



2016 Minerals Yearbook

NIGERIA

THE MINERAL INDUSTRY OF NIGERIA

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In 2016, Nigeria played a significant role in the world's production of crude petroleum, natural gas, and tantalum. Nigeria was the world's third-ranked producer of tantalum. The country's share of world crude petroleum was 2%, and natural gas, 1%. Nigeria also accounted for 7% of the world's trade in liquefied natural gas (LNG). Nigeria was not a globally significant consumer of minerals or mineral fuels in 2016. In 2015 (the latest year for which data were available), however, Nigeria was sub-Saharan Africa's leading cement producer (BP p.l.c., 2017, p. 14, 28, 34; Polyak, 2018; van Oss, 2018, p. 16.31–16.33).

Minerals in the National Economy

In 2016, crude petroleum and natural gas production accounted for 5.4% of the gross domestic product (GDP); construction, 3.6%; cement production, 0.6%; the production of refined petroleum products, 0.3%; the production of basic metals (primarily iron and steel), 0.2%; and mining and quarrying of other minerals, 0.1%. Manufacturing (not including cement, refined petroleum, and basic metal production) accounted for 7.6% of the GDP (National Bureau of Statistics, 2017b, p. 136).

Nigeria's exports were valued at \$33.6 billion in 2016, of which crude petroleum accounted for 82%; natural gas (in the form of LNG) and petroleum products, 14.4%; and solid minerals, 1.3%. Total imports into Nigeria were valued at \$34.8 billion in 2016, of which petroleum products accounted for 28.6% (National Bureau of Statistics, 2017a, p. 15–17).

In 2016, Nigeria's exports of crude petroleum were 645 million barrels (Mbbl), of which Europe accounted for 225 Mbbl; Asia and the Pacific, 180 Mbbl; North America, 118 Mbbl; Africa, 94 Mbbl; and South America, 28 Mbbl. By comparison, crude petroleum exports were 817 Mbbl in 2006, of which North America accounted for 401 Mbbl; Europe, 163 Mbbl; Asia and the Pacific, 116 Mbbl; Africa, 69 Mbbl; and South America, 68 Mbbl (Nigerian National Petroleum Corp., 2016, p. 18; 2017, p. 12).

In 2016, Nigeria's exports of natural gas in the form of LNG were 17.2 million metric tons (Mt). Spain accounted for about 19% of Nigeria's LNG exports in 2016; India and Japan, 11% each; France, 8%; Turkey, 6%; Brazil, 5%; and other countries, 40% (BP p.l.c., 2017, p. 34).

The Federal Government held all mineral rights and was responsible for issuing exploration and development licenses. At the end of 2016, the mining sector was governed by the Minerals and Mining Act, 2007 and the Minerals and Mining Regulations, 2011. The natural gas and petroleum sector was governed by the Petroleum Act of 1969.

The Ministry of Mines and Steel Development (MMSD) managed much of the solid minerals sector. The Nigerian Mining Cadastre Office, which is a department of the MMSD, processed mineral title applications, including exploration licenses, mining licenses, quarrying licenses, and small-scale

mining licenses. The Nigerian Geological Survey Agency (NGSA) explored for mineral deposits and collected geoscience information. The Federal Ministry of Petroleum Resources was responsible for the oversight of the natural gas and petroleum sectors.

Production

In 2016, coal production increased by 568%; sulfur, by an estimated 205%; total refined petroleum products, by 199%; urea, by an estimated 132%; ammonia, by an estimated 127%; other clay, by 38%; limestone and shale, by 30% each; feldspar, by 29%; mined lead, by an estimated 21%; zinc, by 20%; and topaz, by an estimated 11%. Manganese production also increased sharply. Between 2012 and 2016, the production of feldspar increased by 276%; topaz, by 177%; shale, by 132%; niobium (columbium), by an estimated 104%; tantalum, by an estimated 100%; other clay, by 69%; kaolin and limestone, by 56% each; and tungsten, by an estimated 50%. Data on mineral production are in table 1.

Mica production decreased by an estimated 86% in 2016; barite, by 84%; silica sand, by an estimated 60%; sand for construction, by 51%; kaolin and zircon, by 46% each; crushed granite, by 23%; gypsum and crushed marble, by 20% each; other crushed stone, by 18%; natural gas liquids, by 15%; and LNG and tungsten, by 14% each. Beryl, monazite, and quartz production ceased in 2016. Between 2012 and 2016, barite output decreased by 97%; silica sand, by an estimated 86%; zircon, by an estimated 78%; sulfur, by an estimated 68%, and gypsum, by an estimated 63% (table 1).

In 2016, ammonia and urea production increased because of a new plant opening in Rivers State. Refined petroleum and sulfur production increased because of higher capacity utilization.

Structure of the Mineral Industry

The Nigerian National Petroleum Corp. (NNPC) was the major partner in natural gas and petroleum production joint ventures, which were operated by subsidiaries of major international oil companies or domestic oil companies. Crude petroleum also was produced under production-sharing contracts, service contracts, and by sole risk operators (primarily independent domestic companies). Government-operated refineries accounted for more than 99% of petroleum refining capacity. Most Nigerian natural gas output was associated with crude oil production. Table 2 is a list of major mineral industry facilities.

The cement plants and nonfuel minerals operations were privately owned. In December 2015, more than 100 companies were engaged in quarrying. Small-scale and artisanal miners produced gemstones, gold, and other mineral commodities. Nigeria also had a large ferrous and nonferrous metal recycling sector that was mostly privately owned.

In 2016, laterite was produced in 29 of Nigeria's 36 States; sand for construction, in 27 States; crushed granite, in 26 States; limestone, in 8 States; and clay other than bentonite or kaolin, in 5 States. Clay, crushed granite, and laterite also were produced in the Federal Capital Territory (National Bureau of Statistics, 2017c, p. 19–55).

Commodity Review

Metals

Aluminum.—Aluminum Smelter Co. of Nigeria Ltd. (ALSCON), which was a joint venture of United Company RUSAL of Russia and the Government, remained closed in 2016. The Government sold an 85% share in ALSCON to RUSAL in 2006; the sale was voided by a decision of the Supreme Court of Nigeria in 2012. In July 2016, the Supreme Court of Nigeria rejected RUSAL's appeal of its decision. BFIG Group Divino Corp. of the United States was ruled to be the rightful owner of the 85% share in ALSCON (Udo, 2016).

Iron Ore.—KCM Mining Ltd. (a subsidiary of Kogi Iron Ltd. of Australia) planned to complete a feasibility study for a new mine at the Agbaja deposit in the first half of 2017. In its prefeasibility study, Kogi planned to produce 5 million metric tons per year (Mt/yr) of iron ore. Agbaja was located about 15 kilometers north of Lokoja, Kogi State. Kogi estimated that resources at Agbaja were 586 Mt at a grade of 41.3% iron (Cornish, 2017; Kogi Iron Ltd., 2017).

Nickel.—In 2016, Comet Minerals Ltd. of Australia announced the discovery of a native nickel deposit at its Titan project in north-central Nigeria. The deposit is not a conventional nickel laterite or sulfide deposit. Comet was considering starting a new mine by late 2017 (Andrews, 2016).

Niobium (Columbium) and Tantalum.—Columbite-tantalite was mined at Udegi in Nasarawa State by Kenyang Mining Company Ltd. of China. In recent years, artisanal miners also produced columbite-tantalite on the Jos Plateau in Plateau State. Nigeria's columbite-tantalite production increased to 776 metric tons (t) in 2015 from 377 t in 2012. In 2015, China accounted for all Nigerian columbite-tantalite exports (table 1; Nigeria Extractive Industries Transparency Initiative, 2017, p. 49).

Industrial Minerals

Barite.—From 2013 to 2016, Nigeria's reported barite production decreased to 537 t from 17,784 t. The Government lifted the ban on barite imports in 2014. In December 2016, barite producers in Benue State received mining equipment from Chevron Nigeria Ltd. as part of the company's plan to promote domestic barite mining (table 1; National Bureau of Statistics, 2017c, p. 2; O'Driscoll, 2017).

Cement.—In 2016, Nigeria's cement production was estimated to be 22 Mt compared with 21 Mt in 2015. From 2015 to 2016, cement consumption was estimated to have increased to 22.7 Mt from about 21.5 Mt (Dangote Cement plc, 2017, p. 56).

Dangote Cement plc (a subsidiary of Dangote Group) operated three plants with a total capacity of 29.25 Mt/yr. The Obajana plant in Kogi State had a capacity of 13.25 Mt/yr; the Ibese plant in Ogun State, 12 Mt/yr; and the Gboko plant, 4 Mt/yr.

Dangote's domestic sales increased to nearly 14.8 Mt in 2016 from 13.3 Mt in 2015; exports were 300,000 t in 2016. The Obajana plant accounted for 7.6 Mt of sales in 2016; the Ibese plant, 6.9 Mt; and the Gboko plant, 0.6 Mt (Dangote Cement plc, 2017, p. 14–15, 22, 56).

Dangote planned to open plants at Itori in Ogun State and Okpella in Edo State with capacities of 6 Mt/yr and 3 Mt/yr, respectively. The company planned to start construction of its new plants by as early as late 2017; the plants could be completed by as early as late 2019 or the beginning of 2020. Cement produced at Itori and Okpella was likely to be exported (International Cement Review, 2016b; (Dangote Cement plc, 2017, p. 68).

In 2015, Edo Cement Company Ltd. (BUA Group, 87%) completed a new plant at Okpella in Edo State with a capacity of 3 Mt/yr. Cement Company of Northern Nigeria (BUA Group, 50.7%) planned to increase the capacity at its plant at Sokoto to 2 Mt/yr from 500,000 metric tons per year (t/yr); BUA Group planned to increase its total capacity at Okpella and Sokoto to 10 Mt/yr by the end of 2018 (Global Cement, 2016a; International Cement Review, 2016a).

United Cement Company of Nigeria Ltd. (Unicem) operated the Mfamosing plant in Cross River State. In July 2016, Unicem increased its cement capacity by 2.5 Mt/yr and its clinker capacity by nearly 1.9 Mt/yr. AshakaCem Plc (LafargeHolcim, 42.63%) was engaged in the construction of a new plant with a capacity of 1.5 Mt/yr in 2016; the company planned to complete the plant in 2017 (International Cement Review, 2016b, 2017).

Clay and Shale.—In 2016, Nigeria's shale production was 1.32 Mt, all of which was produced in Ogun State. National shale output was 1.01 Mt in 2015. The production of clay other than bentonite and kaolin increased to 1.8 Mt in 2016 from nearly 1.31 Mt in 2015. Kogi State accounted for 1.57 Mt of other clay production in 2016 (National Bureau of Statistics, 2017c, p. 2, 19–55; Nigeria Extractive Industries Transparency Initiative, 2017, p. 123).

Gemstones.—Plateau State accounted for most of Nigeria's reported gemstone production. Gemstones were mined on the Jos Plateau by artisanal miners. In 2016, topaz production in Plateau State was 5,540 kilograms (kg); amethyst, 5,070 kg; garnet, 375 kg; sapphire, 2 kg; and tourmaline, 1 kg. Nasarawa State produced 100 kg of amethyst and Oyo State produced nearly 53 kg of tourmaline (National Bureau of Statistics, 2017c, p. 2, 19–55).

Nitrogen.—At the end of 2015, Notore Chemical Industries Plc was Nigeria's only producer of ammonia and urea. In December 2015, Indorama Eleme Fertilizers & Chemicals Ltd. completed the construction of a new ammonia and urea plant at Port Harcourt in Rivers State. Commissioning was completed in March 2016; large-scale production started in June. The plant had a capacity of nearly 1.5 Mt/yr of urea and 840,000 t/yr of ammonia (Indorama Group, 2018).

In 2016, Dangote Fertilizer Ltd. (a subsidiary of Dangote Group) stated construction of a new plant near Lagos with a capacity of more than 2 Mt/yr of urea and 1 Mt/y of ammonia. The company planned to complete the new plant by 2018 or 2019 (Nigeria Investment Promotion Commission, 2016; Brelsford, 2017a, b).

The Bayelsa Development and Investment Corp. planned to build a new ammonia, methanol, and urea plant at Brass Island in Bayelsa State. The planned capacity of the plant was 2.6 Mt/yr of urea, 1.7 Mt/yr of methanol, and 750,000 t/yr of ammonia. The estimated cost of the plant was \$3.5 billion. At yearend, it was unclear when the plant would be completed (Enietan-Matthews, 2015).

Stone, Crushed.—Nigeria's limestone production increased to 28.2 Mt in 2016 from nearly 21.8 Mt in 2015. Ogun State accounted for 13.3 Mt of limestone production in 2016; Kogi State, 9.47 Mt; Cross River State, 2.34 Mt; and Benue State, 1.35 Mt (National Bureau of Statistics, 2017c, p. 2, 19–55; Nigeria Extractive Industries Transparency Initiative, 2017, p. 123).

National granite production decreased to 7.49 Mt in 2016 from a revised 9.78 Mt in 2015. The Federal Capital Territory accounted for 1.96 Mt of granite production in 2016; Ogun State, 1.1 Mt; Oyo State, about 958,000 t; Ebonyi State, about 692,000 t; Cross River State, about 657,000 t; and Osun State, 655,000 t (National Bureau of Statistics, 2017c, p. 2, 19–55; Nigeria Extractive Industries Transparency Initiative, 2017, p. 123).

Mineral Fuels

Coal.—Nigeria's coal production increased to about 989,000 t in 2016 from 148,000 t in 2015 because of the opening of new mines in Kogi State by Dangote Industries Ltd. In 2016, coal production in Kogi State was about 912,000 t, and in Gombe State, about 77,000 t. Dangote Cement planned to use about 3.6 Mt/yr of coal in the production of cement because of disruptions to natural gas supplies (Global Cement, 2016b; National Bureau of Statistics, 2017c, p. 2, 19–55; Nigeria Extractive Industries Transparency Initiative, 2017, p. 123).

Natural Gas and Petroleum.—In 2016, Nigeria's production of crude petroleum was 670 Mbbl compared with 773 Mbbl in 2015 and 869 Mbbl in 2006. NNPC produced the majority of Nigeria's natural gas and crude petroleum output in joint ventures with foreign companies. (Nigerian National Petroleum Corp., 2016, p. 13; 2017, p. 7).

In 2016, Nigeria's marketed natural gas production was 44.5 billion cubic meters compared with 46 billion cubic meters in 2015 and 33.2 billion cubic meters in 2007. From 2007 to 2016, gross natural gas production increased to 78.7 billion cubic meters from 68.4 billion cubic meters. The higher long-term growth rate in marketable natural gas output as compared with that of gross natural gas was attributable to decreased natural gas flaring. In 2016, 11.3% of gross natural gas production was flared compared with 11.7% in 2015 and 31.4% in 2007 (Nigerian National Petroleum Corp., 2017, p. 15).

Mobil Producing Nigeria Unlimited and NNPC produced 93.7 Mbbl of crude petroleum in 2016 compared with 142.6 Mbbl in 2015. The Ubit Field accounted for nearly 15% of output in 2015; the Usari Field, 14%; the Yoho Field, 10%; the Etim-Etime Field, 7%; and the Edop Field, 6%. Mobil and NNPC produced 11.5 billion cubic meters of gross natural gas in 2016 and 12.4 billion cubic meters in 2015 (Nigerian National Petroleum Corp., 2016, p. 4; 2017, p. 7).

In 2016, Total Upstream Nigeria Ltd. (TUPNI) (a subsidiary of Total S.A. of France) produced 87.2 Mbbl of crude petroleum at the Akpo and the Usan Fields compared with 94.9 Mbbl in

2015. TUPNI's output of gross natural gas increased to 7.02 billion cubic meters in 2016 from 6.75 billion cubic meters in 2015 (Nigerian National Petroleum Corp., 2016, p. 6; 2017, p. 7, 13).

In 2016, Star Deep Water Petroleum Ltd. (Chevron Nigeria Ltd., 68.2%, and NNPC, 15.9%) produced 83.8 Mbbl of crude petroleum at the Agbami Field compared with 85.3 Mbbl in 2015. Gross natural gas production was 4.03 billion cubic meters in 2016 compared with 4.26 billion cubic meters in 2015 (Nigerian National Petroleum Corp., 2016, p. 6; 2017, p. 7, 13).

In 2016, Shell Nigeria Exploration and Production Company Ltd. (SNEPCO) and Esso Exploration and Production Nigeria (Deepwater) Ltd. produced 74.5 Mbbl of crude petroleum at the Bonga Field compared with 70 Mbbl in 2015. The companies also produced 1.5 billion cubic meters of gross natural gas in 2016, which was nearly unchanged from that of 2015 (Nigerian National Petroleum Corp., 2016, p. 6; 2017, p. 7, 13).

Chevron Nigeria Ltd. and NNPC produced 59.5 Mbbl of crude petroleum in 2016 compared with 66.8 Mbbl in 2015. The Okan Field accounted for 25% of output in 2015; the Meji Field, 12%; the Gbokoda and the Meren Fields, 10% each; and the Dibi Field, 8%. Chevron and NNPC also produced 5.18 billion cubic meters of gross natural gas in 2016 compared with 8.27 billion cubic meters in 2015 (Nigerian National Petroleum Corp., 2016, p. 4; 2017, p. 7, 13).

Chevron planned to produce 2.22 billion cubic meters per year of natural gas from the new Sonam Field for domestic consumption. The company was engaged in construction in 2016; production was likely to start in the second half of 2017. Chevron also planned to produce 30,000 barrels per day (bbl/d) of liquids from Soram. Natural gas from Soram would be processed at the Escravos gas plant (Chevron Corp., 2017, p. 22).

In 2016, Esso Exploration and Production Nigeria Ltd. and SNEPCO produced 45.8 Mbbl of crude petroleum at the Erha Field compared with 33.5 Mbbl in 2015. Gross natural gas output was 3.61 billion cubic meters in 2016 compared with 3.52 billion cubic meters in 2015 (Nigerian National Petroleum Corp., 2016, p. 6; 2017, p. 7).

NNPC and Shell Petroleum Development Company of Nigeria produced 42.8 Mbbl of crude petroleum in 2016 compared with 81.6 Mbbl in 2015. The Ea Field accounted for 17% of output in 2015; the Forkadas Yokri Field, 11%; the Belema and the Otumara Fields, 7% each; and the Agbada Field, 6%. Gross natural gas production was 16.5 billion cubic meters in 2016 compared with 18.2 billion cubic meters in 2015 (Nigerian National Petroleum Corp., 2016, p. 3; 2017, p. 7, 13).

NNPC and Total E&P Nigeria Ltd. (a subsidiary of Total S.A. of France) produced 37.7 Mbbl of crude petroleum in 2016 compared with 30.6 Mbbl in 2015. Total E&P also produced 6.36 billion cubic meters of gross natural gas in 2016 compared with 5.59 billion cubic meters in 2015 (Nigerian National Petroleum Corp., 2016, p. 9; 2017, p. 7, 13).

NNPC, Nigerian Agip Oil Company Ltd. (NAOC), and Phillips Oil Company Nigeria Ltd. produced 24.3 Mbbl of crude petroleum in 2016 compared with 28.2 Mbbl in 2015. NAOC also produced 9.84 billion cubic meters of gross natural gas in 2016 compared with 11.3 billion cubic meters in 2015 (Nigerian National Petroleum Corp., 2016, p. 5; 2017, p. 7, 13).

Nigeria Liquefied Natural Gas Ltd.'s [NNPC, 49%; Shell Gas B.V., 25.6%; Total LNG Nigeria Ltd., 15%; and ENI International (N.A.) S.a.r.l., 10.4%] plant at Bonny Island had a capacity of 22 Mt/yr of LNG. The company's exports decreased to 17.2 Mt in 2016 from 19.9 Mt in 2015 (BP p.l.c., 2016, p. 28; 2017, p. 34).

In 2016, the production of refined petroleum products increased to 23.6 Mbbl from 7.9 Mbbl. All of Nigeria's Government-owned refineries operated at less than 18% of capacity in 2016. Production was limited by aging equipment, poor maintenance, and power supply interruptions (Cohen, 2014; Nigerian National Petroleum Corp., 2017, p. 20).

Dangote Group planned to build a new refinery with a capacity of 650,000 bbl/d near Lagos; the capacity was revised from 500,000 bbl/d. The company also planned to build a nearby polypropylene plant with a capacity of 3.6 Mt/yr. Dangote expected to complete the plant and refinery by 2018 or 2019. The estimated total cost of the ammonia and urea and polypropylene plants and the refinery was between \$9 billion and \$11 billion (Brelsford, 2017a, b).

Outlook

Ammonia and urea production is expected to increase between 2017 and 2022 because of the opening of Dangote's and EFCL's new plants. Cement production is expected to increase between 2017 and 2022 because of capacity expansions; the output of clay and limestone would also likely increase as a result. Nickel mining could start at the Comet project in 2017. Large-scale iron ore mining also could start at Agbaja in the near future.

Coal production is expected to increase in 2017 for consumption in Dangote Cement's plants. Natural gas output is likely to increase between 2017 and 2019 because of Chevron's new projects. The production of refined petroleum could increase between 2018 and 2021 because of the opening of Dangote's new refinery; national refined petroleum production is expected to remain well below capacity because of NNPC's refineries.

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TABLE I
NIGERIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2012	2013	2014	2015	2016
METALS					
Aluminum metal, primary	26,000	2,000	--	--	--
Beryllium, beryl	NA	NA	52 ³	26 ^{r,e}	--
Gold, mine, Au content kilograms	-- ^r	-- ^r	16 ^r	5 ^r	23
Iron ore, mine:					
Gross weight	600 ^r	2,086 ^r	1,869 ^r	5,874 ^r	7,000 ^e
Fe content ^e	370	1,300	1,200	3,600	4,000
Iron and steel:					
Raw steel ^e	--	--	--	--	100,000
Steel, from scrap ^e	460,000	520,000	600,000	620,000	620,000
Lead:					
Mine, Pb content	11,300	11,500	11,400	8,000 ^r	9,700 ^e
Refinery, secondary ^e	15,000	15,000 ^r	15,000 ^r	15,000 ^r	15,000
Manganese, mine, gross weight	NA	NA	183	3,502 ^r	52,130
Niobium and tantalum, mine, columbite-tantalite concentrate:					
Gross weight	377	560 ^e	760 ³	776 ^{r,3}	780 ^e
Nb content ^e	26	38	52	53 ^r	53
Ta content ^e	75	110	150	150	150
Tin, mine, cassiterite concentrate:					
Gross weight	3,600 ^{r,e}	3,900 ^{r,e}	4,200 ^{r,e}	3,800 ^{r,e}	3,443
Sn content ^e	2,400 ^r	2,600 ^r	2,800 ^r	2,500 ^r	2,300
Tungsten, mine, wolframite concentrate					
Gross weight	87 ^r	803 ^r	603 ^r	145 ^r	122
W content ^e	40 ^r	380 ^r	290 ^r	70 ^r	60
Zinc, mine, Zn content	13,800	7,000	7,000	14,200 ^r	17,000 ^e
Zirconium mineral concentrates, zircon	4,000 ^e	2,000 ^e	1,034 ³	1,650 ^{r,3}	891
INDUSTRIAL MINERALS					
Barite ⁴	16,174	17,784	7,113 ^r	3,323 ^r	537
Cement, hydraulic ^e thousand metric tons	16,000	20,000	20,000	21,000 ^r	22,000
Clay and shale:					
Bentonite	NA	NA	NA	NA	3,200
Kaolin	15,420	25,000 ^e	35,180	44,952 ^r	24,104
Shale thousand metric tons	567	1,026	813	1,012 ^r	1,318
Other do.	1,065	1,482	1,519 ^r	1,305 ^r	1,799
Feldspar, mine production	9,080	12,880	52,080	26,381 ^r	34,144
Gemstones:					
Amethyst kilograms	NA	NA	NA	NA	5,170
Garnet do.	NA	NA	NA	NA	375
Sapphire do.	NA	NA	NA	NA	2
Topaz do.	2,000 ^{r,e}	3,000 ^{r,e}	4,000 ^{r,e}	5,000 ^{r,e}	5,540
Tourmaline do.	90 ^{r,e}	80 ^{r,e}	70 ^{r,e}	58 ^r	55
Gypsum	54,178	56,168	31,791	24,856 ^r	20,000 ^e
Laterite thousand metric tons	3,661	5,242	3,802	2,120 ^r	2,161
Mica	NA	NA	1,077 ³	570 ^{r,e}	79
Monazite concentrate	NA	NA	104 ³	100 ^{r,e}	--
Nitrogen, N content:					
Ammonia	210,000 ^r	130,000 ^r	90,000 ^r	150,000 ^r	340,000 ^e
Urea ^e	350,000 ^r	220,000 ^r	150,000 ^r	250,000 ^r	580,000
Quartz	NA	NA	100 ³	50 ^{r,e}	--

See footnotes at end of the table.

TABLE 1—Continued
NIGERIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2012	2013	2014	2015	2016
INDUSTRIAL MINERALS—Continued					
Sand and gravel, industrial, sand thousand metric tons	28 ^{r,e}	22 ^{r,e}	16 ^{r,e}	10 ^{r,e}	4
Stone, sand, and gravel:					
Sand and gravel, construction, sand do.	2,109	2,662	768	2,724 ^r	1,344
Stone, crushed:					
Granite do.	11,959	12,862	13,274	9,778 ^r	7,489
Limestone do.	18,110	24,078	25,652	21,752 ^r	28,205
Marble	15,300	40,218	31,722 ^r	25,065 ^r	20,118
Other thousand metric tons	4,476	4,632	4,863 ^r	5,107 ^r	4,200 ^e
Stone, dimension, granite	NA	NA	NA	NA	6,339
Stone, size and shape unspecified:					
Basalt	NA	NA	NA	NA	1,400
Dolomite	NA	NA	NA	NA	9,835
Sandstone	NA	NA	NA	NA	33
Sulfur, S content ^e	1,900	1,900	610 ^r	200	610
Talc	NA	NA	NA	NA	667
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous	53,614	106,456	127,467	148,027 ^r	989,155
Liquefied natural gas thousand metric tons	19,700	16,200	18,300	19,900	17,200
Natural gas:					
Gross million cubic meters	73,061 ^r	65,840 ^r	70,385 ^r	82,963 ^r	78,658
Marketable ⁵ do.	37,945 ^r	31,202 ^r	37,245 ^r	46,008 ^r	44,461
Natural gas liquids:					
Butane thousand 42-gallon barrels	3,344	4,103	4,692	4,207	3,188
Pentane do.	3,207	3,754	3,769	3,744	3,467
Propane do.	3,803	4,533	5,535	4,269	3,690
Petroleum:					
Crude, including condensate do.	852,777	800,488	798,542	773,459	669,998
Refinery production:					
Asphalt do.	--	--	-- ^r	-- ^r	43
Distillate fuel oil do.	7,185	7,603	4,764	1,493	4,993
Gasoline do.	9,678	10,554	4,627	2,225	7,942
Kerosene do.	4,683	5,774	3,549	2,016	7,197
Liquefied petroleum gas do.	987	1,880	703	280 ^r	1,112
Residual fuel oil do.	6,458	8,962	4,884	1,889	2,330
Total do.	28,991 ^r	34,773 ^r	18,527 ^r	7,903 ^r	23,617

^eEstimated. ^rRevised. do. Ditto. NA Not available. -- Zero.

¹Includes data available through January 30, 2018. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, secondary copper, diamond, emerald, ilmenite, lime, rolled-steel products, ruby, rutile, salt, and soda ash may have been produced in Nigeria, but available information was inadequate to make reliable estimates of output.

³Reported exports.

⁴Considerably more barite was produced but it was considered to be commercially unusable.

⁵Total natural gas production less flared gas, gas used for fuel, gas used for gas lift, and reinjected gas.

TABLE 2
NIGERIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners		Location of main facilities	Annual capacity
Aluminum		Aluminum Smelter Co. of Nigeria, Ltd. (ALSCON) (BFIG Group Divino Corp., 85%)		Smelter at Ikot Abasi	96,000 ¹
Barite		Artisanal miners		Mines in Benue State	NA
Cement		AshakaCem Plc (LafargeHolcim, 42.63%)		Ashaka	1,000,000
Do.		Benue Cement Company Plc (Dangote Cement Plc)		Gboko	4,000,000
Do.		Cement Co. of Northern Nigeria Plc (BUA Group, 50.7%)		Sokoto	500,000
Do.		Dangote Cement Works Ltd. (Dangote Cement Plc)		Ibese in Ogun State	12,000,000
Do.		Edo Cement Co. Ltd. (BUA Group, 87%)		Okpella in Edo State	3,000,000
Do.		do.		do.	350,000 ¹
Do.		WAPCO Operations (LafargeHolcim, 72.74%)		Two plants at Ewekoro	3,500,000
Do.		do.		Sagamu	1,000,000
Do.		Obajana Cement Plc (Dangote Cement Plc)		Obajana in Kogi State	13,250,000
Do.		United Cement Company of Nigeria Ltd. (Unicem) (Nigerian Cement Holdings B.V., 100%)		Mfamosing in Cross River State	5,000,000
Clay and shale:					
Clay		Dangote Cement Plc		Mines in Benue, ¹ Kogi, and Ogun States	1,500,000 ^e
Do.		Purechem Industries Ltd.		Mine in Ogun State	45,000 ^e
Do.		Porcelainware Industries Ltd.		do.	35,000 ^e
Shale		WAPCO Operations		Quarries in Ogun State	650,000 ^e
Do.		Dangote Cement Plc		Quarries in Benue, ¹ Kogi, ¹ and Ogun States	350,000 ^e
Do.		United Cement Company of Nigeria Ltd. (Unicem)		Quarry in Cross River State ¹	100,000 ^e
Coal		Dangote Industries Ltd.		Mines in Kogi State	3,600,000 ^e
Do.		AshakaCem Plc		Mine in Gombe State	150,000 ^e
Copper, secondary		Sun & Sand Industries Ltd.		Otta	NA
Gemstones:					
Amethyst	kilograms	Artisanal miners		Mines in Plateau State	5,600 ^e
Do.	do.	do.		Mines in Nasarawa State	110 ^e
Garnet	do.	do.		Mines in Plateau State	420 ^e
Sapphire		do.		do.	NA
Tourmaline	kilograms	do.		Mines in Oyo State	60 ^e
Do.		do.		Mines in Plateau State	NA
Topaz	kilograms	do.		do.	6,200 ^e
Gold		Artisanal miners		Mines in Kaduna State	NA
Gypsum		AshakaCem Plc		Mine at Fika in Yobe State	58,000 ^e
Iron and steel:					
Iron ore		National Iron Ore Mining Co. Ltd. (Government, 100%)		Mine at Itakpe	NA ¹
Steel:					
Crude		African Steel Mills Ltd. (Liberty Group)		Electric arc furnace at Ikorodu	170,000
Do.		Continental Iron and Steel Co.		Electric arc furnace at Ikeja	60,000
Do.		Delta Steel Co. Ltd. (Asset Management Co. of Nigeria)		Electric arc furnaces at Aladja	1,000,000 ¹
Do.		Federated Steel Mills Ltd.		Electric arc furnace at Ikeja	140,000
Do.		Nigerian Spanish Engineering Co.		Electric arc furnace at Kano	100,000
Do.		Sankyo Steel Mill Company Ltd.		Electric arc furnace at Ikeja	80,000
Do.		Universal Steel Co.		do.	50,000
Rolled		African Steel Mills Ltd. (Liberty Group)		Ikorodu	100,000
Do.		Delta Steel Co. Ltd.		Aladja	300,000 ¹
Do.		Jos Steel Rolling Co. Ltd. (Zuma Steel West Africa Ltd.)		Jos	210,000 ¹
Do.		Katsina Steel Rolling Co. Ltd. (Dana Steel Ltd.)		Katsina	207,000
Do.		Oshogbo Steel Rolling Co. Ltd. (Kura Holdings Ltd.)		Oshogbo	210,000
Do.		Sunflag Steel (Nigeria) Ltd.		Lagos	120,000
Lead		Tongyi Allied Mining Ltd.		Mine in Federal Capital Territory	NA

See footnotes at end of table.

TABLE 2—Continued
NIGERIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Natural gas:				
Crude	million cubic meters	Nigerian National Petroleum Corp. (NNPC) and Shell Petroleum Development Company of Nigeria (SPDC) joint venture [NNPC, 55%; SPDC, 30%; Total E&P Nigeria Ltd., 10%; Nigerian Agip Oil Company Ltd. (NAOC), 5%]	Koma Field	3,700 °
Do.	do.	do.	Soku Field	3,500 °
Do.	do.	do.	Zara Field	3,400 °
Do.	do.	do.	Gbaran Field	2,900 °
Do.	do.	do.	Bonny Field	1,900 °
Do.	do.	do.	50 other oilfields	3,900 °
Do.	do.	Nigerian National Petroleum Corp. (NNPC) and Mobil Producing Nigeria Unlimited joint venture (NNPC, 60%, and Mobil Producing Nigeria Unlimited, 40%)	Oso Field	3,200 °
Do.	do.	do.	Ubit Field	2,300 °
Do.	do.	do.	Yoho Field	2,000 °
Do.	do.	do.	Edop Field	1,600 °
Do.	do.	do.	Abang Field	630 °
Do.	do.	do.	21 other oilfields	3,300 °
Do.	do.	Nigerian National Petroleum Corp. (NNPC) and Nigerian Agip Oil Company Ltd. (NAOC) joint venture (NNPC, 60%; NAOC, 20%; Phillips Oil Company Nigeria Ltd., 20%)	Idu Field	2,700 °
Do.	do.	do.	Obiafu Field	2,000 °
Do.	do.	do.	Ogbainbiri Field	1,700 °
Do.	do.	do.	Mbede Field	1,200 °
Do.	do.	do.	Oshi Field	1,100 °
Do.	do.	do.	25 other oilfields	4,000 °
Do.	do.	Nigerian National Petroleum Corp. (NNPC) and Chevron Nigeria Ltd. joint venture (NNPC, 60%, and Chevron Nigeria Ltd., 40%)	Okan Field	5,100 °
Do.	do.	do.	Meji Field	690 °
Do.	do.	do.	Meren Field	630 °
Do.	do.	do.	29 other oilfields	2,200 °
Do.	do.	Nigerian National Petroleum Corp. (NNPC) and Total E&P Nigeria Ltd. joint venture (NNPC, 60%, and Total E&P Nigeria Ltd., 40%)	Amenam/Kpono Field	3,300 °
Do.	do.	do.	Ibewa Condensates Field	1,700 °
Do.	do.	do.	Obagi Gas-Cap Field	460 °
Do.	do.	do.	Obagi Deep Field	460 °
Do.	do.	do.	7 other oilfields	940 °
Do.	do.	Star Deep Water Petroleum Ltd. (Chevron Nigeria Ltd., 68.2%; and Nigerian National Petroleum Corp. (NNPC), 15.9%)	Agbami Project	5,200 °
Do.	do.	Esso Exploration and Production Nigeria Ltd., 56%, and Shell Nigeria Exploration and Production Co., 44%	Erha Project	5,100 °
Do.	do.	Shell Nigeria Exploration and Production Co., 55%, and Esso Exploration & Production Nigeria (Deepwater) Ltd., 20%	Bonga Project	2,100 °
Do.	do.	Total Upstream Nigeria Ltd.	Akpo and Usan Fields	7,700 °
Liquefied	million metric tons	Nigeria Liquefied Natural Gas Ltd. [Nigerian National Petroleum Corp. (NNPC), 49%, and Shell Gas B.V., 25.6%]	Trains 1 through 6 at Finima, Bonny Island	22
Niobium (columbium) and tantalum		Kenyang Mining Company Ltd.	Udegi in Nasarawa State	NA
Do.		Artisanal miners	Jos region	NA

See footnotes at end of table.

TABLE 2—Continued
NIGERIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Nitrogen, N content:				
Ammonia		Indorama Eleme Fertilizers & Chemicals Ltd.	Plant at Port Harcourt	840,000
Do.		Notore Chemical Industries Plc	Plant at Onne	300,000
Urea		Indorama Eleme Fertilizers & Chemicals Ltd.	Plant at Port Harcourt	1,460,000
Do.		Notore Chemical Industries Plc	Plant at Onne	500,000
Petroleum:				
Crude	thousand 42-gallon barrels	Nigerian National Petroleum Corp. (NNPC) and Mobil Producing Nigeria Unlimited joint venture (NNPC, 60%, and Mobil Producing Nigeria Unlimited, 40%)	Ubit Field	25,000 ^e
Do.	do.	do.	Usari Field	22,000 ^e
Do.	do.	do.	Yoho Field	18,000 ^e
Do.	do.	do.	Etim/Etimec Field	11,000 ^e
Do.	do.	do.	Edop Field	8,000 ^e
Do.	do.	do.	21 other oilfields	65,000 ^e
Do.	do.	Star Deep Water Petroleum Ltd.	Agbami Project	91,000
Do.	do.	Nigerian National Petroleum Corp. (NNPC) and Shell Petroleum Development Company of Nigeria (SPDC) joint venture [NNPC, 55%; SPDC, 30%; Total E&P Nigeria Ltd., 10%; Nigerian Agip Oil Company Ltd. (NAOC), 5%]	Ea Field	14,000 ^e
Do.	do.	do.	Forkadas Yokri Field	10,000 ^e
Do.	do.	do.	Otumara Field	6,900 ^e
Do.	do.	do.	Belema Field	6,000 ^e
Do.	do.	do.	Agbada Field	5,000 ^e
Do.	do.	do.	50 other oilfields	43,000 ^e
Do.	do.	Nigerian National Petroleum Corp. (NNPC) and Chevron Nigeria Ltd. joint venture (NNPC, 60%, and Chevron Nigeria Ltd., 40%)	Okan Field	19,000 ^e
Do.	do.	do.	Meji Field	9,000 ^e
Do.	do.	do.	Meren Field	8,200 ^e
Do.	do.	do.	Gbokoda Field	8,000 ^e
Do.	do.	do.	Dibi Field	6,300 ^e
Do.	do.	do.	27 other oilfields	27,000 ^e
Do.	do.	Shell Nigeria Exploration and Production Co., 55%, and Esso Exploration & Production Nigeria (Deepwater) Ltd., 20%	Bonga Project	73,000
Do.	do.	Esso Exploration and Production Nigeria Ltd., 56%, and Shell Nigeria Exploration and Production Co., 44%	Erha Project	55,000
Do.	do.	Total Upstream Nigeria Ltd.	Akpo and Usan Fields	100,000 ^e
Do.	do.	Nigerian National Petroleum Corp. (NNPC) and Total E&P Nigeria Ltd. joint venture (NNPC, 60%, and Total E&P Nigeria Ltd., 40%)	Ofon Field	15,000 ^e
Do.	do.	do.	Amenam/Kpono Field	12,000 ^e
Do.	do.	do.	Obagi Field	3,400 ^e
Do.	do.	do.	Edikan Field	2,300 ^e
Do.	do.	do.	Imi Field	2,300 ^e
Do.	do.	do.	6 other oilfields	4,100 ^e
Do.	do.	Nigerian Petroleum Development Company (NNPC, 100%)	Okono/Okpoho Field	13,000 ^e
Do.	do.	do.	Oben/Sapele/Amukpe Field	12,000 ^e
Do.	do.	do.	Batan Field	4,700 ^e
Do.	do.	do.	Afisere/Eriemu Field	3,900 ^e
Do.	do.	do.	Utorogu/Ugheli Field	2,900 ^e
Do.	do.	do.	5 other oilfields	3,500 ^e

See footnotes at end of table.

TABLE 2—Continued
NIGERIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Petroleum:—Continued				
Crude—Continued	thousand 42-gallon barrels	Nigerian National Petroleum Corp. (NNPC) and Nigerian Agip Oil Company Ltd. (NAOC) joint venture (NNPC, 60%; NAOC, 20%; Phillips Oil Company Nigeria Ltd., 20%)	Ogbainbiri Field	5,600 ^e
Do.	do.	do.	Idu Field	3,500 ^e
Do.	do.	do.	Samabiri Field	2,800 ^e
Do.	do.	do.	Oshi Field	2,500 ^e
Do.	do.	do.	Okpai Field	2,200 ^e
Do.	do.	do.	25 other oilfields	16,000 ^e
Natural gas liquids	do.	Mobil Producing Nigeria Unlimited, 51%, and Nigerian National Petroleum Corp. (NNPC), 49%	Bonny Island	16,400
Refined	do.	Port Harcourt Refining Co. Ltd. (Government, 100%)	New Port Harcourt refinery	55,000
Do.	do.	do.	Old Port Harcourt refinery	22,000
Do.	do.	Warri Refinery and Petrochemicals Co. Ltd. (Government, 100%)	Warri refinery	46,000 ¹
Do.	do.	Kaduna Refinery and Petrochemicals Co. Ltd. (Government, 100%)	Kaduna refinery	40,000 ¹
Gas-to-liquids	do.	Chevron Nigeria Ltd.	Escravos Gas To Liquids Plant	12,000
Stone:				
Granite		Julius Berger Nigeria plc	Quarry in Federal Capital Territory	1,700,000 ^e
Do.		RCC Nigeria Ltd.	do.	1,200,000 ^e
Do.		Crushed Rock Industries Ltd.	Quarry in Rivers State	650,000 ^e
Do.		Arab Contractors Nigeria Ltd.	Quarry in Federal Capital Territory	600,000 ^e
Do.		Setraco Nigeria Ltd.	do.	500,000 ^e
Do.		Dantata & Sawoe Construction Co.	do.	450,000 ^e
Do.		Georgio Rock Ltd.	Quarry in Edo State	400,000 ^e
Do.		Ratcon Construction Company Ltd.	Quarry in Oyo State	350,000 ^e
Do.		Kopek Construction Ltd.	do.	350,000 ^e
Do.		Zeberced Nigeria Ltd.	Quarry in Federal Capital Territory	350,000 ^e
Limestone		Dangote Cement Plc	Quarries in Benue, Kogi, and Ogun States	27,000,000 ^e
Do.		WAPCO Operations	Quarries in Ogun State	5,000,000 ^e
Do.		United Cement Company of Nigeria Ltd. (Unicem)	Quarry in Cross River State	2,000,000 ^e
Do.		AshakaCem Plc	Quarry in Gombe State	1,100,000 ^e
Do.		CCNN Plc	Quarry in Sokoto State	800,000 ^e
Sulfur		Kaduna Refinery and Petrochemicals Co. Ltd.	Kaduna refinery	6,600
Tin		Artisanal miners	Mines in the Jos area	NA
Zinc		Tongyi Allied Mining Ltd.	Mine in Federal Capital Territory	NA

^eEstimated. Do., do. Ditto. NA Not available.

¹Not operating at the end of 2016.