Energy Information Administration

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# COUNTRY ANALYSIS BRIEFS

# **Nigeria**

Last Updated: April 2007

# **Background**

Nigeria is rich in mineral wealth, with petroleum and natural gas being the country's major mineral products. Nigeria's economic growth primarily comes from the country's oil sector.

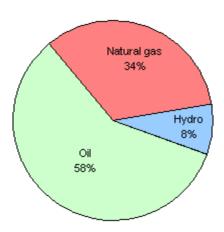
On April 21, 2007, Nigeria held presidential elections, marking the first time in Nigeria's history that the country passed control from one civilian government to another. During the 16 months preceding the election, militant activity in the Niger Delta (especially near Warri and Port Harcourt) has severely impacted Nigeria's oil production potential by shutting-in an estimated 20 percent of total production. The Nigerian economy is heavily dependent on the oil sector, which accounts for 95 percent of the country's total export revenues.

Map: Niger Delta Oil Infrastructure Nigeria Abuja Area of Bight Cameroon of Warri Benin Port Harcourt Qua Iba Mission Brass Rive Bight of Bonny

Source: CIA

In 2004, Nigeria's energy consumption mix was dominated by oil (58 percent), followed by natural gas (34 percent) and hydroelectricity (8 percent). Coal, nuclear and other renewables are currently not part of the country's energy consumption mix. Between 1984-2004, the share of oil in Nigeria's energy mix has decreased from 77 percent to 58 percent. Natural gas consumption increased from 18 percent to 34 percent. Hydroelectricity has seen a slight increase as well from 5 percent to 8 percent.

## Total Energy Consumption in Nigeria, by Type (2004)



Source: EIA International Energy Annual 2004

# Oil

Nigeria is the largest oil producer in Africa.
Approximately twothirds of Nigeria's production capacity is located onshore, while one-third is located offshore.

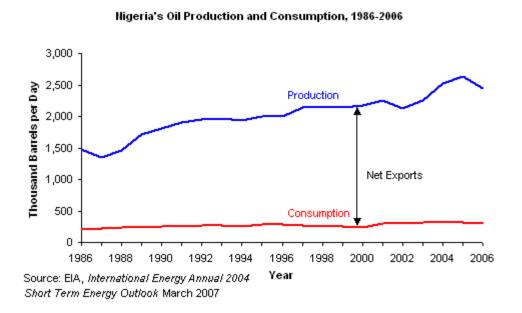
According to *Oil and Gas Journal* (*OGJ*), Nigeria had 36.2 billion barrels of proven oil reserves as of January 2007. The Nigerian government plans to expand its proven reserves to 40 billion barrels by 2010. The majority of reserves are found along the country's Niger River Delta, in southern Nigeria and offshore in the Bight of Benin, Gulf of Guinea and Bight of Bonny. Nigeria has total production capacity (total potential production capacity if all oil currently shut-in came back online) of three million barrels per day (bbl/d) including two million bbl/d onshore and one million bbl/d offshore.

#### **Recent Developments**

Since December 2005, Nigeria has experienced increased pipeline vandalism, kidnappings, and militant takeover of oil facilities in the Niger Delta. As of April 2007, an estimated 587,000 bbl/d of crude production is shut-in. The majority of shut-in production is located onshore in the Niger Delta, with the exception of the offshore 115,000 bbl/d EA Platform. Since December 2005, Nigeria has lost an estimated 16 billion dollars in export revenues due to shut-in oil production. Shell has incurred the majority of shut-in oil production (477,000 bbl/d), followed by Chevron (70,000 bbl/d) and Agip (40,000 bbl/d). Militant attacks on oil infrastructure have also crippled Nigeria's domestic refining capabilities. In February 2006, militant attacks in the western delta region forced the Warri (125,000 bbl/d) and Kaduna (110,000 bbl/d) refineries to shutdown due to a lack of feedstocks. In December 2006, operators shutdown Nigeria's two Port Harcourt refineries for two months due to technical problems. The Niger Delta rebel group, Movement for the Emancipation of the Niger Delta (MEND) and other militia organizations in search of monetary compensation and/or political leverage are the ones behind the attacks. In addition to abductions, thousands of foreign workers and their families have left the Niger Delta due to continued hostilities. At least three companies, including a private drilling company and pipeline laying company have also left. MEND has stipulated numerous conditions to the Nigerian government that it wants met or else it has vowed to continue the attacks. Chief among the conditions is greater revenue sharing of the oil wealth, increased local control of oil property, the release of tribal prisoners, and transparency of government budgets. International oil companies (IOCs) are not expected to repair damaged oil infrastructure until after the elections are over.

#### Production

Nigeria is the largest oil producer in Africa, the eleventh largest producer of crude oil in the world and a member of the Organization of Petroleum Exporting Countries (OPEC). In 2006, total Nigerian oil production, including lease condensates, natural gas liquids and refinery gain, averaged 2.45 million bbl/d (of which 2.28 million bbl/d was crude oil). If Nigeria could bring back online all oil currently shut-in, EIA estimates that Nigeria could reach crude oil production capacity of three million bbl/d. With the help of new projects coming online, the Nigerian government hopes to increase oil production capacity to four million bbl/d by 2010.



Despite the recent attacks on Shell's oil facilities, the company's deepwater Bonga field began producing oil at the end 2005, reaching production of 225,000 bbl/d in April 2006. Bonga is estimated to hold recoverable oil reserves of 600 million barrels. Oil from the field is stored in a floating production, storage and offloading (FPSO) unit, with capacity of two million barrels. In August 2008, Shell plans to bring online its Gbaran/Ubie field (220,000 bbl/d), located offshore of the eastern delta.

ExxonMobil produces around 750,000 bbl/d of oil in Nigeria. The company plans to invest \$11 billion in the country's oil sector through 2011, with the hope of increasing production to 1.2 million bbl/d. In March 2006, ExxonMobil brought online its Erha development, which is located offshore of the western delta. Erha reached peak production of 200,000 bbl/d in July 2006. Oil from Erha is stored in a FPSO, with capacity of 2.2 million barrels of oil. Very Large Crude Carriers (VLCC), capable of holding up to 300,000 deadweight tons are used for exporting the oil from the terminal. ExxonMobil also operates the Yoho field, with current output of around 150,000 bbl/d. Yoho contains around 400 million barrels of oil reserves. Yoho will be re-injected with natural gas to maintain field pressure. The \$1.2 billion field is located in the shallow waters of the eastern delta. In June 2008, ExxonMobil plans to bring online its Bosi field (110,000 bbl/d) located offshore of the western delta.

Chevron's offshore Agbami field is scheduled to come online in 2008, with peak production estimated at 250,000 bbl/d. The majority of Agbami lies in Block 127, while one-third of it lies in the adjacent Block 128. In February 2005, the Nigerian National Petroleum Corporation (NNPC) awarded Chevron a \$1.1 billion contract for the construction of a FPSO for the field, which will be undertaken by Daewoo Shipping and Maritime Engineering (South Korea). The FPSO is expected to export up to 250,000 bbl/d of oil and 450 million cubic feet per day (MMcf/d) of natural gas.

Total, Agip, and ConocoPhillips are also involved in the Nigerian oil sector. Output at Total's Amenam field reached 120,000 bbl/d in January 2005. The Amenam field contains reserves of around one billion barrels of oil equivalent. In January 2009, Total plans to bring online its offshore Akpo field (180,000 bbl/d) and in January 2010, its offshore Usan field (150,000 bbl/d).

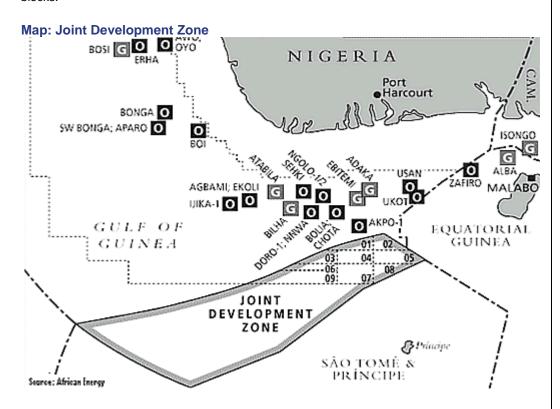
#### Licensing Rounds

Deepwater projects may represent the future of Nigerian oil production by allowing multinational operators to avoid security risks inherent to the unstable Niger Delta region. In a licensing round held in March 2005, Nigeria offered a total of 77 deepwater and inland blocks. Beginning in April 3, 2007, the Nigerian government opened a licensing round in which 44 blocks are being offered. A number of the blocks in the April round were also offered in 2005. According to the Department of Petroleum Resources (DPR), companies that plan to invest in Nigeria's infrastructure and refinery projects will be given right of first refusal on 17 of the blocks.

Along with the increased foreign investment in Nigeria's oil and natural gas sectors, the Nigerian government has been working to promote local investment in the hydrocarbon industry. Nigeria's Marginal Field Development Program (MFDP) provides tax breaks and government incentives to encourage local involvement in the extractive industries. The government has called for the current 10 percent local ownership to be increased to 45 percent in 2008 and 70 percent in 2010.

#### Joint Development Zone

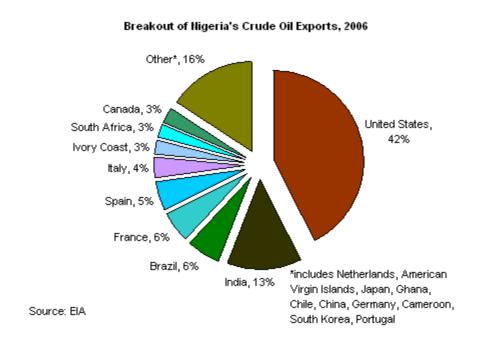
The Joint Development Zone (JDZ), shared by Nigeria and neighboring Sao Tome and Principe (STP), contains 23 exploration blocks and could potentially hold up to 14 billion barrels of oil reserves. Nigeria and Sao Tome have agreed to split revenues from the blocks on a 60:40 basis, respectively. The International Monetary Fund estimates that Sao Tome and Principe could net more than \$700 million per year if oil production output of 80,000 bbl/d is attained before 2013. Block One is currently the only block in the JDZ undergoing development. The block is controlled by Chevron (51 percent), with partners ExxonMobil (40 percent) and Equity Energy Resources (9 percent). If oil is located, Chevron plans to bring it onstream by 2010. In 2005, JDZ put Blocks 2-6 up for offer. In March 2006, Nigeria and Sao Tome and Principe signed PSCs for three of the blocks.



#### **Exports**

Nigeria is the world's eighth largest exporter of crude oil and the country is a major oil exporter to the United States. In 2006, Nigeria's total oil exports reached an estimated 2.15 million bbl/d. Nigeria shipped approximately one million bbl/d or 42 percent of its crude exports to the United States in 2006. Additional importers of Nigerian crude oil include Europe (19 percent), South America (7.6 percent), Asia and the Caribbean. Despite shut-in production, major importers of Nigerian crude have experienced little to no decrease in Nigerian crude imports over the past 15 months. The steady exports suggest that the new production capacity additions (approximately 545,000 bbl/d) have mostly offset shut-in production.

Nigeria has six export terminals including Forcados and Bonny (operated by Shell); Escravos and Pennington (Chevron); Qua Iboe (ExxonMobil) and Brass (Agip). According to the *International Crude Oil Market Handbook*, Nigeria's export blends are light, sweet crudes, with gravities ranging from API 29 – 36 degrees and low sulfur contents of 0.05 – 0.2 percent. Forcados Blend is considered one of the best gasoline-producing blends in the world.



### **Refining and Downstream**

Nigeria's refining capacity is currently insufficient to meet domestic demand, forcing the country to import petroleum products. According *OGJ*, Nigeria's state-held refineries (Port Harcourt I and II, Warri, and Kaduna) have a combined nameplate capacity of 438,750 bbl/d, but problems including sabotage, fire, poor management and a lack of regular maintenance contribute to the current operating capacity of around 214,000 bbl/d. To increase refining capacity, the Nigerian government is granting permits to build several independently-owned refineries. Oando, a leading petroleum-marketing company in Nigeria, is considering building a refinery in Lagos. The refinery would be built in two phases, with each phase providing 180,000 bbl/d of refining capacity.

Nigeria is trying to privatize state entities by selling NNPC's four oil refineries, petrochemicals plants, and its Pipelines and Products Marketing Company (PPMC). IOCs have shown little interest in investing in refinery privatization. However, the Nigerian government recently opened negotiations with Libyan, Indian, and Chinese investors. As of March 2007, Mittal Steel of India was looking to purchase a controlling stake in the Port Harcourt Refinery Company (PHRC), although, no deal has officially been signed.

### **Sector Organization**

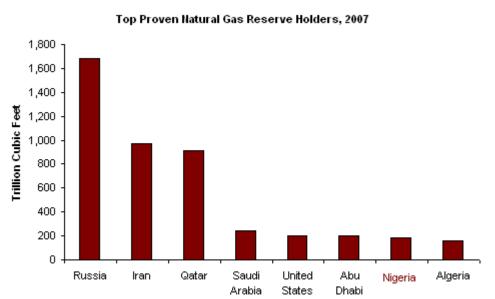
In 1977, Nigeria created the Nigerian National Petroleum Corporation (NNPC). At that time, the NNPC's primary function was to oversee the regulation of the Nigerian oil industry, with secondary responsibilities for upstream and downstream developments. In 1988, the Nigerian government divided the NNPC into 12 subsidiary companies in order to better manage the country's oil industry. The majority of Nigeria's major oil and natural gas projects (95 percent) are funded through joint ventures (JVs), with the NNPC as the major shareholder. The largest JV is operated by Shell Petroleum Development Company (SPDC). Additional foreign companies operating in JVs with the NNPC include ExxonMobil, Chevron, ConocoPhillips, Total, Agip and Addax Petroleum. The remaining funding arrangements are comprised of production sharing contracts (PSCs), which are mostly confined to Nigeria's deep offshore development program.

## **Natural Gas**

Nigeria flares more natural gas than any other country in the world.

#### Overview

OGJ estimates that Nigeria had an estimated 182 trillion cubic feet (Tcf) of proven natural gas reserves as of January 2007, which makes Nigeria the seventh largest natural gas reserve holder in the world and the largest in Africa. The majority of the natural gas reserves are located in the Niger Delta. In 2004, Nigeria produced 770 billion cubic feet (Bcf) of natural gas, while consuming 325 Bcf. The government plans to raise earnings from natural gas exports to 50 percent of oil revenues by 2010. However, NNPC estimates that \$15 billion in private sector investments is necessary to meet its natural gas development goals by 2010.



Source: Oil and Gas Journal 2007

Because many of Nigeria's fields lack the infrastructure to produce natural gas, it is flared. According to NNPC, Nigeria flares 40 percent of its annual natural gas production, while the World Bank estimates that Nigeria accounts for 12.5 percent of total flared natural gas in the world. Nigeria is working to end natural gas flaring by 2008. However, Shell indicated in its 2005 annual report that it would not be able to eliminate routine natural gas flaring until 2009. Shell listed reduced funding and poor contractor performance on some projects as barriers to eliminating natural gas flaring.

### **Liquefied Natural Gas (LNG)**

A significant portion of Nigeria's natural gas is processed into LNG. Nigeria's most ambitious natural gas project is the \$3.8 billion Nigeria Liquefied Natural Gas (NLNG) facility on Bonny Island. Partners including NNPC, Shell, Total and Agip completed the first phase of the facility in September 1999. In 2006, NLNG completed its fifth train increasing annual production capacity to 17 million tons per year of LNG. NLNG plans to bring a sixth train online in late 2007, raising production capacity to 22 million tons per year. A seventh train could come online in 2011. The facility is currently supplied from dedicated (non-associated) natural gas fields, but it is anticipated that within a few years half of the natural gas feedstock will consist of associated (currently flared) natural gas from existing oil fields.

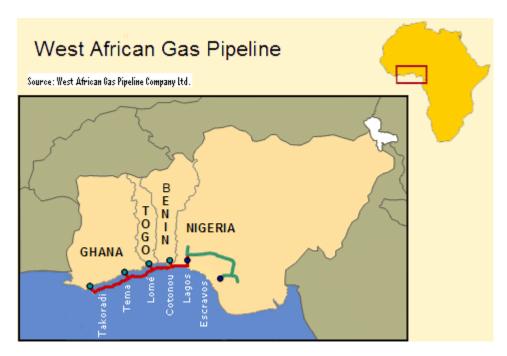
Additional LNG facilities in Nigeria are also being developed. In January 2005, Chevron announced the possibility of constructing the \$7 billion OK-LNG plant at Olokola in western Nigeria. The plant would have an initial capacity of 11 million tons per year and a maximum capacity of 33 million tons per year. In March 2007, NNPC awarded a contract to France-based Technip for construction of the OK-LNG plant. The project includes connecting the LNG plant to oil and natural gas reserves in the Niger Delta through a network of pipelines. OK-LNG is expected to produce its first LNG in 2011. In December 2005, ConocoPhillips, Chevron and Agip met with NNPC to sign a shareholders agreement for the establishment of the \$3.5 billion Brass River LNG plant. The project, which includes two LNG trains, could be operational by late 2009 depending on a final investment decision (FID) to be made in 2007.

Chevron is working on the Escravos gas-to-liquids (EGTL) project, which is located in the western Niger Delta, and is expected to have production capacity of 33,000 bbl/d. Completion of the GTL project was scheduled for 2009. However, in January 2007, work on the EGTL project came to a halt after a breakdown in salary negotiations. A year earlier, the Nigerian government halted the implementation of the EGTL project due to high costs. Plans for the project include linking the Escravos pipeline system with the West African Gas Pipeline (WAGP) for natural gas export to Benin, Togo and Ghana.

#### International Pipelines

Progress on the WAGP, which will deliver 140 MMcf/d of natural gas to power stations in Ghana,

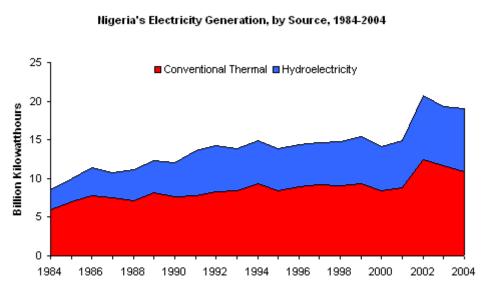
is moving forward. The \$590 million, 420-mile pipeline will carry natural gas from Nigeria to Ghana, Togo, and Benin. Operational start-up of the project is expected during 2007, with initial capacity of 200 MMcf/d of natural gas. The pipeline is expected to function at a full capacity of 450 MMcf/d within 15 years. The Multilateral Investment Guarantee Agency (MIGA), and the International Development Association (IDA) are also helping to fund the WAGP by giving \$75 million and \$50 million, respectively.



Nigeria and Algeria continue to discuss the possibility of constructing a Trans-Saharan Gas Pipeline (TSGP). The 2,500-mile pipeline would carry natural gas from oil fields in Nigeria's Delta region to Algeria's Beni Saf export terminal on the Mediterranean. It is estimated that construction of the \$7 billion project would take six years. The TSGP is currently in the study phase of development.

# **Electricity**

Water shortages and maintenance issues continue to affect Nigeria's ability to produce electricity. The Nigerian power sector operates well below its estimated capacity, with power outages being a frequent occurrence. To compensate for the power outages, the commercial and industrial sectors are increasingly using privately operated diesel generators to supply electricity. In 2004, total installed electricity capacity was 5.9 gigawatts (GW). Total electricity generation during 2004 was 19 billion kilowatthours (Bkwh), while total consumption was 18 Bkwh. Only 40 percent of Nigerians have access to electricity, the majority of whom are concentrated in urban areas. Despite endemic blackouts, customers are billed for services rendered, partially explaining Nigeria's widespread vandalism, power theft and Power Company Holding of Nigeria's (PHCN) problems with payment collection.



Source: EIA International Energy Annual 2004

China is becoming increasingly involved in Nigeria's electric infrastructure developments. In early 2007, Nigeria awarded China Gezhouba Group Corporation (CGC) and China Geo-Engineering Corporation (CGC) a hydroelectric project contract. Nigeria hopes the Mambilla power station, which will be located in northeastern Nigeria, will add 2,600 megawatts (MW) to the national grid. The project could be completed by 2012. In addition, China's EXIM Bank, Su Zhong, and Sino Hydro have committed to funding the Zungeru (950-MW) hydroelectric projects. In March 2007, Nigeria's Minister of Energy announced that the Zungeru project should be online soon, but he did not give a specific start-up date.

# **Profile**

# **Country Overview**

President	Olusegun Obasanjo (since 29 May 1999)
Location	Western Africa, bordering the Gulf of Guinea, between Benin and Cameroon
Independence	October 1, 1960 (from UK)
Population (2005E)	128,771,988
Languages	English (official), Hausa, Yoruba, Igbo (Ibo), Fulani
Religion	Muslim 50%, Christian 40%, indigenous beliefs 10%
Ethnic Group(s)	Nigeria, Africa's most populous country, is composed of more than 250 ethnic groups; the following are the most populous and politically influential: Hausa and Fulani 29%, Yoruba 21%, Igbo (Ibo) 18%, Ijaw 10%, Kanuri 4%, Ibibio 3.5%, Tiv 2.5%

### **Economic Overview**

Minister of Finance	Mrs. Nenadi E. Usman
Currency/Exchange Rate (4/20/07)	1 Naira (NGN) = 0.0078 USD
Inflation Rate (Consumer Price Index)	(2005E): 13.5% (2006E): 9.2%
<b>Gross Domestic Product</b>	(2005E): \$97 billion (2006E): \$121 billion
Real GDP Growth Rate	(2005E): 6.5% (2006E): 5.8%
Unemployment Rate	(2006E): 5.8%
External Debt	(2006E): \$6.3 billion
Exports	(2005E): \$48.1 billion (2006E): \$59.2 billion

Exports - Commodities	petroleum and petroleum products 95%, cocoa, rubber
Exports - Partners (2005E)	US 52.5%, Spain 8.2%, Brazil 6.1%
Imports	(2005E): \$17.3 billion (2006E): \$21 billion
Imports - Commodities	machinery, chemicals, transport equipment, manufactured goods, food and live animals
Imports - Partners (2005E)	China 10.4%, US 7.3%, UK 6.7%, Netherlands 6.1%, France 5.9%, Germany 4.2%
<b>Current Account Balance</b>	(2005E): \$24.2 billion (2006E): \$29.9 billion
Energy Overview	
Minister of State for Petroleum	Dr. Edmund Daukoru
Proven Oil Reserves (January 1, 2007E)	36.2 billion barrels
Oil Production (2006E)	2,452 thousand barrels per day, of which 93% was crude oil.
Oil Consumption (2006E)	297 thousand barrels per day
Net Oil Exports (2006E)	2,155 thousand barrels per day
Crude Oil Refining Capacity (2007E)	439 thousand barrels per day
Proven Natural Gas Reserves (January 1, 2007E)	182 trillion cubic feet
Natural Gas Production (2004E)	800 billion cubic feet
Natural Gas Consumption (2004E)	325 billion cubic feet
Net Natural Gas Exports (2004E)	475 billion cubic feet
Recoverable Coal Reserves (2003E)	209 million short tons
Coal Production (2004E)	0.02 million short tons
Coal Consumption (2004E)	0.02 million short tons
Electricity Installed Capacity (2004E)	5.9 gigawatts
Electricity Production (2004E)	19 billion kilowatt hours
Electricity Consumption (2004E)	18 billion kilowatt hours
Total Energy Consumption (2004E)	1 quadrillion Btus*, of which Oil (58%), Natural Gas (34%), Hydroelectricity (8%), Coal (0%), Nuclear (0%), Other Renewables (0%)
Total Per Capita Energy Consumption (2004E)	8.1 million Btus
Energy Intensity (2004E)	6,511.6 Btu per \$2000-PPP**
Environmental Overvi	ew
Minister of Environment	Mrs. Helen Esuene
	94 million metric tons, of which Oil (45%), Natural Gas (19%), Coal (0%)
Per-Capita, Energy-Related Carbon Dioxide Emissions (2004E)	0.7 metric tons
Carbon Dioxide Intensity (2004E)	0.6 Metric tons per thousand \$2000-PPP**
Environmental Issues	soil degradation; rapid deforestation; urban air and water pollution; desertification; oil pollution - water, air, and soil; has suffered serious damage from oil spills; loss of arable land; rapid urbanization
Major Environmental Agreements	party to: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Ozone Layer Protection, Wetlands signed, but

	not ratified: none of the selected agreements
Oil and Gas Industry	
Organization	The Nigerian National Petroleum Corporation (NNPC) manages the state-owned oil industry. The NNPC holds 49% in the Nigeria Liquefied Natural Gas (NLNG) Company.
Foreign Company Involvement	British Gas, BP, Chevron, ConocoPhilips, Deminex, ENI/Agip, ExxonMobil, Nexen, Petrobras, Shell, Sinopec, Statoil, Sun Oil, Tenneco, Total
Major Oil Fields	Bonga, Cawthron Channel, EA, Edop, Ekkulama, Escravos Beach, Forcados Yorki, Jones Creek, Meren, Nembe, Okan, Oso, Ubit
Major Terminals	Bonny Island, Brass River, Escravos, Forcados, Odudu, Pennington, Qua (Kwa) Iboe
Major Refineries	Port Harcourt-Rivers State (60,000), Kaduna (110,000), Warri (118,750), Port Harcourt-Alesa Eleme (150,000),

<sup>\*</sup> The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

\*\*GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

# Links

### **EIA Links**

EIA - Country Information on Nigeria

EIA - Independent Power Projects in Nigeria

### **U.S. Government**

CIA World Factbook - Nigeria

U.S. Agency for International Development - Nigeria

U.S. Census Bureau - Trade with Nigeria

U.S. Embassy in Nigeria

U.S. Library of Congress Country Study - Nigeria

U.S. State Department's Background Notes - Nigeria

U.S. State Department's Consular Information Sheet - Nigeria

U.S. State Department's Travel Warning - Nigeria

### **Foreign Government Agencies**

Bureau of Public Enterprises Nigerian Embassy in the U.S.

#### **Non-Governmental Organizations**

African Development Bank: Nigeria

African Union (formerly Organization of African Unity)

All Africa News Service: Nigeria

BBC News Country Profile - Nigeria

International Energy Agency (IEA): Key Energy Indicators for Nigeria

International Monetary Fund (IMF): Nigeria

Nigeria.com

Nigeria Today

Nigeria Web

Nigeria World

Online Nigeria Portal

Stanford University African Studies: Nigeria

University of Pennsylvania African Studies Center - Nigeria

Voice of Nigeria

World Bank: Nigeria

#### Oil and Natural Gas

Chevron

**ConocoPhillips** 

**ExxonMobil** 

Nigerian National Petroleum Corporation

<u>Shell</u>

### **Electricity**

Power Holding Company of Nigeria

# Sources

Africa Energy and Mining

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Alexander's Gas and Oil Connections

AllAfrica

AP Worldstream

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Economist Intelligence Unit (EIU) Viewswire

**Energy Compass** 

Eurasia Group

ExxonMobil

Factiva

Financial Times African Energy

Global Insight

Hart's Africa Oil and Gas

**IHS GEPS Reports** 

International Crude Oil Market Handbook

International Energy Agency

International Oil Daily

International Monetary Fund

Oil and Gas Journal

**OPEC Statistical Bulletin** 

Panafrican News Agency

Petroleum Economist

Petroleum Intelligence Weekly

Platts Oilgram News

Reuters

Rigzone

U.S. Energy Information Administration

Weekly Petroleum Argus

World Bank

World Markets Research Centre

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