



# 2015 Minerals Yearbook

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**YEMEN [ADVANCE RELEASE]**

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# THE MINERAL INDUSTRY OF YEMEN

By Mowafa Taib

Yemen supplied the world with modest quantities of crude petroleum and liquefied natural gas (LNG) in 2015. The country also produced basalt, cement, granite, gypsum, limestone, marble, refined petroleum products, salt, and sand and gravel. Aggregates, clay, feldspar, mica, silica sand, scoria, talc, and zeolites may also have been produced, but available information was inadequate to make reliable estimates of output. Yemen hosts a wide variety of metallic mineral resources, which include cobalt, copper, gold, lead, nickel, niobium (columbium), platinum-group metals, rare-earth elements, tantalum, and zinc. Industrial mineral resources in the country included dolomite, gypsum, limestone, magnesite, pumice, and zeolites (General Investment Authority, 2015; Yemen Geological Survey and Mineral Resources Board, 2015b–d; BP p.l.c., 2016, p. 8, 22).

The Yemen Geological Survey and the Mineral Resources Board estimated that the country had identified resources of 343 million cubic meters of tuff and ignimbrite rock; 142 million cubic meters of basalt; 5.3 billion cubic meters of limestone; 2.7 billion cubic meters of granite and gabbro; and 180 million cubic meters of marble (Al-Razhi, 2014, p. 463–464; Yemen Geological Survey and Mineral Resources Board, 2015a).

In September 2014, Houthi forces took over many Government buildings in the capital city of San'a. In January 2015, the Houthis surrounded the Presidential palace, forced the elected President to resign, and installed a 5-member council to run the country. In March, a Saudi Arabia-led coalition began a military campaign against the Houthis in support of the President, who escaped from San'a to the city of Aden, rescinded his resignation, established a rival Government, and vowed to restore democracy in the country. Thus, armed and military conflicts halted the work of most Government agencies and forced most of the remaining international businesses and individuals to leave the country (Council on Foreign Relations, 2016; U.S. Department of State, 2017).

## Minerals in the National Economy

Yemen's gross domestic product decreased, in real terms, by 28.1% in 2015 compared with a decrease of 0.2% in 2014. Government revenue, which was heavily dependent on crude petroleum and LNG proceeds, decreased by \$3.7 billion in 2015. The decrease in Government revenue was attributed to sharp decreases in the volume and the value of crude petroleum production. The decline in the volume of crude petroleum and LNG output was attributed to the armed conflict and the consequent withdrawal of international oil companies from the country. The value of oil sector activity decreased by about 76% in 2015 compared with that of 2014. The value of crude petroleum and LNG exports decreased by 84.5% in 2015 compared with that of 2014. In terms of volume, crude petroleum exports decreased to zero in 2015 compared with 51.8 million barrels (Mbbbl) in 2011. LNG exports decreased to 1.98 billion cubic meters in 2015 from 8.90 billion cubic

meters in 2014 and 9.60 billion cubic meters in 2013. The decrease in the value of crude petroleum and LNG exports was the result of a worldwide drop in petroleum prices in 2015 (International Monetary Fund, 2016, p. 92; Ministry of Planning and International Cooperation, 2016; Organization of Arab Petroleum Exporting Countries, 2016, p. 92, 96).

## Government Policies and Programs

Law No. 22 of 2010—Concerning Mines and Quarries governs the mineral exploration and production activities in Yemen. The law, which was approved by the Government in 2010 and the legislative body (House of Representatives) in 2011, regulates exploration, mining, and prospecting operations in the country, including artisanal operations. According to the law, the Government offers the following five types of licenses: artisanal, exploration, mining, quarrying, and reconnaissance. Article 3 of the law states that the law aims to encourage national and foreign capital investment in the exploration, extraction, mining, and reconnaissance activities in Yemen and that those activities should meet the country's economic and social development requirements. Article 7 of the law states that a licensed reconnaissance area should not exceed 10,000 square kilometers (km<sup>2</sup>) (contiguous) and has to be specified by geographic coordinates. Article 12 of the law specifies that a reconnaissance license is valid for 1 year. This license can be extended once for an additional 1 year after reducing the licensed area by 50%. Article 17 of the law states that a licensed exploration area should not exceed 10,000 km<sup>2</sup> for metallic minerals and 5 km<sup>2</sup> for quarrying of raw materials. The law adds royalties of 8% and 3% for precious and semiprecious stones and metals, respectively. The royalty would be assessed on the market value of production. The law also requires producers of building materials to pay \$0.3 per metric ton for exports and \$0.1 per metric ton for domestic consumption (Republic of Yemen, 2010, p. 7, 9, 11, 14, 46).

## Production

Except for cement, crude petroleum, and natural gas, comprehensive information to make estimates of industrial mineral production in 2015 was not available because Government information data portals were either offline or about 2 years out of date. In 2015, marketed natural gas production (which was produced and exported mainly as LNG) decreased by 72% to 2.7 billion cubic meters from 9.3 billion cubic meters in 2014. Yemen's crude petroleum production decreased by 68% to 47,000 barrels per day (bbl/d) in 2015 from 145,000 bbl/d in 2014 (table 1; BP p.l.c., 2016, p. 8, 22).

## Structure of the Mineral Industry

The Ministry of Oil and Minerals (MOM) managed mining and quarrying operations in the country through the Yemen

Geological Survey and Mineral Resources Board (YGSMRB), which was established by Government Decree No. 317 of 1999. The YGSMRB was the official body responsible for conducting geologic surveys and preparing geologic maps and publications in Yemen. Other mining and quarrying companies were privately owned (Yemen Geological Survey and Mineral Resources Board, 2015e).

The MOM managed the natural gas and petroleum sector in Yemen through the Petroleum Exploration and Production Authority (PEPA) and had several state-owned and joint-venture subsidiaries that managed day-to-day activities. The MOM's subsidiaries included Aden Refinery Co. (ARC), Masila Petroleum Exploration and Production Company (PetroMasila), Safer E and P Operation Co. (SEPOC), Yemen General Corporation for Oil and Gas (YOGC), Yemen Investments Company for Oil and Minerals (YICOM), Yemen LNG Co., and Yemen Petroleum Co. (YPC) (table 2; U.S. Energy Information Administration, 2014; Yemen Geological Survey and Mineral Resources Board, 2015d; Yemen General Corporation for Oil and Gas, 2016).

## Commodity Review

### *Industrial Minerals*

**Cement.**—In March, the cement plant at Lahij Governorate, which was owned by the National Cement Co. (NCC), was bombed and was severely damaged. NCC was owned by the Hayel Saeed Anam Group. In July, the Government-owned Amran Cement Factory was virtually destroyed by aerial attacks. The damage to the plant was estimated at \$100 million. The Al Barah Cement Factor at Mafraq also sustained damage owing to the armed conflict. Thus, cement production capacity in Yemen, which stood at 5.6 million metric tons per year in 2013, decreased by about one-half in 2015 owing to the damage to plants (table 2; Al-Homaid, 2015; Global Cement, 2015).

### *Mineral Fuels*

**Natural Gas and Petroleum.**—In 2015, Yemen held 3.0 billion barrels of proved crude petroleum resources and 300 billion cubic meters of natural gas reserves. According to the Ministry of Planning and International Cooperation's latest reports, crude petroleum production decreased by 80.3% in 2015 compared with that of 2014. Crude petroleum output in 2015 amounted to 13.2 Mbbl, which was a small fraction of the 61.8 Mbbl planned by the Government. The sharp decrease in crude petroleum production was attributed to the total stoppage of crude petroleum production and exports by April 2015 owing to the departure of international oil companies working in Yemen because of the deterioration of the security situation in the country. Similarly, exports of LNG decreased by 77% in 2015 compared with that of 2014. Production of refined petroleum products at the Aden refinery was halted in June 2015, and the stoppage continued through yearend 2015. Production at the Ma'rib oil refinery decreased by 4.8% in 2015 compared with that of 2014 (BP p.l.c., 2016, p. 6, 20; Ministry of Planning and International Cooperation, 2016).

## Outlook

The International Monetary Fund projected that Yemen's economy will contract by 4.2% in 2016. Mineral exploration is expected to remain on hold pending improvement in the country's security and political situation. The continued armed conflict in the country since 2011 has adversely affected and is expected to continue to affect Yemen's efforts to attract the flow of foreign direct investment into the country; such investment is considered necessary to develop the mining sector and exploit its vast untapped mineral resources (International Monetary Fund, 2016, p. 92).

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TABLE 1  
YEMEN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity <sup>2</sup>	2011	2012	2013	2014	2015
<b>INDUSTRIAL MINERALS</b>					
Cement	2,800	2,800	3,000	3,100 <sup>r,3</sup>	3,100 <sup>3</sup>
Gypsum	100	100	100	100	NA
Salt	75	75	75	50	NA
Sand and gravel	6,000	6,000	6,000	6,000	NA
Stone:					
Basalt	500	500	500	500	NA
Granite	100	100	100	100	NA
Limestone	3,000	3,000	3,000	3,000	NA
Marble	250	250	250	250	NA
Volcanic tuff	1,400	1,400	1,400	1,400	NA
<b>MINERAL FUELS AND RELATED MATERIALS<sup>4</sup></b>					
Natural gas:					
Gross					million cubic meters
Marketed	29,600	29,600	30,000	30,000	3,000
Petroleum:	9,400 <sup>3</sup>	7,600 <sup>3</sup>	10,300 <sup>3</sup>	9,600 <sup>3</sup>	2,700 <sup>3</sup>
Crude, including condensate					thousand 42-gallon barrels
Refinery products:	87,965 <sup>3</sup>	69,350 <sup>3</sup>	54,750 <sup>3</sup>	52,925 <sup>3</sup>	1,716 <sup>3</sup>
Liquefied petroleum gas	6,786 <sup>3</sup>	7,772 <sup>3</sup>	9,245 <sup>3</sup>	9,000	NA
Naphtha	1,861 <sup>3</sup>	2,704 <sup>3</sup>	6,054 <sup>3</sup>	6,000	NA
Gasoline	3,736 <sup>3</sup>	1,092 <sup>3</sup>	1,552 <sup>3</sup>	1,330 <sup>3</sup>	NA
Kerosene	1,956 <sup>3</sup>	1,252 <sup>3</sup>	3,262 <sup>3</sup>	2,250 <sup>3</sup>	NA
Distillate fuel oil	5,684 <sup>3</sup>	2,651 <sup>3</sup>	6,430 <sup>3</sup>	8,400 <sup>3</sup>	NA
Residual fuel oil	3,263 <sup>3</sup>	1,379 <sup>3</sup>	4,296 <sup>3</sup>	4,000	NA
Asphalt	145 <sup>3</sup>	79 <sup>3</sup>	145 <sup>3</sup>	100	NA
Total	23,431 <sup>3</sup>	16,929 <sup>3</sup>	30,984 <sup>3</sup>	31,100	NA

<sup>1</sup>Revised. do. Ditto. NA Not available.

<sup>1</sup>Table includes data available through July 11, 2016. Estimated data and totals are rounded to three significant digits; may not add to totals shown.

<sup>2</sup>In addition to the commodities listed, aggregate, clays, feldspar, mica, silica sand, scoria, talc, and zeolites may have been produced, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>Reported figure.

<sup>4</sup>Source: Organization of Arab Petroleum Exporting Countries, 2016.

TABLE 2  
YEMEN: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
Basalt		Local private companies	Hadramawt, San'a, Ta'izz, Dhamar	900
Cement		Amran Cement Factory [Yemen Corporation for Cement Industry and Marketing (YCC), 100%]	Kilns and mills at Amran	NA <sup>1</sup>
Do.		Al Barah Cement Factory [Yemen Corporation for Cement Industry and Marketing (YCC), 100%]	Kilns and mills at Mafraq	NA <sup>1</sup>
Do.		Bajil Cement Factory [Yemen Corporation for Cement Industry and Marketing (YCC), 100%]	Kilns and mills at Bajil near Ta'izz	500
Do.		National Cement Co. (NCC) (Hayel Saeed Anam Group, 100%)	Kilns and mills at Wadi Saim, Lahij	NA <sup>1</sup>
Do.		Arabian Yemen Cement Co. Ltd. (Eastern Province Cement Co., 31.5%; Al-Amoudi Group, 15%; Bagshan Group, 15%; Saudi Binladin Group, 10%; Baroom Investment Holding Co. Ltd., 10%; Ali Ali Hussain Miksa, 10%; Sara Development Co. Ltd., 3.5%; Yemeni Group for Development of Yemen, 5%)	Kilns and mills at Al-Oyoun, Hadramawt	1,500
Clay		Local private companies	Al Hudaydah, Lahij, Ibb, Hijjah, Al Jawf, Mar'ib, San'a, Shabwah, Ta'izz	700
Gypsum		do.	Al Hudaydah, Hadramawt, San'a, Shabwah	200
<b>Natural gas:</b>				
Associated	million cubic meters	Jannah Hunt Oil Co. [Yemen General Corporation for Oil and Gas (YOGC), 71%, and Hunt Oil Co., 29%]	Jannah field (Block 5)	227
Liquefied	thousand metric tons	Yemen LNG Co. (Total E&P Yemen, 39.62%; Hunt Oil Co., 17.22%; Yemen Gas Co., 16.73%; SK Energy, 9.55%; Korea Gas Corp., 6.00%; Hyundai Corp., 5.88%; Yemen General Authority for Social Security and Pensions, 5.00%)	Marib field (Block 18), liquefied natural gas plant in Belhaf	6,700
<b>Petroleum:</b>				
Crude	thousand 42-gallon barrels per day	Occidental Petroleum Yemen [Occidental Petroleum Corp., 65%, and Yemen General Corporation for Oil and Gas (YOGC), 35%]	Damis oilfield (Block S1)	4,000 <sup>2</sup>
Do.	do.	OMV A.G., 68%, and Yemen General Corporation for Oil and Gas (YOGC), 32%	Al-Uqla oilfield (Block S2)	1,560 <sup>2</sup>
Do.	do.	Calvalley Petroleum Ltd., 59%, and Yemen General Corporation for Oil and Gas (YOGC), 41%	Malik oilfield (Block 9)	2,000 <sup>2</sup>
Do.	do.	DNO Yemen [Yemen General Corporation for Oil and Gas (YOGC), 52%, and DNO International ASA, 48%]	Hwarim oilfield (Block 32)	3,300 <sup>2</sup>
Do.	do.	DNO Yemen [DNO International ASA, 62%, and Yemen General Corporation for Oil and Gas (YOGC), 38%]	South Hwarim oilfield (Block 43)	2,600 <sup>2</sup>
Do.	do.	Yemen General Corporation for Oil and Gas (YOGC), 51%, and Dove Energy Ltd., 49%	East Saar oilfield (Block 53)	3,200 <sup>2</sup>
Do.	do.	Jannah Hunt Oil Co. [Yemen General Corporation for Oil and Gas (YOGC), 71%, and Hunt Oil Co., 29%]	Jannah oilfield (Block 5)	15,700 <sup>2</sup>
Do.	do.	Korea National Oil Co. (KNOC), 82%, and Yemen General Corporation for Oil and Gas (YOGC), 18%	West Ayad field (Block 4)	123 <sup>2</sup>

See footnotes at end of table.

TABLE 2—Continued  
YEMEN: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity <sup>e</sup>
<b>Petroleum—Continued:</b>				
Crude—Continued	thousand 42-gallon barrels per day	Safer E&P Operations Co. (Government, 100%)	Marib field (Block 18)	22,000 <sup>2</sup>
Do.	do.	Total E&P Yemen [Yemen General Corporation for Oil and Gas (YOGC), 59%, and Total S.A., 41%]	East Shabwah oilfield (Block10)	13,700 <sup>2</sup>
Do.	do.	Canadian Nexen Petroleum Yemen Ltd. [Nexen Inc., 63%, and Yemen General Corporation for Oil and Gas (YOGC), 37%]	East Al-Hajr field (Block 51)	3,000 <sup>2</sup>
Do.	do.	Masila Petroleum Exploration and Production Co. (PetroMasila)	Masila field (Block 14)	42,000 <sup>2</sup>
Refined	do.	Aden Refinery Co. (Government, 100%)	Refinery at Aden	150,000 <sup>2</sup>
Do.	do.	Yemen Oil Refining Co. (Yemen Hunt Oil Co. and Exxon Yemen, Inc., 75.5%, and Yukong Group, 24.5%)	Topping plant at Ma'rib	10,000
Pumice		Local private companies	Dhamar	2,500
<b>Salt:</b>				
<b>Crude:</b>				
Marine		do.	Eleven saltworks near Aden	150
Rock		do.	Five salt mines near Salif	140
Refined		Salt Refining and Packing Factory (Government)	Salif	50
Do.		Aden Salt Factory (Government)	Aden	150
Scoria		Local private companies	Dhamar, Mar'ib, Shabwah	500
Steel, finished products		Arab Iron and Steel Corp.	do.	100
Do.		Mukalla Iron and Steel Co.	Rayan	500
Do.		Yemen Steel Manufacturing Company Ltd. (Al-Rhabi Trading Group, 100%)	Al Hudaydah	500
<b>Stone:</b>				
Limestone		do.	Amran, Hadramawt, San'a, Ta'izz	4,000
Do.		3S Minerals Pvt. Ltd	Hadramawt	1,000
Do.		Naine Minerals and Resources Pte. Ltd.	Hadramawt, Yathmoon	1,000
Marble		do.	Hijjah, Mar'ib, Ta'izz	700
Unspecified		About 1,900 local private companies	Dhamar, Mayana, San'a, Ta'izz, and Wadi Marek	16,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto.

<sup>1</sup>Plant sustained damage owing to armed conflict.

<sup>2</sup>Operations were suspended in 2015.