from \$5.6 billion in 2012.

Lebanon's diamond exports decreased by about 62% in value and 56% in quantity in 2013 compared with those of 2012. Exports of rough and polished diamond were 310,997 carats valued at \$48 million in 2013 compared with 704,390 carats valued at more than \$125 million in 2012. Similarly, diamond imports decreased by 55% in quantity and 60% in value compared with those of 2012. Lebanon imported 304,533 carats valued at about \$45 million in 2013 compared with 683,390 carats of diamond valued at about \$113 million in 2012 (Kimberley Process Certification Scheme, 2013, 2014).

The UAE was a global diamond trading hub. The country's imports of rough diamond increased by 13% in 2013 to 67.3 million carats compared with 59.7 million carats in 2012. The UAE's exports of rough diamond increased by 12% in quantity in 2013 to 67.9 million carats compared with 60.4 million carats in 2012 (Kimberley Process Certification Scheme, 2013, 2014; Dubai Multi Commodities Centre Authority, 2014).

**Nitrogen.**—In 2013, the region produced 10 Mt of ammonia (N content), which was 7% of the world's 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 (3.2 Mt), followed by Qatar (3.0 Mt), and Iran (2.5 Mt) (table 4).

**Phosphate Rock.**—Jordan remained the region's leading producer of phosphate rock in 2013, followed by Israel, Saudi Arabia, and Syria (table 4). Saudi Arabia, which produced 2.8 Mt of phosphate rock for the first time in 2013, was expected to become the region's leading producer 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. Saudi Arabia was planning to develop another phosphate mining and fertilizer manufacturing complex at Wa'ad Al Shammal in 2016 (Saudi Arabian Mining Co., 2014, p. 75–77).

Rotem Amfert Negev Ltd. (a subsidiary of Israel Chemicals Ltd.) produced phosphate rock at the Arad, the Oron, and the Zin Mines in the Negev Desert. The production of beneficiated phosphate rock increased slightly to 3.58 Mt in 2013 from 3.51 Mt in 2012 (Israel Chemicals Ltd., 2014, p. 11).

### **Mineral Fuels**

**Coal.**—Iran was the only country the Middle East that produced coal. Iran's salable coal production increased by 11% to 3.1 Mt in 2013 from 2.8 Mt in 2012. IMIDRO planned to increase its production of coking coal by 30% to 1.2 Mt in 2014 from 922,000 t in 2013. IMIDRO hoped to produce 3.4 Mt of coking coal by 2016 (table 14; Iranian Mines and Mining Industries Development and Renovation Organization, 2015, p. 22, 49).

**Natural Gas and Petroleum.**—In 2013, the Middle East region's share of the world's crude oil and natural gas

production in 2013 was 33.9% and 16.9%, respectively. Saudi Arabia was the world's leading crude-oil-producing country, in terms of the volume of production, with output of 4.2 billion barrels (Gbbbl) in 2013. 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). Saudi Arabia held 15.8% of the world's proven crude oil reserves; Iran, 9.3%; Iraq, 8.9%; Kuwait, 6.0%, and the UAE, 5.8% (table 4; BP p.l.c., 2014, p. 6, 8, 20, 22).

The Middle East region was responsible for 9.1% of the world's total output of refinery products in 2013. The region's total output of refined petroleum products was about 2.5 billion barrels. With the exception of Lebanon, all countries in the region carried out petroleum refining activities (table 4).

Three crude oil refineries were under construction in Saudi Arabia in 2013. They were the 400,000-barrel-per-day (bbl/d)-capacity heavy-crude-oil refinery for Saudi Aramco Total Refining and Petrochemical Co. at Jubail, which began initial operations in 2013; the 400,000-bbl/d-capacity heavy-crude-oil refinery of Yanbu Aramco Sinopec Refining Company Ltd., which was expected to be completed by 2014 by 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 (Saudi Arabian Oil Co., 2014, p. 33–37).

The UAE had five refining facilities in 2013. The largest was at Ruwais and was operated by Abu Dhabi Oil refining Co. (Takreer), which was a wholly owned subsidiary of ADNOC, and had the capacity to refine 350,000 bbl/d of crude oil. The Ruwais refinery was expected to begin a \$10 billion expansion project that would add 417,000 bbl/d of crude oil production capacity, bringing the overall capacity to 800,000 bbl/d by mid-2014 (Abu Dhabi National Oil Co., 2014, p. 8, 12; Oil and Gas Journal, 2014).

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TABLE 1  
MIDDLE EAST: AREA AND POPULATION IN 2013

Country/Territory	Area <sup>1</sup> (square kilometers)	Estimated population <sup>2</sup> (millions)
Bahrain	760	1.3
Iran	1,648,195	77.2
Iraq	438,317	33.8
Israel	220,770	8.1
Jordan	89,342	6.5
Kuwait	17,818	3.6
Lebanon	10,400	4.5
Oman	309,500	3.9
Qatar	11,586	2.1
Saudi Arabia	2,149,690	30.2
Syria	185,180	21.8
United Arab Emirates	83,600	9.0
West Bank and Gaza Strip	6,220	4.2
Yemen	527,968	25.5
Total	5,699,350	231.7
World	510,072,000	7,125.0

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

<sup>2</sup>Source: The World Bank, 2014 World Development Indicators Database.

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

Country/Territory	Gross domestic product in 2013 based on purchasing power parity		Real gross domestic product growth rate (percentage)		
	Gross value (million dollars)	Per capita (dollars)	2011	2012	2013
Bahrain	58,281	49,633	2.1	3.4	5.3
Iran	1,244,330	16,165	4.0	-6.6	-1.9
Iraq	499,618	14,367	10.2	10.3	4.2
Israel	257,511	32,717	4.2	3.0	3.2
Jordan	76,167	11,639	2.6	2.7	2.9
Kuwait	275,360	70,785	10.2	8.3	-0.4
Lebanon	77,403	17,326	2.0	2.5	1.5
Oman	155,640	43,304	4.1	5.8	4.8
Qatar	298,388	145,894	13.0	6.1	6.5
Saudi Arabia	1,553,060	51,779	8.6	5.8	4.0
Syria	43,375 <sup>3</sup>	1,981 <sup>3</sup>	-3.7 <sup>4</sup>	-28.9 <sup>4</sup>	-6.8 <sup>4</sup>
United Arab Emirates	570,574	63,181	4.9	4.7	5.2
West Bank and Gaza Strip <sup>5</sup>	12,476	2,970	12.4	6.3	2.2
Yemen	102,333	3,838	-12.7	2.4	4.8
Total	5,224,516	22,729 <sup>6</sup>	1.4 <sup>7</sup>	-1.1 <sup>7</sup>	0.9 <sup>7</sup>
World total	101,623,212	14,307 <sup>6</sup>	4.1	3.4	3.3

<sup>1</sup>Source: International Monetary Fund, World Economic Outlook Database, October 2014.

<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>Estimated based on United Nations data for 2012.

<sup>4</sup>United Nations Refugees Work Agency estimates.

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

<sup>6</sup>Calculated using country data reported by the International Monetary Fund and the World Bank.

<sup>7</sup>Weighted average.



TABLE 3  
MIDDLE EAST: SELECTED EXPLORATION ACTIVITY IN 2013<sup>1</sup>

Country	Type <sup>2</sup>	Prospect	Commodity	Companies	Resource notes <sup>2,3</sup>	Exploration notes
Iran	P	Ardakan (Saghand)	U <sub>3</sub> O <sub>8</sub>	Government of Iran	2,400 t U <sub>3</sub> O <sub>8</sub> (R)	Commenced production.
Do.	F	Haft Cheshmeh	Cu	National Iranian Copper Corp.	478,000 t Cu (R)	Evaluating development.
Do.	P	Zarshoran	Au	Government of Iran	2.9 Moz Au (R)	Commenced production.
Jordan	P	Eshidiya	P <sub>2</sub> O <sub>5</sub>	Jordan Phosphate Mines Co.	Data not released	Plan drilling program.
Do.	P	Wadi al Abiad	P <sub>2</sub> O <sub>5</sub>	do.	do.	do.
Oman	E	Daris	Cu, Au	Alara Resources Ltd.	68,000 t Cu, 37,000 oz Au (D)	Ongoing scoping study.
Saudi Arabia	D	Ad Duwayhi	Au	Saudi Arabian Mining Co.	1.76 Moz Au (R)	Planned construction contract.
Do.	E	Jibal Qutman	Au	Abdul Rahman Saad Al-Rashid	482,000 oz Au (IF)	Ongoing exploration.
Do.	F	Khnaiguiyah	Zn, Au, Cu	Alara Resources Ltd.	1 Mt Zn, 5.5 Moz Au, 43,000 t Cu (D)	do.
Do.	D	Northern Promise	P <sub>2</sub> O <sub>5</sub>	Saudi Arabian Mining Co.	Data not released	Development ongoing.
Yemen	E	Al Hariqah	Au	Cantex Mine Development Corp.	1.9 Moz Au (ID)	Ongoing drilling.

Do. Ditto.

<sup>1</sup>Abbreviations used for commodities include the following: Au—gold; Cu—copper; P<sub>2</sub>O<sub>5</sub>—phosphate; U<sub>3</sub>O<sub>8</sub>—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.

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

<sup>3</sup>Based on 2013 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 2013<sup>1</sup>  
(Thousand metric tons unless otherwise specified)

Country	Metals										Mineral fuels and related products				
	Aluminum, metal, primary		Chromite, mine output, gross weight		Steel, crude <sup>e</sup>		Ammonia, N content		Cement, hydraulic <sup>e</sup>		Industrial minerals		Crude, including condensate		Refinery products
	primary	gross weight	gross weight	gross weight	gross weight	N content	hydraulic <sup>e</sup>	Gypsum <sup>e</sup>	Phosphate rock, gross weight <sup>e</sup>	Potash, K <sub>2</sub> O equivalent	(thousand 42-gallon barrels)	(thousand 42-gallon barrels)	(thousand 42-gallon barrels)		
Bahrain	913	--	--	378	1,200 <sup>2</sup>	--	--	--	--	--	72,123	99,963			
Iran	350	400	15,400	2,500 <sup>e</sup>	70,000	15,000	100	--	--	--	1,300,000 <sup>e</sup>	640,000 <sup>e</sup>			
Iraq	--	--	--	146	10,000	1,400	350	--	--	--	1,146,465	219,365			
Israel	--	--	500	--	6,398 <sup>2</sup>	27 <sup>2</sup>	3,578 <sup>2</sup>	2,155	--	--	383	105,000 <sup>e</sup>			
Jordan	--	--	150	--	5,000	857	5,399 <sup>2</sup>	1,046	--	--	8,000	24,522			
Kuwait	--	--	1,500	500 <sup>e</sup>	2,250	--	--	--	--	--	1,140,000 <sup>e</sup>	336,000 <sup>e</sup>			
Lebanon	--	--	--	--	5,831 <sup>2</sup>	110	--	--	--	--	--	--			
Oman	354	788	160	1,100 <sup>e</sup>	4,472 <sup>2</sup>	2,785 <sup>2</sup>	--	--	--	--	343,830	69,660			
Qatar	634	--	2,236 <sup>2</sup>	2,985	5,335 <sup>2</sup>	145	--	--	--	--	728,175	171,889			
Saudi Arabia	187	--	5,471 <sup>2</sup>	3,209	57,000	2,500	2,810	--	--	--	3,517,000	600,973			
Syria	--	--	10	50 <sup>e</sup>	4,000	300	1,000	--	--	--	20,440	NA			
United Arab Emirates	1,864	--	2,878 <sup>2</sup>	658	21,000	700	--	--	--	--	1,330,790	173,193			
Yemen	--	--	--	--	3,000 <sup>2</sup>	100	--	--	--	--	58,765	30,000 <sup>e</sup>			
Total	4,300	1,190	28,300	11,500	195,000	23,900	13,200	3,200	9,670,000	2,470,000					
Share of world total	9.0%	3.4%	1.8%	8.1%	4.8%	9.4%	5.5%	8.7%	33.9%	9.1%					
United States	1,950	--	86,900	9,170 <sup>3</sup>	77,400	15,500	31,200	2,220	2,720,000	4,430,000					
Total, world	47,600	34,500	1,610,000	142,000	4,090,000	255,000	243,000	36,800	28,600,000	27,100,000					

<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 due to independent rounding. Percentages are calculated on unrounded data. Includes data available as of October 16, 2015.

<sup>2</sup>Reported figure.

<sup>3</sup>Synthetic anhydrous ammonia; excludes coke oven byproduct ammonia.

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

(Metric tons)

Country	2005	2010	2012	2013	2016 <sup>e</sup>	2018 <sup>e</sup>	2020 <sup>e</sup>
Iran	437,595	714,800	898,400	900,000	1,000,000	1,000,000	1,000,000
Saudi Arabia <sup>2</sup>	--	284,000	760,000	1,044,000	4,000,000	4,000,000	4,000,000
Total	438,000	999,000	1,660,000	1,940,000	5,000,000	5,000,000	5,000,000

<sup>e</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: HISTORIC AND PROJECTED ALUMINA PRODUCTION, 2005–2020<sup>1</sup>

(Metric tons)

Country	2005	2010	2012	2013	2016 <sup>e</sup>	2018 <sup>e</sup>	2020 <sup>e</sup>
Iran	130,000	236,000	227,000	249,000	790,000	1,000,000	1,500,000
Saudi Arabia	--	--	--	--	1,800,000	1,800,000	1,800,000
United Arab Emirates	--	--	--	--	--	2,000,000	4,000,000
Total	130,000	236,000	227,000	249,000	2,590,000	4,800,000	7,300,000

<sup>e</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: HISTORIC AND PROJECTED PRIMARY AND SECONDARY ALUMINUM METAL PRODUCTION, 2005–2020<sup>1</sup>

(Metric tons)

Country	2005	2010	2012	2013	2016 <sup>e</sup>	2018 <sup>e</sup>	2020 <sup>e</sup>
Bahrain <sup>2</sup>	750,700	850,700	890,000	913,000	913,000	928,000	1,450,000
Iran	220,000	303,000	337,000	350,000	487,000	1,100,000	1,100,000
Oman	--	367,000	360,000	354,000	375,000	375,000	400,000
Qatar	--	126,000	628,000	634,000	630,000	630,000	630,000
Saudi Arabia	--	--	--	187,000	760,000	760,000	760,000
United Arab Emirates	722,000	1,400,000	1,820,000	1,864,000	2,400,000	2,400,000	2,600,000
Total	1,690,000	3,050,000	4,040,000	4,300,000	5,570,000	6,200,000	6,900,000

<sup>e</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: HISTORIC AND PROJECTED CHROMIUM MINE PRODUCTION, 2005–2020<sup>1</sup>

(Metric tons of metal content)

Country	2005	2010	2012	2013	2016 <sup>e</sup>	2018 <sup>e</sup>	2020 <sup>e</sup>
Iran	110,000	100,000	190,000	190,000	200,000	200,000	200,000
Oman	12,000	350,000	211,000	276,000	350,000	350,000	350,000
Total	122,000	450,000	401,000	466,000	550,000	550,000	550,000

<sup>e</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: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 2005–2020<sup>1</sup>

(Metal content of concentrate in metric tons)

Country	2005	2010	2012	2013	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	190,000	210,000	260,000	220,000	430,000	500,000	500,000
Israel	--	--	--	--	8,000	20,000	20,000
Oman	2,000	2,000	2,000	1,000	4,000	4,000	4,000
Saudi Arabia	668	1,600	6,000	10,000	15,000	15,000	15,000
Total	193,000	214,000	268,000	231,000	460,000	540,000	540,000

<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 10  
MIDDLE EAST: HISTORIC AND PROJECTED REFINED COPPER METAL PRODUCTION, 2005–2020<sup>1,2</sup>

(Metric tons)

Country	2005	2010	2012	2013	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	178,000	220,000	225,000	260,000	360,000	500,000	700,000
Israel	--	--	--	--	13,000	20,000	20,000
Oman	24,543	15,000	16,000	16,000	32,000	32,000	32,000
Total	203,000	235,000	241,000	276,000	405,000	550,000	750,000

<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 11  
MIDDLE EAST: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 2005–2020<sup>1</sup>

(Metal content in kilograms)

Country	2005	2010	2012	2013	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	1,000	1,000	2,000	1,700	3,000	6,000	6,000
Oman	384	82	--	--	100	100	100
Saudi Arabia	7,456	4,476	4,347	3,789	7,000	15,600	15,600
Total	8,840	5,560	6,350	5,490	10,100	21,700	21,700

<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 12  
MIDDLE EAST: HISTORIC AND PROJECTED IRON ORE PRODUCTION, 2005–2020

(Metal content in thousand metric tons)

Country	2005	2010	2012	2013	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	7,400	16,100	21,700	24,300	25,000	25,000	25,000

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

TABLE 13  
MIDDLE EAST: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 2005–2020<sup>1</sup>

(Thousand metric tons)

Country	2005	2010	2012	2013	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	9,400	12,000	14,500	15,400	37,000	45,000	45,000
Iraq	--	--	--	--	2,000	2,000	2,000
Israel	480	430	500	500	500	500	500
Jordan	150	160	160	160	390	390	390
Kuwait	450	500	1,300	1,500	1,300	1,300	1,300
Oman	84	84	160	160	4,000	6,000	6,000
Qatar	1,057	1,705	2,100	2,236	3,000	3,000	4,000
Saudi Arabia	4,185	5,000	5,200	5,471	10,200	10,200	10,200
Syria	70	70	10	10	100	100	100
United Arab Emirates	90	1,180	2,408	2,878	5,500	5,500	5,500
Total	16,000	21,400	26,300	28,300	64,000	74,000	75,000

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

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

TABLE 14  
MIDDLE EAST: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 2005–2020<sup>1</sup>

(Thousand metric tons)

Country	2005	2010	2012	2013	2016 <sup>c</sup>	2018 <sup>c</sup>	2020 <sup>c</sup>
Iran	1,899	2,324	2,820	3,140	11,700	11,700	11,700

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

<sup>1</sup>Includes anthracite, bituminous, and lignite.