



Country Analysis Brief: Nigeria

Last Updated: April 26, 2023
Next update: May 2024

Overview

Table 1. Nigeria's energy overview, 2021

	Crude oil and other petroleum liquids	Natural gas	Coal	Nuclear	Hydro	Renewables and other	Total
Primary energy consumption (quad Btu)	1.0	0.8	0.0	0.0		0.1	1.9
Primary energy consumption (percentage)	52%	44%	0%	0%		4%	100%
Primary energy production (quad Btu)	3.4	1.6	0.0	0.0		0.1	5.2
Primary energy production (percentage)	67%	32%	0%	0%		1%	100%
Electricity generation (TWh)			23.4	0.0	8.0	0.1	31.5
Electricity generation (percentage)			74%	0%	25%	0%	100%

Data source: U.S. Energy Information Administration, International Energy Statistics database

Note: We aggregate hydroelectricity and renewables as *renewables and other* for primary energy production and consumption. We aggregate crude oil and other petroleum liquids, natural gas, and coal fuel sources as fossil fuel-derived fuel sources for electricity generation. Quad Btu=quadrillion British thermal units, TWh=terawatthours

- Nigeria is a major hydrocarbons producer in Africa and its production is the mainstay of the country's economy. Oil and natural gas revenue is the country's primary source of foreign exchange, and crude oil price changes noticeably affect its economy.
- Nigeria holds the largest natural gas reserves on the continent and, according to BP's estimates in its June 2022 *Statistical Review of World Energy*, it was ranked sixth globally among exporters of liquefied natural gas (LNG) in 2021.¹
- Although Nigeria is a major crude oil producer in Africa, sporadic supply disruptions have affected production and resulted in unplanned outages in recent years. Since 2020, unplanned disruptions and less investment in upstream development led to a significant decline in crude oil production. In third-quarter 2022, Nigeria's crude oil production briefly dropped below one million barrels per day (b/d) because of significant and extended disruptions stemming from crude oil theft and pipeline vandalism. These disruptions reduced crude oil production of Nigeria's major crude oil grades, such as Bonny Light, Brass River, and Forcados. Although crude oil output largely returned to typical levels by first-quarter 2023, disruptions remain a significant and persistent downside risk to Nigeria's production.²

- Nigeria’s oil and natural gas industry is primarily located in the southern Niger Delta area, where it has been a source of conflict. Local groups seeking a share of the wealth often attack the oil infrastructure, forcing companies to declare *force majeure* on oil shipments (a legal clause that releases parties from contractual obligations because of circumstances beyond their control). At the same time, oil theft causes pipeline damage that is often severe, resulting in loss of production and in pollution. This damage also sometimes forces companies to shut in production. In addition, aging infrastructure and poor maintenance resulted in oil spills.

Figure 1. Map of Nigeria



Data source: U.S. Central Intelligence Agency, [CIA World Factbook—Nigeria](#)

Petroleum and Other Liquids

- Nigeria held an estimated 37.1 billion barrels of proved crude oil reserves at the beginning of 2023.³ Nigeria produces mostly light, sweet (low sulfur) crude oil and most of this oil is exported to global markets (Table 2).⁴

Table 2. Selected crude oil grades produced in Nigeria

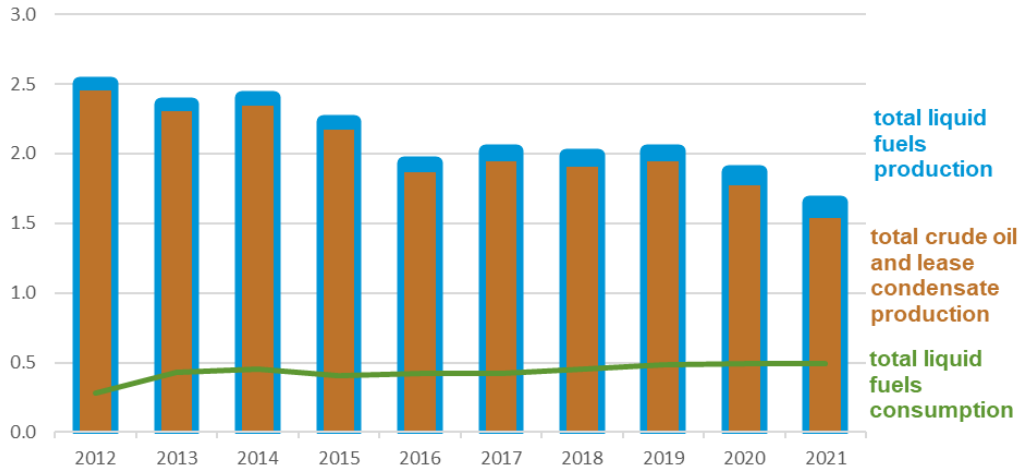
Crude oil grade	API gravity number (degrees)	Sulfur content (percentage)
Agbami	47.2	0.05%
Akpo	45.8	0.07%
Amenam	37.0	0.17%
Bonga	29.1	0.29%
Bonny Light	34.5	0.14%
Brass River	36.5	0.13%
Erha	33.7	0.18%
Escravos	34.0	0.15%
Forcados	30.0	0.15%
Qua Iboe	36.6	1.60%
Usan	30.6	0.23%

Data source: McKinsey & Company's Energy Insights

- The Nigerian government announced in December 2022 that it plans to open a *mini-bid* round for seven offshore exploration blocks in 2023. The previous bid round in Nigeria was in 2007, and the latest mini-bid round is the first under Nigeria’s new legal framework developed under the 2021 Petroleum Industry Act, a legislative act that provides more favorable fiscal terms to attract more international investors. According to Rystad Energy, awards are likely to be announced sometime in early 2024.⁵
- On August 16, 2021, the Petroleum Industry Act (PIA) was passed, a culmination of a 20-year effort to overhaul the hydrocarbon industry’s legal framework and attract investor interest in upstream development. Changes to the hydrocarbons legal framework include:
 - Creating two distinct industry regulators, the Nigerian Upstream Regulatory Commission and the Nigerian Midstream and Downstream Petroleum Regulatory Authority
 - Restructuring the national oil company, the Nigerian National Petroleum Corporation (NNPC)
 - Lowering the tax and royalty structure for crude oil production
 - Modifying terms and conditions for upstream licensing and leasing⁶
- Nigeria produced about 1.5 million b/d in crude oil and lease condensate in 2021, nearly a 37% decline from its production average in 2012. Nigeria’s hydrocarbon production declined in recent years because of a number of factors, such as:
 - Lower international investor interest in upstream development
 - Oil theft and smuggling
 - Maturing fields
 - Aging and poorly maintained infrastructure
 - Disruptions and forced shut-ins stemming from security-related incidents at its production sites or transport facilities (Figure 2)⁷

Figure 2. Total annual liquid fuels production and consumption in Nigeria, 2012–2021

million barrels per day



Data source: U.S. Energy Information Administration, International Energy Statistics database

- Despite having a refinery nameplate capacity that can meet nearly all of its domestic demand, Nigeria is fully reliant on imported petroleum products to meet domestic demand because its four state-owned refineries have been shut in for long-term maintenance or rehabilitation since 2020, and it is unclear when or if these refineries will be brought back online.⁸ The Nigerian government planned to construct smaller modular refineries, but the lack of financing has caused delays and the current status of those refineries is unclear. The Dangote Group is building a 650,000 b/d refinery that was scheduled to be commissioned by the end of 2022, but the start date has reportedly been delayed until 4Q 2023. The refinery’s completion would allow Nigeria to reduce its petroleum product imports and potentially become a net petroleum product exporter (Table 3).⁹

Table 3. Major refineries in Nigeria

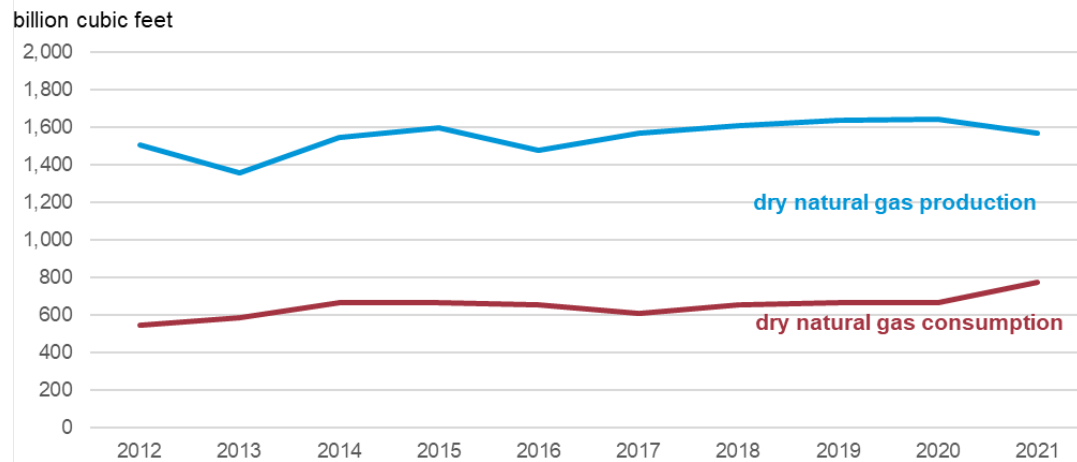
Refinery	Location	Notes	Nameplate Capacity (barrels per day)
Kaduna refinery	Kaduna state	crude sourced from Escravos and Forcados terminals	110,000
Port Harcourt refinery I and refinery II	Rivers state	crude sourced from Escravos terminal	210,000
Warri refinery	Delta state	crude sourced from Bonny terminal	125,000
Dangote refinery	Lagos state	commissioning expected by end-2023	650,000
Total			1,095,000

Data source: PwC Nigeria, NS Energy Business

Natural Gas

- Nigeria held an estimated 206.5 trillion cubic feet (Tcf) of proved natural gas reserves at the beginning of 2023.¹⁰
- Dry natural gas production in Nigeria averaged about 1.5 Tcf between 2012 and 2021, and dry natural gas consumption averaged 649 billion cubic feet (Bcf) over the same time period (Figure 3).¹¹

Figure 3. Total dry annual natural gas production and consumption in Nigeria, 2012–2021



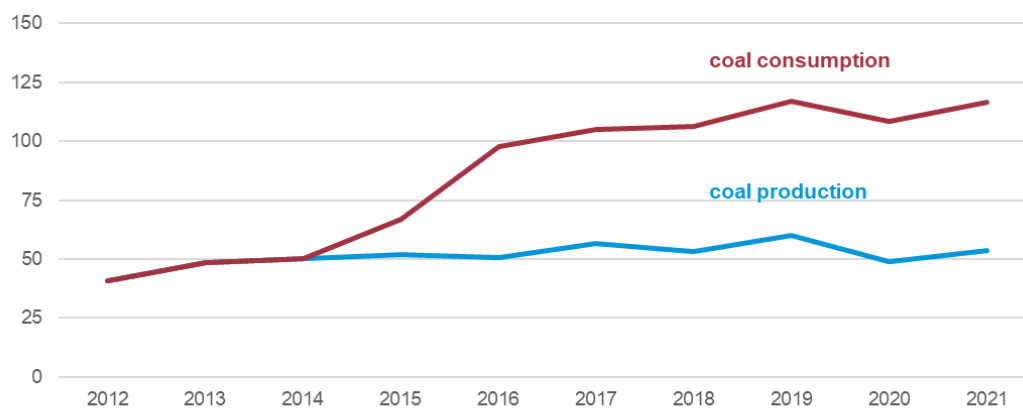
Data source: U.S. Energy Information Administration, International Energy Statistics database

- Significant amounts of natural gas production in Nigeria is either re-injected or flared. Some of Nigeria's oil fields lack the infrastructure to capture the natural gas produced with oil, known as associated gas. According to the most recent data by the World Bank's Global Gas Flaring Reduction Partnership (GGFR), Nigeria flared about 5.318 billion cubic meters (or 188 Bcf) of natural gas in 2022, making Nigeria the ninth-highest natural gas-flaring country in terms of annual natural gas-flaring volume.¹²
- Nigeria has a gas-to-liquids (GTL) plant at Escravos with a nameplate capacity of 33,000 b/d that started production in mid-2014. The Escravos GTL plant is operated by Chevron (75%) in partnership with NNPC (25%). The Escravos GTL plant can convert about 475 million cubic feet per day (MMcf/d) of natural gas into diesel, liquefied petroleum gas (LPG), and naphtha products, primarily for export.¹³

Coal

- According to our latest estimates, Nigeria held about 379 million short tons in coal reserves in 2022.¹⁴
- Nigeria both produces and consumes relatively small amounts of coal. Between 2012 and 2021, the country averaged about 51,000 short tons of coal production, all of which was bituminous coal. Nigeria consumed an average of about 86,000 short tons of bituminous coal in the same time period and so needed to import coal to meet its domestic needs (Figure 4).¹⁵

Figure 4. Total coal production and consumption in Nigeria, 2012–2021
thousand short tons

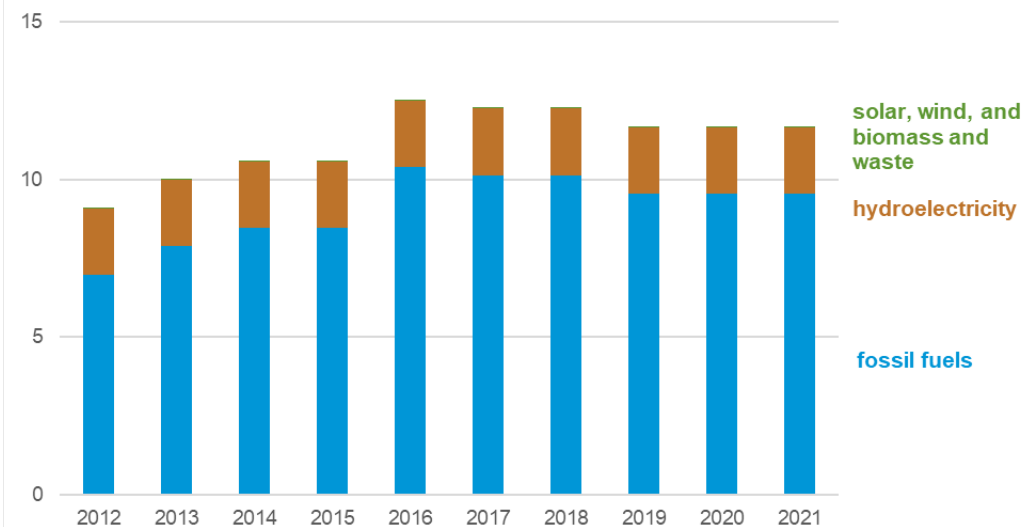


eia Data source: U.S. Energy Information Administration, International Energy Statistics database

Electricity

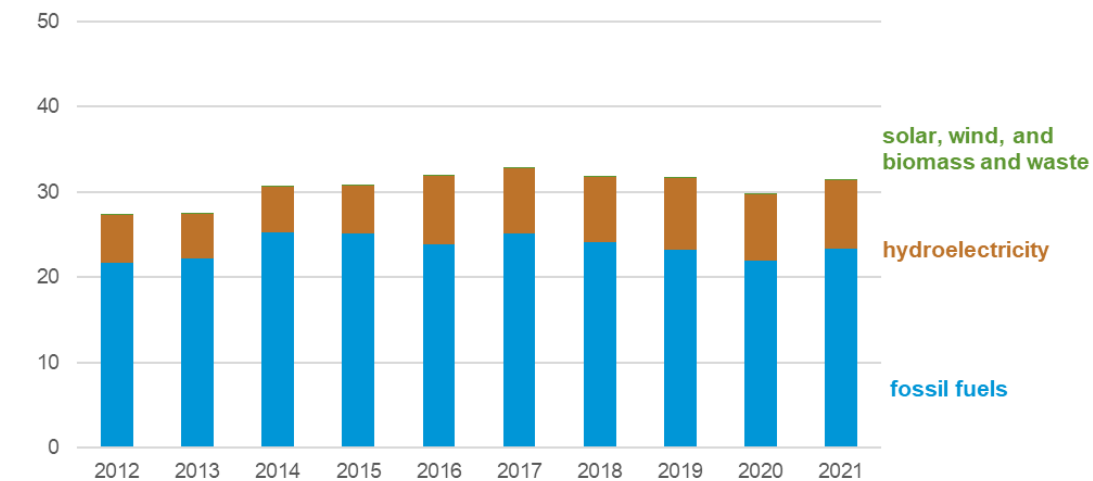
- Nigeria mostly relies on fossil fuel-derived fuel sources for power generation, but the country also employs some hydropower to meet its electricity needs. In 2021, Nigeria had a total electricity capacity of 11.7 gigawatts (GW), only slightly higher than 9.1 GW in 2012. Nigeria generated about 31.5 gigawatthours (GWh) in 2021, and about 74% of that total was derived from fossil fuel sources and the remainder from hydropower (Figures 5 and 6).¹⁶

Figure 5. Nigeria's electricity capacity by fuel type, 2012–2021 gigawatts



eia Data source: U.S. Energy Information Administration, International Energy Statistics database

Figure 6. Nigeria's net electricity generation by fuel type, 2012–2021 gigawatthours



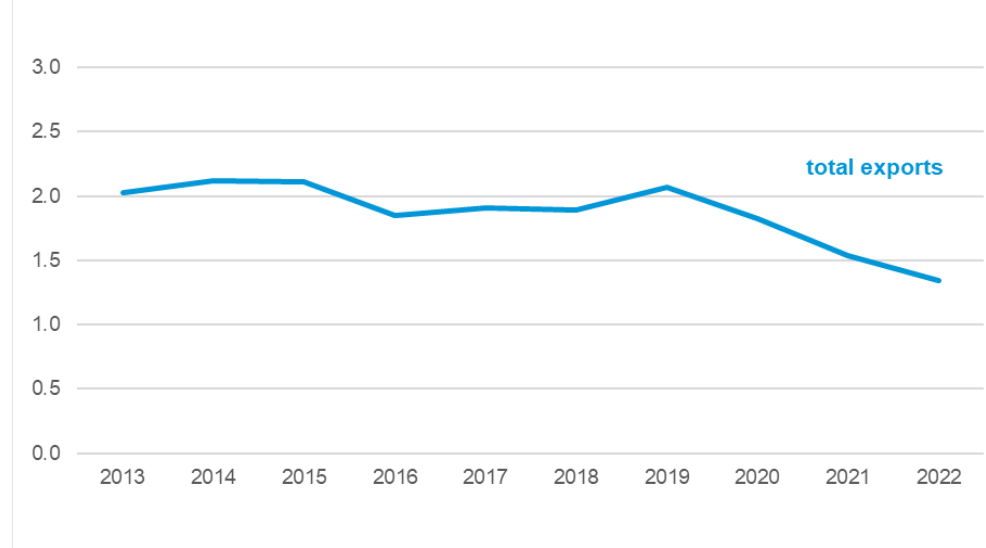
eia Data source: U.S. Energy Information Administration International Energy Statistics database

- According to estimates by the World Bank, about 55% of Nigerian households had access to electricity in 2020, up from 48% in 2010. The disparity between urban and rural electrification rates are significant; 84% of residents in urban areas had access to electricity in 2020 (up from 80% in 2010), compared with about 25% of residents in rural areas (slightly up from 24% in 2010).
- Nigeria’s electric power sector faces many challenges, such as poor and underdeveloped power infrastructure and high transmission and distribution losses. Even those with access to electricity deal with frequent electricity load-shedding events that result in blackouts. As a result, residents and businesses rely on costly oil-fired power generators or off-grid traditional biomass and waste to meet their energy needs.¹⁷
- In 2022, the Nigerian government revealed its Energy Transition Plan, which outlines its strategy to reduce its carbon emissions across five key sectors (power, transport, oil and natural gas, cooking, and industry) to become carbon neutral by 2060. The Energy Transition Plan requires an estimated \$1.9 trillion, or \$410 billion above normal projected spending levels, to achieve this target. The government is seeking to raise funds to help implement this plan.¹⁸
- According to the International Hydropower Association, Nigeria has natural resources that provide significant hydropower potential, but hydropower in the country is underdeveloped. The Nigerian government is seeking to build hydropower plants and increase its hydropower capacity to help the government better address domestic electricity needs.¹⁹ In November 2022, the Nigerian government invited bids for private investors to operate the 700-megawatt Zungeru hydropower plant, which is currently under construction and is slated to be completed in 2023. The Zungeru hydropower plant is the largest hydropower plant in Nigeria and is located on the Kaduna River in the Niger state, about 150 kilometers (113 miles) away from Abuja, the nation’s capital.²⁰
- Government support has grown for solar power projects that will increase access to electricity in remote and rural areas. In October 2022, the Nigerian government’s Rural Electrification Agency, with support from the United Nations Development Programme (UNDP) in Nigeria and the Global Environment Facility (GEF), launched the Africa Minigrids Program. This program supports solar mini-grid development and provides off-grid access and a cleaner and cheaper alternative to diesel power generators for end users.²¹

Energy Trade

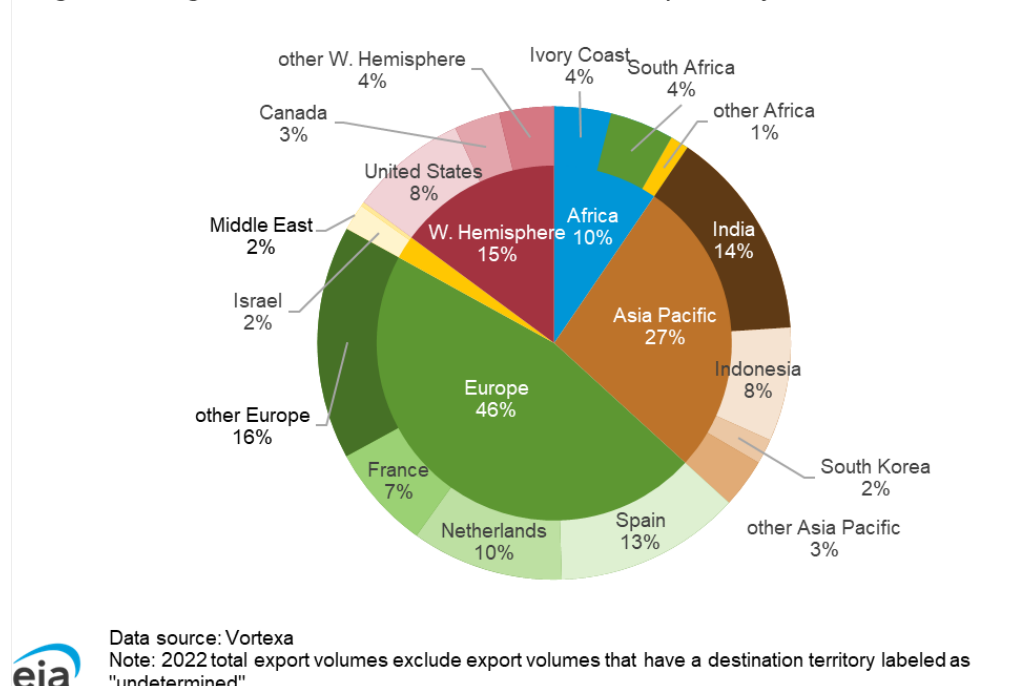
- According to Vortexa’s estimates, Nigeria imports virtually no crude oil or lease condensates. Crude oil and lease condensate exports from Nigeria averaged about 1.9 million b/d between 2013 and 2022; however, crude oil and condensate exports significantly declined over the past decade. In 2022, these exports were about 776,000 b/d lower than the 10-year high of 2.1 million b/d. Nigeria’s declining production over the past decade is the primary factor driving these decreased exports (Figures 7 and 8).²²

Figure 7. Nigeria's total annual exports of crude oil, 2013–2022
million barrels per day



Data source: U.S. Energy Information Administration, International Energy Statistics database, Vortexa
Note: U.S. EIA estimates are for 2013 to 2018. Subsequent years are Vortexa's estimates.

Figure 8. Nigeria's crude oil and condensate exports by destination, 2022

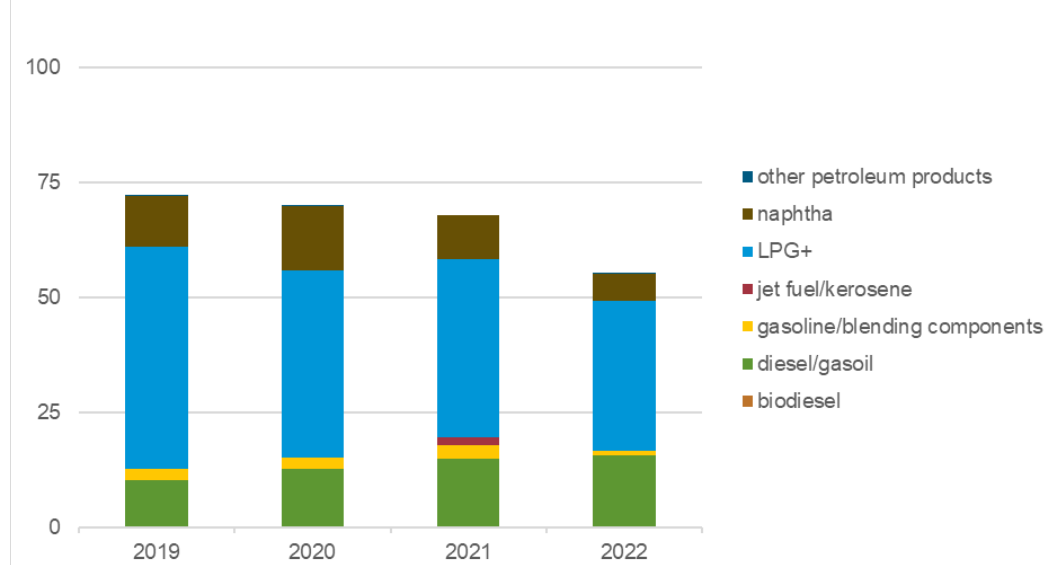


Data source: Vortexa
Note: 2022 total export volumes exclude export volumes that have a destination territory labeled as "undetermined"

- Because Nigeria's main state-owned refineries are currently offline as a result of long-term rehabilitation, Nigeria exports only a small amount of petroleum products, mainly liquefied

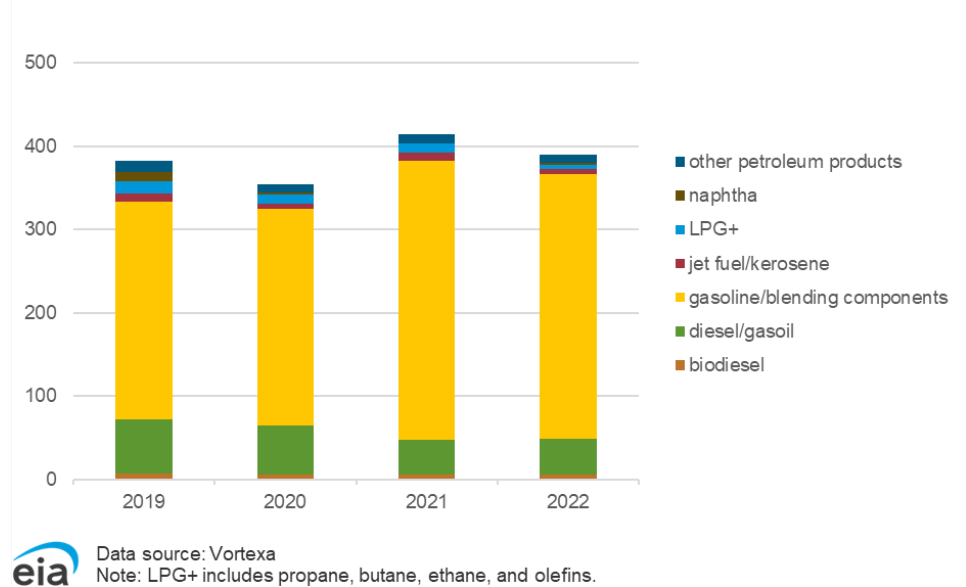
petroleum gas and diesel or gasoil. Between 2019 and 2022, Nigeria exported an average of about 66,000 b/d of petroleum products; these exports originate from Nigeria’s small modular refineries, which generally have small capacities and lack complex refining capabilities. Nigeria imports substantially higher volumes of petroleum products; volumes averaged about 385,000 b/d between 2019 and 2022. Almost 90% of this volume was gasoline and its blending components, or diesel/gasoil products, which is used in the electric power and transportation sectors (Figures 9 and 10).²³

Figure 9. Nigeria's total annual petroleum products exports, 2019–2022
thousand barrels per day



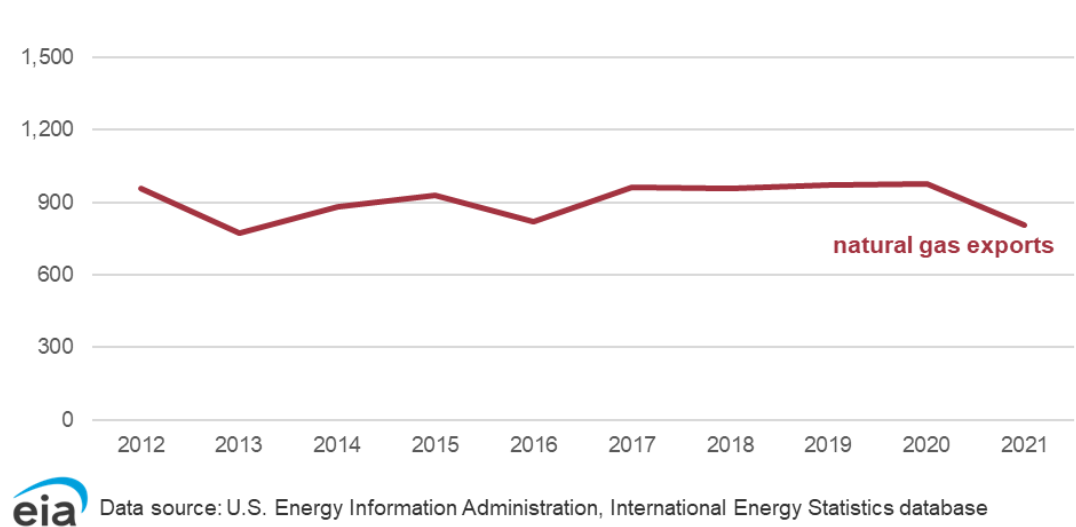
eia Data source: Vortexa
Note: LPG+ includes propane, butane, ethane, and olefins.

Figure 10. Nigeria's total annual petroleum products imports, 2019–2022
thousand barrels per day



- Nigeria does not import any natural gas, and it exports natural gas that is not consumed domestically. Nigeria exported an average of about 900 Bcf of natural gas from 2012–2021 (Figure 11).²⁴

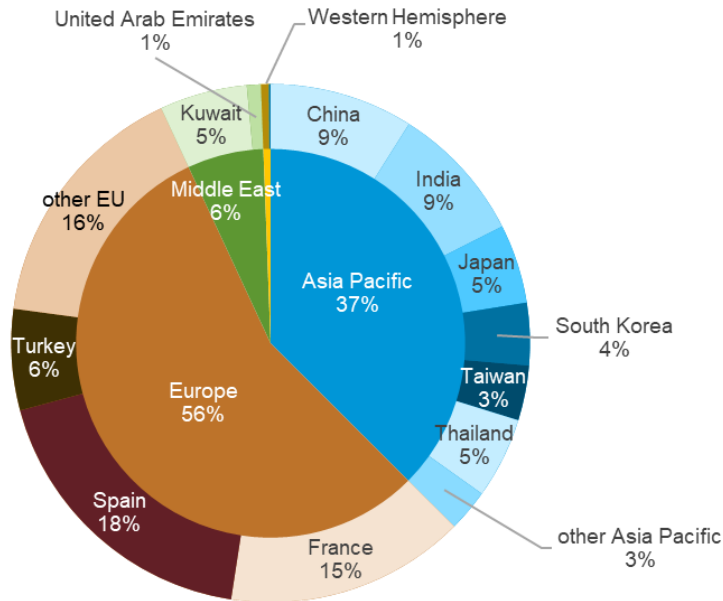
Figure 11. Nigeria's total annual natural gas exports, 2012–2021
billion cubic feet



- Nigeria exports most of its natural gas as LNG. Both infrastructure and demand constraints are challenges to exporting significant natural gas volumes by pipeline to neighboring countries. According to BP's 2022 *Statistical Review of World Energy*, Nigeria exported about 824 Bcf of natural gas in 2021, most of which went to Europe or Asia. France and Spain were the top European importers in 2021, receiving 123 and 152 Bcf of LNG from Nigeria, respectively. In

Asia, China and India were the top importers in the region, receiving 74 and 71 Bcf of LNG from Nigeria, respectively (Figure 12).²⁵

Figure 12. Nigeria's liquefied natural gas exports by destination, 2021



Data source: BP's 2022 Statistical Review of World Energy

- Nigeria has only one LNG terminal currently in operation and located at Bonny Island, which is also a major crude oil export hub. The Nigeria LNG (NLNG) terminal at Bonny Island began operations in 1999 and has six liquefaction trains operating, which has a total capacity of about 1.1 Tcf per year. Construction of a seventh train began in June 2021 and aims to finish by 2026. A 58 Bcf floating LNG terminal has been proposed by UTM Offshore, in partnership with NNPC, that would potentially take feedstock from the Yoho natural gas field, which is owned by ExxonMobil and NNPC; the project is currently under appraisal and has not reached a final investment decision (Table 4).²⁶

Table 4. Nigeria's liquefied natural gas terminals

Project name	Status	Ownership	Start date	Number of storage tanks	Nominal liquefaction capacity (billion cubic feet per year)	Storage capacity (million cubic feet)
Nigeria LNG (NLNG) terminal		NNPC: 49% Shell: 26% TotalEnergies: 15% Eni: 10%		4		12
NLNG T1 - T2	Operating		T1: 1999 T2: 2000		317	
NLNG T3	Operating		2002		158	
NLNG T4 - T5	Operating		2006		394	
NLNG T6	Operating		2008		197	
NLNG T7	Under construction		2026			
Total					1,066	12

Data source: GIIGNL 2022 Annual Report

- The Nigerian government is seeking to expand its pipeline capacity domestically and across borders to increase both destinations and volumes of its natural gas exports. The Ajaokuta-Kaduna-Kano (AKK) pipeline is currently under construction and, once built, could transport natural gas from Ajaokuta and Abuja in central Nigeria to Kano state in northern Nigeria and provide natural gas feedstock for thermal power stations along its route. The AKK pipeline is scheduled for completion sometime in early 2023; however, whether the pipeline will be completed on time remains unclear.²⁷ The pipeline is also part of the larger Trans-Nigeria Gas Pipeline (TNGP) project, which includes both the AKK pipeline and a proposed pipeline that aims to connect the Qua Iboe Terminal on the coast of southern Nigeria to Ajaokuta. The TNGP project is also part of a proposed larger, intraregional natural gas pipeline project called the Trans-Saharan Gas Pipeline (TSGP) project. The TSGP aims to transport natural gas from Nigeria to Algeria via Niger, which would provide an additional route for Nigeria to transport natural gas to Europe via Algeria's own international pipeline network. The TSGP project is still being discussed at a ministerial level and still at a preliminary stage (Table 5).²⁸

Table 5. Selected major natural gas pipelines in Nigeria

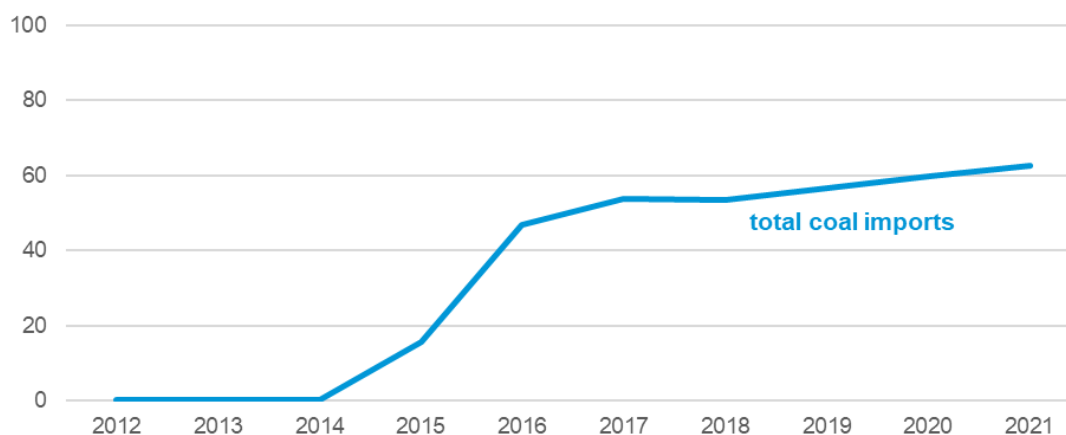
Pipeline name	Status	Ownership	Route	Start date	Length of pipeline (miles)	Pipeline capacity (billion cubic feet per year)
West African Gas Pipeline	Operating	Chevron, NNPC, Shell, Takoradi Power Company Ltd., Societe Togolaise de Gaz, Societe BenGaz S.A.	From Lagos, Nigeria, to Togo, Ghana, and Benin. Also links to Escravos-Lagos pipeline in Nigeria	2011	424	168
Escravos-Lagos Pipeline System II (ELPS 2) expansion project	Operating	NNPC	Doubles capacity of existing Escravos-Lagos pipeline (402 Bcf per year) and follows same route from Escravos (Delta state) to Lekki (Lagos state)	2021	214	402
Ajaokuta-Kaduna-Kano (AKK) pipeline	Under construction	NNPC	Connects Ajaokuta to Abuja terminal natural gas station (TGS), Kaduna TGS, and Kano TGS. Pipeline is phase one of three for the Trans-Nigeria Gas Pipeline development	2023	384	1,278
Obiafu-Obrikom-Oben (OB3) Gas Pipeline	Under construction	NNPC	Starts in Edo state and ends in Rivers state	Unknown	88	730
Trans-Nigeria Gas Pipeline (TNGP) project	Proposed	NNPC	Planned route to start at the Qua Iboe Terminal and run through the Obigbo-Umuahia-Enugu-Ajaokuta pipeline network and AKK pipeline and connect to Algeria via Niger	Unknown	429	Unknown

Data source: Hydrocarbons Technology, Global Energy Monitor, West African Gas Pipeline Company website, NS Energy Business

Note: The TNGP project's specified length excludes the AKK pipeline segment. When combined, the total length is 1,300 kilometers (813 miles).

- Nigeria imported an average of 35,000 short tons of coal between 2012 and 2021. Nigeria began importing coal in 2015 as higher domestic consumption needs outstripped domestic coal production (Figure 13).²⁹

Figure 13. Nigeria's total annual coal imports, 2012–2021
thousand short tons



Data source: U.S. Energy Information Administration, International Energy Statistics database

¹ [BP 2022 Statistical Review of World Energy](#), June 2022.

² “Can Nigeria keep oil theft and vandalism at bay to sustain current output?” *Rystad Energy*, March 7, 2023.

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- ²⁴ U.S. Energy Information Administration, [International Energy Statistics database](#), accessed January 31, 2023.
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- ²⁶ International Group of Liquefied Natural Gas Importers (GIIGNL), [2022 Annual Report](#), May 24, 2022.
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- ²⁸ “[Ajaokuta-Kaduna-Kano \(AKK\) Gas Pipeline](#),” *NS Energy Business*, accessed March 16, 2023. “[Algeria, Niger, Nigeria resume talks on Trans-Saharan gas pipeline](#),” *Al-Jazeera*, June 23, 2022. International Trade Administration, “[Algeria Trans Saharan Gas Pipeline](#),” Market Intelligence press release, September 22, 2022. “[Trans Nigeria Gas Pipeline](#),” *Global Energy Monitor*, accessed March 16, 2023. International Trade Administration, “[Nigeria Renewable Energy](#),” Market Intelligence press release, March 24, 2022.
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