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# Country Analysis Brief: Angola

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## Angola

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*Angola is the second-largest oil producer in Sub-Saharan Africa behind Nigeria, and recent exploration suggests that Angola's reserves may be larger than initially estimated.*

### Overview-

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Angola's rapid rise as an energy producer over the past two decades came despite a civil war that lasted until 2002 and without many of the advantages found in other energy-rich regions. In particular, Angola lacked the appropriate infrastructure and the regulatory oversight necessary to operate a modern energy sector. With the end of the Angolan civil war in 2002, and steady investment in the country's energy infrastructure, the future of Angolan production is bright. Challenges remain—notably the tensions in the Cabinda province—but as the demand for oil continues to rebound from the global recession, Angolan crude will be an important resource for \*China\*, the United States, and other major energy importers.

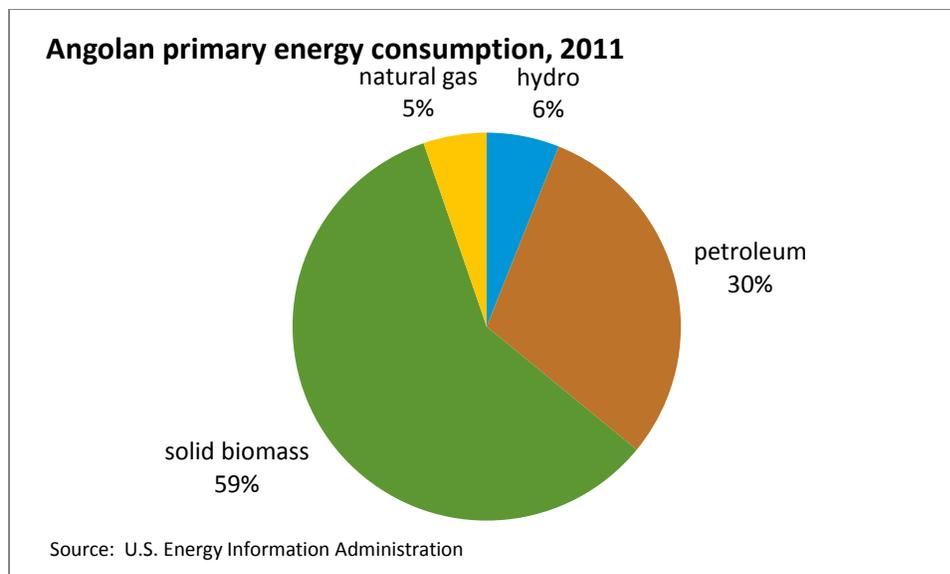


Source: CIA Factbook

Since becoming a member of the Organization of the Petroleum Exporting Countries (OPEC) in 1997, Angola's production levels have been subject to oversight by the group. However, Angola has not always acceded to the group's demands, and Angola's leadership plans to continue boosting production of oil and natural gas over the coming decade to help increase government revenue. In particular, Angola's offshore pre-salt formations and the construction of natural gas-processing facilities are viewed as potentially lucrative sources of future revenues.

Angola's economy is almost entirely dependent on oil production, as oil exports accounted for approximately 98 percent of government revenues in 2011 according to the International Monetary Fund. High international oil prices will be important for the future prospects of exploration, production, and exports of oil and natural gas, and will directly affect Angola's government spending. In recent years, roughly three-quarters of Angola's total government revenues came from the energy sector.

With a gross domestic product (GDP) of over \$104 billion in 2011 on the strength of its oil exports, Angola has the third-largest economy in Africa. The International Monetary Fund estimates Angola's GDP per capita in 2011 was approximately \$5,900 in current international dollars; however, much of the oil wealth in the country does not find its way to the average citizen, which is one of the reasons why nearly 60 percent of primary energy consumption consists of solid biomass.



The August 2012 presidential election again brought the country’s energy sector into the public discourse, as the management of profits from the export of crude oil became an issue of some importance. Over the past decade, Angola made progress towards better capturing and distributing the profits associated with its hydrocarbon industries—notably through its Oil Investment Fund—but opposition voices disagree on the level of success the country has made. A policy of “Angolanization” intends to help the Angolan populace become more integrated into the country’s energy sector, and to obtain a greater share of the wealth being generated by the country’s oil exports. Additionally, in October of 2012 plans for a \$5 billion sovereign wealth fund were announced. While such programs have not yet achieved great success, Angolans remain optimistic that the government’s efforts will succeed.

## Oil

*Successful exploration in Angola’s pre-salt formations continues to drive optimistic oil production forecasts for the country, and the Angolan government is targeting 2 million barrel per day production levels by 2014.*

### Background

According to *Oil & Gas Journal* estimates for the end of 2011, Angola had proved reserves of 9.5 billion barrels of crude oil. That figure is the second-largest in Sub-Saharan Africa behind Nigeria, and ranks 18th in the world. Angola’s crude oil is light and sweet, making it ideal for export to major world markets like China and the United States. Exploration and production in offshore Angola is advancing at a rapid pace, and foreign investors are beginning to consider some onshore opportunities economically viable. Exports continue to drive Angolan oil production, but the development of new refining capacity could help ease domestic demand shortages that have plagued the country since the end of the civil war in 2002. Prospects for growth in the oil sector are good, but instability and the threat of conflict continue to temper expectations.

## Sector Organization

In 1976, the government of Angola created a national oil company, the Sociedade Nacional de Combustiveis de Angola (Sonangol). In 1978, Sonangol became the sole concessionaire and majority shareholder in all oil and gas exploration in Angola, and took charge of all petroleum industry activities. Sonangol operates 17 subsidiaries throughout the oil and natural gas (and related) industries. Key subsidiaries include: Sonangol Pesquisa e Produção (P&P), which undertakes all exploration and production activities for Sonangol in Angola; Sonaref, which runs refining operations in Angola; and Sonagás, which is in charge of the exploration, production, and transportation of natural gas in Angola.

Foreign companies involved in Angola operate under joint venture operations and production-sharing agreements (PSAs) with Sonangol, and major partners include Chevron, ExxonMobil, British Petroleum (BP), Statoil, Eni, and Total, among others. \*China\*'s Sinopec and the China National Offshore Oil Corporation (CNOOC) are also involved in Angola, and are providing development assistance as well as oil-backed loans and trade. Sonangol funds its operations through oil-backed borrowing, so finding partners able to provide such services is an important goal for the company.

Sonangol is becoming more involved in international ventures, and the company currently has interests in \*Brazil\*, Cuba, \*Iraq\*, São Tome and Principe, \*Venezuela\*, and in the Gulf of Mexico. Early in 2012, Sonangol pulled out of a natural gas project in Iran after a tightening of US-led sanctions on that country. Nevertheless, Sonangol continues to explore opportunities across the globe as it tries to establish itself as a major international player.

Over the past few years, Angola instituted local-content (notably labor) requirements in its energy sector, but the so-called “Angolanization” regulations have yet to make a sizeable impact. The regulations require international companies operating in the country to meet a 70 percent Angolanization threshold, but to date this figure has rarely—if ever—been met. Despite these requirements, less than 1 percent of Angolans are employed in the energy sector, although the government hopes that will change as the technical capacity of its citizen’s increases in the coming years. This may occur through the contributions to training programs that is now required of all international oil companies doing business in Angola. Companies are expected to provide \$200,000 per year, per block during the exploration phase of their operations to fund technical training programs, and \$0.15 per barrel of oil during the production phase. These regulations are designed to improve the technical and financial capacity of Sonangol, its subsidiaries, and Angola’s citizens. In 2011, Angola also passed a law that requires the international oil companies to utilize the services of local banks.

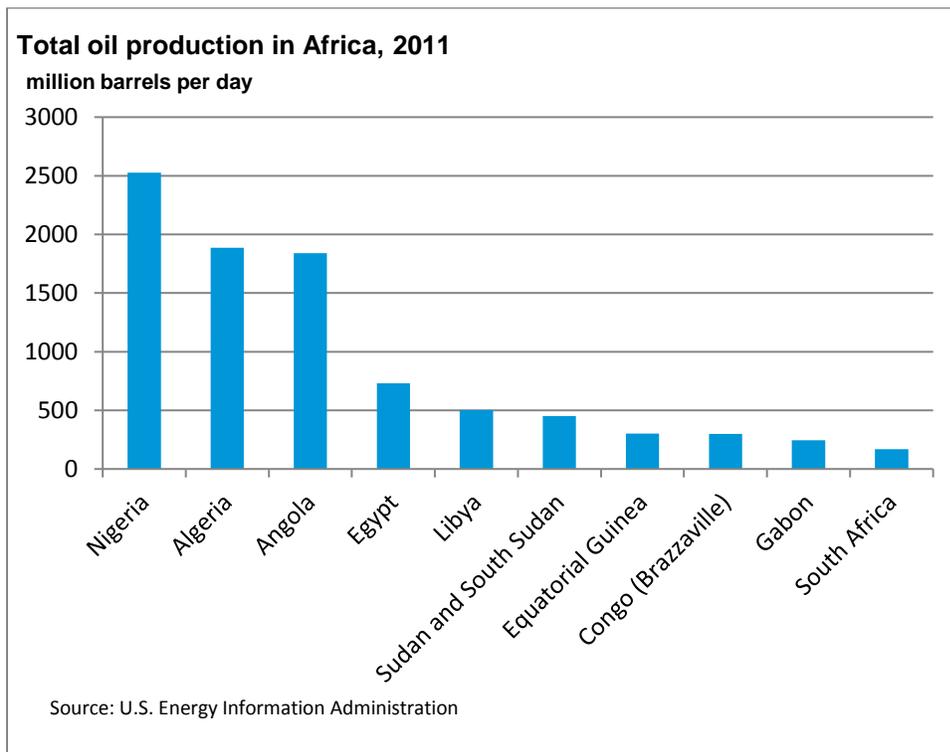
## Exploration and Production

Exploration in Angola’s offshore blocks continues to be successful, and recent forays into onshore blocks have been met with positive results. Angola’s position as the second-largest producer of crude oil in Sub-Saharan Africa, and as a member of the OPEC, means that international oil companies are already very familiar with the country’s resource endowments. Nevertheless, recent drilling success in Angola’s pre-salt formations created a palpable buzz in the industry.

With Angola’s crude being sweet (low in sulfur) and light, it is well-suited for exports to the United States, \*China\*, and other large importers, and the possibility of significant hydrocarbon resources in

pre-salt formations has potential investors intrigued. This is due to the geological similarities between Angola’s pre-salt formations and those of \*Brazil\*, which have remained largely unchanged since present-day South America and Africa split 165 million years ago. Because of the similar geology on the east coast of Brazil and the west coast of Angola (and its neighbors), many petroleum geologists believe that the hydrocarbon formations of the two areas will be similar.

Angola’s rise as a major oil-producing nation came relatively recently due to the country’s long civil war (1975-2002), which restricted exploration in the country. Once Angola began to stabilize its oil production increased dramatically, more than doubling from 896,000 barrels per day (bbl/d) in 2002 to 1.84 million bbl/d of total liquids in 2011. Angola briefly challenged \*Nigeria\* as the top oil producer in Sub-Saharan Africa in 2009, but Angola’s total liquid production declined slightly in 2010 and again in 2011. Crude oil production in Angola slipped to 1.79 million bbl/d in 2011, but the additions from new projects like the Kizomba Satellites should help Angola reverse that trend. These declines came as a result of regular maintenance and normal decline in the country’s older fields, and Angola’s government is targeting a return to the 2 million bbl/d production-levels it achieved in 2008 by 2014.



### Major oil projects

Project	Output ('000 bbl/d)	Estimated Startup	Block	Operator
Kizomba Satellites*	140+	2012	15	ExxonMobil
PSVM	150	2012	31	BP
Palas, Ceres, Juno, Astrea, Hebe, Urano, Titania	150	2012+	31	BP
Platino, Chimbo, Cesio	150	2013	18W	BP

Sangos/N'goma	85	2013	15	ExxonMobil
SE PAJ	150	2013	31	BP
AB 32 Southeast Hub	210,000	2013+	32	Total
CLOV	160	2014	17	Total
Cabaca Norte-1	40-200	2014	15	ExxonMobil
Terra Miranda, Cordelia, Porti	150	2014	31	BP
Mafumeira Sul	120	2014+	0	Chevron
Negage	50+	2014+	14	Chevron
Lucapa	100	2014+	14	Chevron

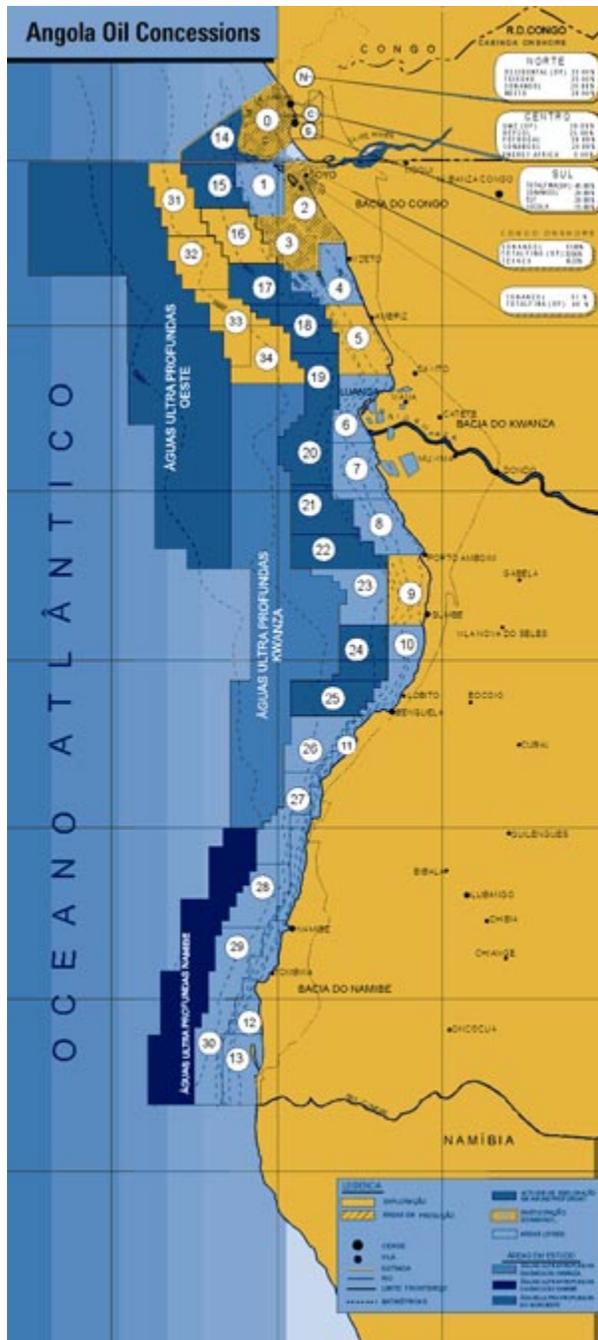
\*Phase 1 of the project began operations in July 2012

Source: Company reports, IHS, PFC Energy, various trade reports

### *Major Blocks*

Angola's offshore assets are divided into 41 blocks, and are separated into three bands: Band A (shallow water blocks 0-13), Band B (deepwater blocks 14-30), and Band C (ultra-deepwater blocks 31-40). While limited exploration is underway onshore, the vast majority of exploration and production comes from Angola's offshore blocks, several of which are discussed below.

### [Angola concession map](#)



Source: Sonangol

SEE ATTACHED PDF

**Block 0**

Located off the coast of the Cabinda province, Block 0 is divided into two Areas (A and B) composed of 21 fields. Total liquid production in 2011 averaged 340,000 barrels per day (bbl/d), approximately 94 percent of which is crude oil. Block 0 is operated by a consortium led by Chevron subsidiary Cabinda Gulf Oil Company (CABGOC) in partnership with Sonangol Total, and Eni; Chevron holds a 39.2 percent

share in Block 0. While some of the fields in Block 0 are beginning to experience natural decline rates, drilling and exploration continue and production gains are expected over the next few years. In particular, the Mafumeira Sul development is expected to boost crude oil production by 110,000 bbl/d starting in 2015. The plan also calls for a new central processing facility, two wellhead platforms, 50 wells, and 75 miles of subsea pipelines, although the final investment decision had not been released to the public as of October 2012.

### ***Block 14***

Like Block 0, Block 14 is located off the coast of the Cabinda province, and is made up of several development areas: Kuito, Benguela Belize-Lobito Tomboco (BBLT), Tombua-Landana, Negage, Gabela, Lucapa, and Menongue. Of these development areas, only Kuito, BBLT, and Tombua-Landana are currently producing. Kuito is significant because it was Angola's first deepwater oilfield, and because it is a zero-flare development (many of Angola's operators still flare the majority of the associated gas produced at their oilfields). Nevertheless, production levels continue to decline after reaching a high point of 80,000 bbl/d in 2000. These losses, however, are outweighed by the gains made from bringing the Tombua-Landana development online in 2009, and the continued production at the BBLT fields.

Block 14 began producing in 1999, and in 2011 reached approximately 187,000 bbl/d of liquids (including condensates). Chevron—which holds a 31 percent interest in Block 14, and is the chief operator—is pursuing expansion at several of the fields in Block 14, including the BBLT, Kuito, and Tombua-Landana. With improvements at a number of fields coming online in 2011, production in 2012 is expected to surpass 200,000 bbl/d. Other stakeholders in Block 14 include Sonangol (20 percent), Eni (20 percent), Total (10.01 percent), Inpex (9.99 percent), and Petrogal (9 percent). Inpex is the newcomer to the group after buying a 9.99 percent share from Total in August 2012.

### ***Block 15***

Block 15 is operated by ExxonMobil-affiliate Esso Exploration Angola Limited (Esso Angola), which holds a 40 percent stake. Other stakeholders in Block 15 include: British Petroleum (26.67 percent), Eni (20 percent), and Statoil (13.33 percent). The first discovery at Block 15 occurred in 1998, and production first began at the Xikomba field in 2003. The Kizomba A (2004), B (2005), and C (2008) all came online in subsequent years, and production reached more than 650,000 bbl/d in 2011. Already the largest producing deepwater block in Angola, additions from the Kizomba Satellite developments should boost production by an additional 100,000 bbl/d in the near future. Cumulative production from the block reached 1 billion barrels in 2009, and remaining recoverable reserves are estimated to be between 2 and 2.5 billion barrels of oil.

### ***Block 17***

Production in Block 17 began in 2001 at the Girassol field, and has been boosted by developments at the Jasimin (2003), Dalia (2006), and Rosa (2007) fields. Operated by Total—which holds a 40 percent stake in the block—production in 2011 surpassed 460,000 bbl/d. In August 2011, the Pazflor field began operations and output is expected to average 220,000 bbl/d. Further development at the Cravo, Lirio, Orquidea, and Violeta (CLOV) fields is expected to boost Block 17 production by an additional 160,000 bbl/d beginning in 2014. Other stakeholders in Block 17 are ExxonMobil (through Esso, 20 percent), Statoil (23.33 percent), and BP (16.67 percent).

### ***Block 18***

BP is the operator of the deepwater Block 18. Production in the block comes from the Greater Plutonio development, which includes the Plutonio, Galio, Paladio, Cromio, and Cobalto fields. The Greater Plutonio development of Block 18 came online in 2007 at approximately 100,000 bbl/d, and peak production totals were expected to hit 200,000 bbl/d by 2011. However, technical problems with the water injection system limited production to just 100,000 bbl/d. Fully operational, the Greater Plutonio development will help boost Block 18's overall production beyond the roughly 220,000 bbl/d it produced in 2011.

### ***Block 31***

Angola's first ultra-deepwater discoveries came in 2002, when BP drilled successful wells in Block 31. BP was given permission to move ahead on the country's first ultra-deepwater development in 2008; a project that centered on the Plutão, Saturno, Venus, and Marte (PSVM) fields. PSVM production was scheduled to begin in 2012, with levels expected to reach 150,000 bbl/d by late 2013; however, reports indicate the first marketable production may not occur until early 2013. Operations are run through a converted very large crude carrier (VLCC), and the floating production, storage, and offloading (FPSO) vessel is capable of processing more than 150,000 bbl/d and has 1.8 million barrels of storage capacity. Other stakeholders in Block 31 include Sonangol (25 percent), Sonangol P&P (20 percent), Statoil (13.33 percent), Marathon (10 percent), and China Sonangol (5 percent).

### ***Block 32***

The AB32 Southeast Hub development in Block 32 is expected to have production capacity topping 200,000 bbl/d, and the block holds an estimated 1.4 billion barrels of oil equivalent (boe). The block is operated by Total—which holds a 30 percent stake—and Sonangol P&P (20 percent), China Sonangol (20 percent), Esso (15 percent), Marathon (10 percent), and Petrogal (5 percent) are also stakeholders in the block. In late 2011, Marathon was rumored to be interested in selling off its stake in Block 32, though no sale has been reported.

### ***Onshore***

Early in 2012, Sonangol P&P announced that it intends to begin onshore exploration in the Cabinda Norte Block. However, the security environment—and therefore the operating conditions—are problematic, as the Front for the Liberation of the Enclave of Cabinda (a separatist group) remains active in the region. Nevertheless, Angola is expected to hold a licensing round for onshore blocks some time in 2013.

### ***Shared Development Areas***

#### ***Republic of the Congo (Brazzaville)***

Chevron announced in August 2012 that it will develop the offshore Lianzi field, which straddles the Angola-Republic of the Congo\* border. Once it is producing, the field is slated to be connected to the BBLT development in Block 14. While the available resources are not as significant as those found in other blocks, the major breakthrough in trans-border developments is an encouraging sign. Revenues from the field, which is estimated to contain proven reserves of 70 million barrels, will be split 50-50 between Angola and the Republic of the Congo.

## *Democratic Republic of the Congo*

The boundary dispute between Angola and the Democratic Republic of the Congo (DRC) is more problematic, but industry analysts hope that the Lianzi development can serve as a template for moving discussions forward. In particular, unresolved border disputes (both land and maritime) have led both sides to lay claim to energy and mineral resources in the area. In September of 2012, the DRC's Minister of Hydrocarbons stated that Angola and the DRC would come to an agreement over the so-called Common Interest Zone within six months, but shared production of any resources is still some time away.

## *Pre-Salt*

The Angolan government held a closed licensing round in January 2011, and invited only major international firms with deepwater expertise. Many are intrigued by the similarities between Angola's pre-salt geology and those found on the other side of the Atlantic Ocean in *\*Brazil\**. With *\*Brazil\**'s pre-salt formations estimated to have at least 50 billion barrels of oil equivalent, exploration in Angola's pre-salt formations is beginning to ramp up.

Cobalt International's announcement in December 2011 confirming the presence of hydrocarbons in the pre-salt formations of Block 21 excited foreign investors, and in February 2012 Cobalt announced that the test results exceeded earlier expectations. Maersk also encountered hydrocarbon deposits at an exploratory well in Angola's pre-salt formations in Block 23 (in the Kwanza basin). While encouraging, technical difficulties have plagued both companies, and serve to temper expectations about the viability of such developments. Nevertheless, Angola's pre-salt potential is something on which industry experts will be keeping a close watch on.

## *Licensing*

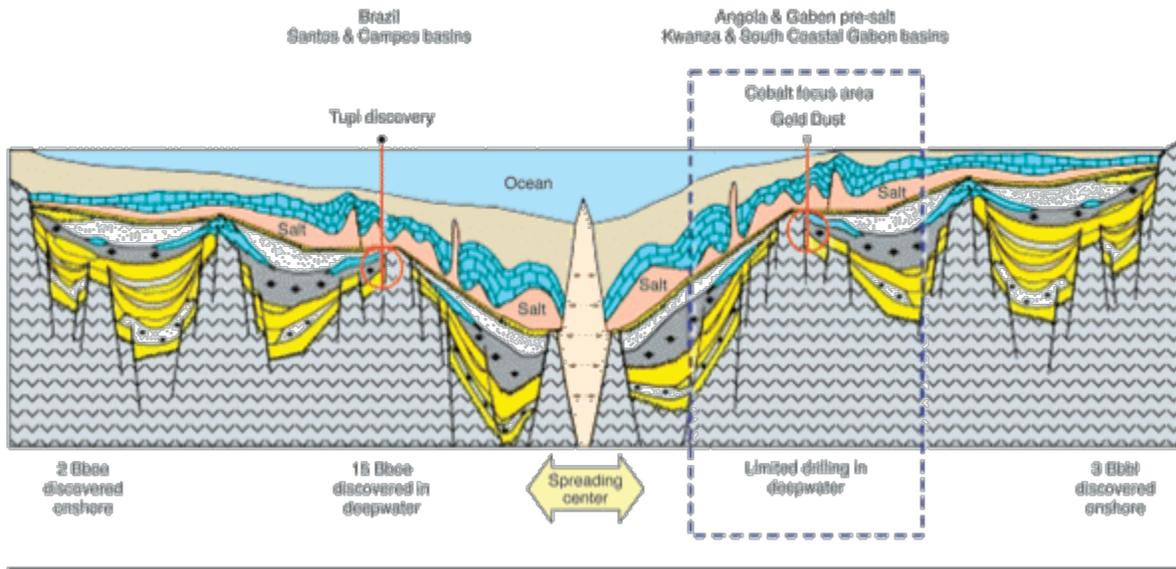
The most recent exploration and production licensing round occurred in January of 2011, as Angola opened bidding for 11 of the country's pre-salt blocks. There are plans to open another licensing round sometime in 2013 for the country's onshore blocks, particularly those in the Kwanza basin where discoveries in pre-salt formations were made recently.

## *Results of 2011 exploration and production licensing*

Block	Operator	Stake (%)
19	BP	50%
20	Cobalt	40%
22	Repsol	30%
24	Cobalt	50%
25	Total	35%
35	ENI	30%
36	ConocoPhillips	30%
37	ConocoPhillips	30%
38	Statoil	40%
39	Statoil	40%
40	Total	35%

Source: PFC Energy, company reports

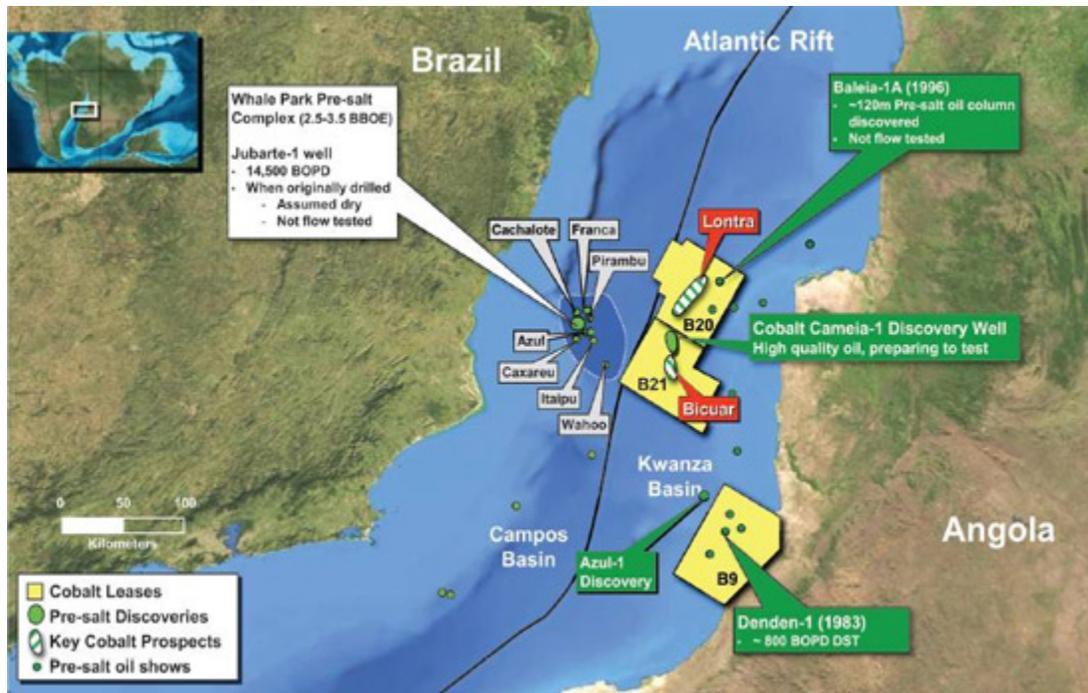
## Angola - Brazil sub-sea geology



Provided to EIA by Cobalt International Energy

Source: Cobalt International Energy SEE ATTACHED PDF

## Pre-salt formations in Angola and Brazil



Source: Cobalt International SEE ATTACHED PDF

Provided to EIA by Cobalt International Energy

## Refining and Downstream

Angola has only one refinery, which was constructed in 1955 and has a capacity of just 39,000 bbl/d. On the horizon, however, is the new Sonaref refinery in Lobito, which is scheduled to begin operations in 2016. The refinery is expected to produce approximately 120,000 bbl/d initially, and will eventually reach a 200,000 bbl/d capacity. It will be able to process heavy and acidic crudes, drawn from fields like Dalia and others like it. The project was originally to be built in partnership with China’s Sinopec, but the Chinese company withdrew citing concerns about the current market for refined products. Sonangol is exploring possible collaboration with a number of other international oil companies, but to date no agreements have been reached. While the new refinery will help to meet domestic demand for refined products, Angola will most likely remain heavily dependent on imports for the foreseeable future.

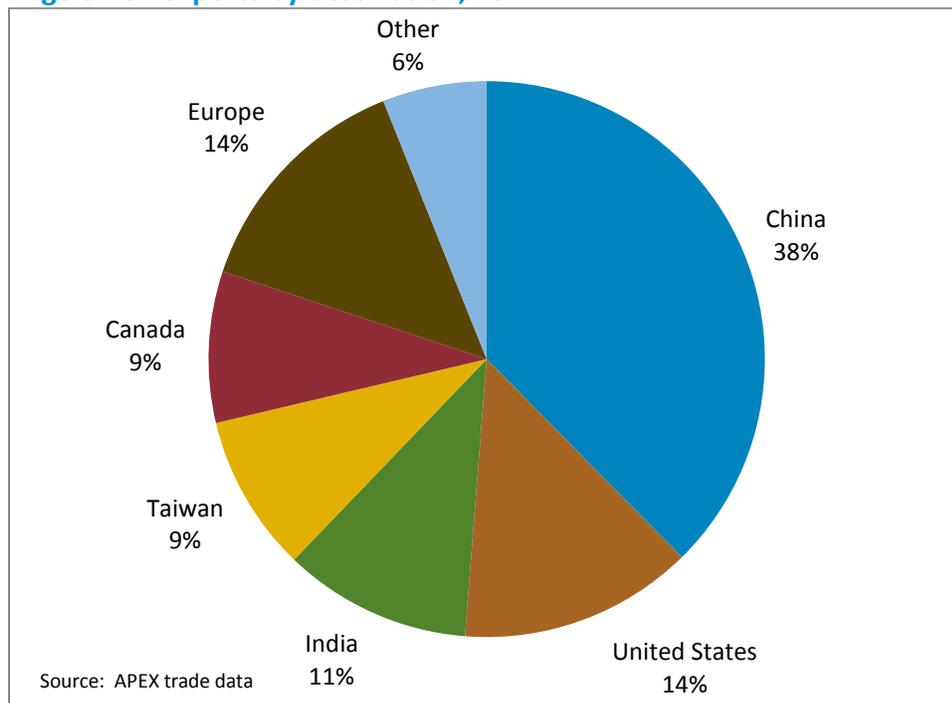
Consumption of refined products in Angola remains relatively low due to low levels of economic development across large segments of the population, but it is increasing steadily. In 2011, total consumption of oil products was approximately 88,000 bbl/d, up substantially from 75,300 bbl/d in 2009. Transportation fuel prices are among the lowest in the world due to state subsidies that have been in place for years; subsidies which equaled 7.8 percent of GDP in 2011 (the equivalent of 90 percent of the government’s public investment spending).

## Exports

The majority of Angolan crude oil is medium- to light-crude (30 degrees – 40 degrees API) and has low sulfur content (0.12 percent – 0.14 percent), making it ideal for export. With domestic consumption of

under 100,000 bbl/d, nearly all of Angola’s oil production is available for export. In 2011, Angola exported approximately 1.53 million bbl/d, with the largest shares going to China (38 percent) and the United States (14 percent). In 2011, Angola was the second-largest supplier of oil to China (behind only Saudi Arabia) and the 10th largest supplier to the United States. All told, Angola exports nearly 80 percent of its total oil production.

### Angolan oil exports by destination, 2011



Angola has several export terminals, including many very large floating production, storage, and offloading (FPSO) vessels like the Sanha LPG FPSO and the Kizomba A FPSO. The Sanha vessel was the first to combine all the LPG processing and export functions on the same vessel; it is also the largest of its kind. The Kizomba A has a storage capacity of 2.2 million barrels of oil, and is one of the largest vessels of its kind in the world (perhaps even the largest).

### Key export terminals in Angola

Terminal	Location
Dalia	FPSO operating in Block 17; 250,000 bbl/d processing capacity; 2 million barrel storage capacity
Girassol	FPSO operating in Block 17; 250,000 bbl/d processing capacity; 2 million barrel storage capacity
Greater Plutonio	FPSO operating in Block 18; 240,000 bbl/d processing capacity; 1.77 million barrel storage capacity
Kizomba A	FPSO operating in Block 15; 200,000+ bbl/d processing capacity; 2.2 million barrel storage capacity
Kuito	FPSO operating in Block 14; 100,000 bbl/d processing capacity; 1.4 million barrel storage capacity

Palanca	Located in Block 2; 140,000 bbl/d processing capacity
Malongo	Located in Cabinda province; 200,000+ bbl/d processing capacity;
Sanha	Floating LPG processing plant; 100,000 bbl/d of oil, condensate, and LPG

Source: IHS, company reports, Offshore Magazine, Rigzone

While Angola does not currently have any export pipelines, in the spring of 2012 a \$2.5 billion memorandum of understanding (MoU) was signed between Angola and Zambia to construct a pipeline from Lobito in Angola to Lusaka in Zambia. The pipeline will be 870 miles long and is intended to send refined products (including gasoline, diesel, and jet fuel) to Zambia. The project is scheduled to begin in 2013, and will be operational in 2016.

With its location on the western coast of Africa, shipping time to North American and European markets is significantly lower than those for Angola’s oil-exporting competitors in the Middle East. In addition, Angola’s position as a major oil exporter free from the geopolitical risks of the Strait of Hormuz (see EIA’s *\*World Oil Chokepoints\** analysis brief) make it a potentially reliable trade partner (along with *\*Nigeria\**) for the United States and other importing countries.

## Natural Gas

*With the first cargo of liquefied natural gas (LNG) scheduled to leave Angola in early 2013, the country is in a position to capitalize on the high demand for LNG to bolster its export portfolio.*

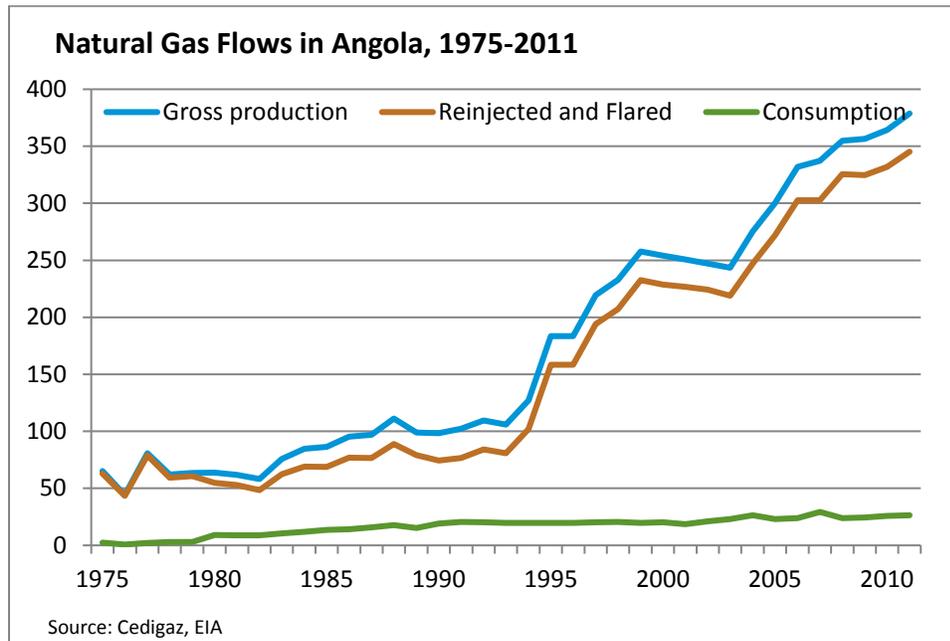
According to *Oil and Gas Journal* estimates, at the end of 2011 Angola had proved reserves of natural gas of 10.95 trillion cubic feet (Tcf). That is the fifth-largest endowment in Africa, and ranks second in Sub-Saharan Africa behind only *\*Nigeria\**. While the majority of Angolan natural gas is re-injected into the country’s oilfields to aid recovery—or simply flared off—efforts are underway to enhance Angola’s ability to produce and market its natural gas reserves. To date, these efforts have been focused on the development of the country’s first liquefied natural gas (LNG) terminal at Soyo. With operations set to begin in early 2013, Angola should be able to capitalize on the recent demand spike for LNG cargoes resulting from *\*Japan\**’s continued shuttering of its nuclear program.

Angola’s natural gas sector is run through a subsidiary of national oil company Sonangol, called Sonangás. Sonangás was formed in 2004, and is tasked with the exploration, evaluation, production, storage, and transport of Angola’s natural gas and natural gas derivatives. Sonangás is working with Sonangol P&P to establish a regulatory environment—including taxation—to help spur research and development in the natural gas sector of Angola.

## Exploration and Production

Natural gas production in Angola has more than tripled over the past two decades, growing from 98 billion cubic feet (Bcf) in 1990 to 379 Bcf in 2011. The vast majority of Angolan natural gas is re-injected into oil fields to help recovery, or it is simply flared off as a by-product of oil operations. In 2011, re-injection and flaring accounted for 91 percent of all the natural gas produced in the country. Angola’s

natural gas production comes almost entirely from associated fields, but the completion of the Soyo LNG facility (Angola LNG) could begin raising the incentives for natural gas production in the country.



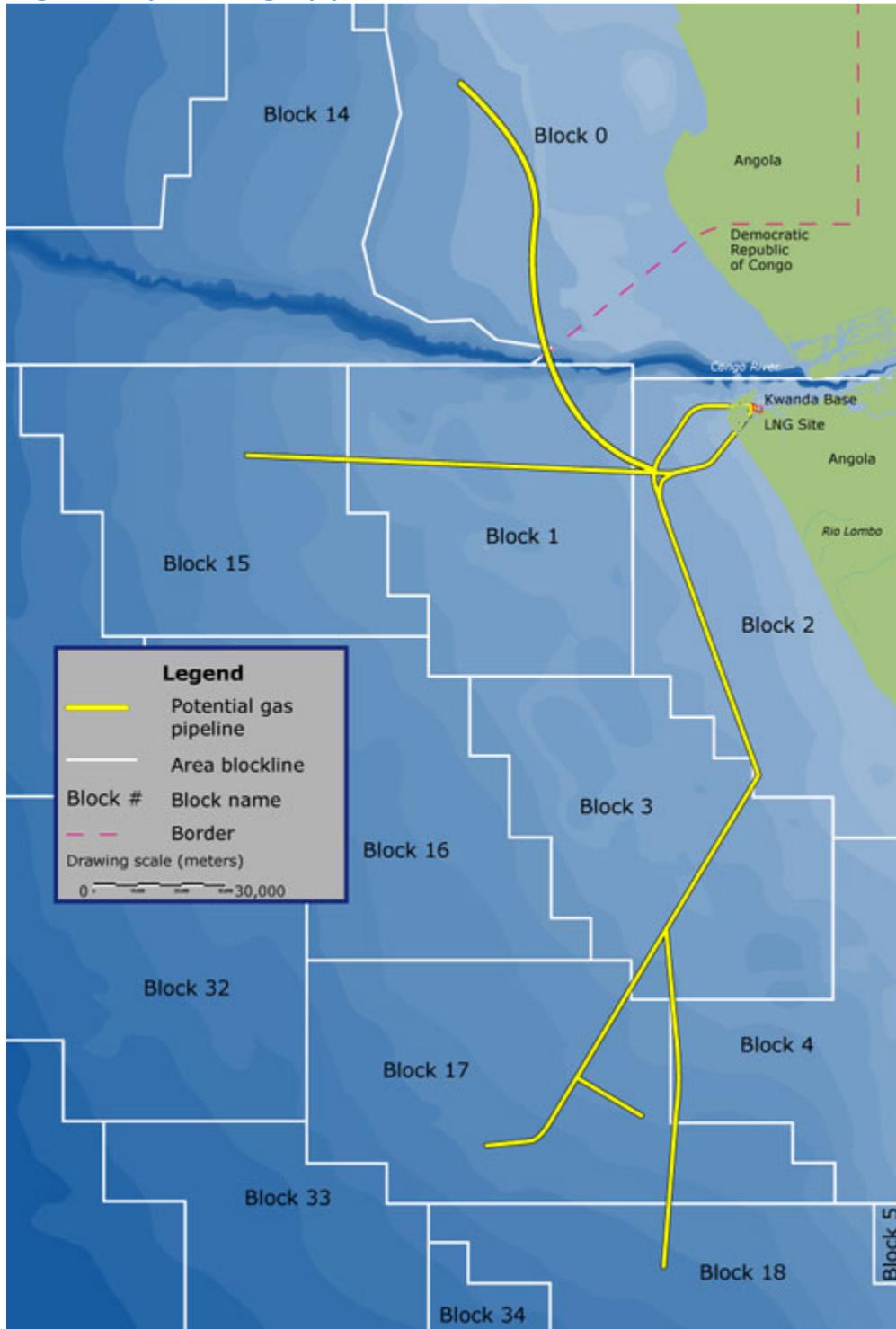
Chevron’s \$1.9 billion Sanha project (located offshore near Soyo) began operations in 2005, and is able to process 100,000 bbl/d of oil, condensate, and liquefied petroleum gas (LPG). The project significantly reduced the need for gas-flaring in Areas A, B, and C in Block 0 (shown on map), as the roughly 500 million cubic feet per day (MMcf/d) of dry gas (which is what remains after the raw product is stripped of condensate and LPG) will be re-injected into the Sanha reservoir to help with oil recovery operations. This process is estimated to both reduce flaring in Block 0 by at least 50 percent and to reduce carbon dioxide emissions by more than 2 million tons per year according to Offshore magazine.

With offshore oil exploration continuing apace, Angola will need to address its capacity for processing the large volumes of associated gas its oil operations will inevitably produce. Enhancing LNG capabilities, developing the domestic market for natural gas—specifically commercial customers—and enhanced oil recovery techniques will all be important components of Angola’s natural gas strategy moving forward.

### Liquefied Natural Gas

Central to Angola’s plan of reducing flaring and monetizing its significant natural gas reserves is the LNG facility at Soyo, which was completed in 2012. The Angola LNG project is a joint venture between Sonangol (22.8 percent), Chevron (36.4 percent), Total (13.6 percent), BP (13.6 percent), and Eni (13.6 percent), and is slated to process 1 billion cubic feet (Bcf) per day of natural gas for domestic and international markets. The facility has a capacity of 5.2 million tons per year of LNG, and will also provide up to 125,000 cubic feet per day of natural gas for domestic consumption. Plans call for the gas to be sourced from Blocks 0, 1, 2, 14, 15, 17 and 18.

## Angola LNG potential gas pipelines



Source: Angola LNG

According to Angola LNG—the Sonangol subsidiary in charge of the project in Soyo—the project represents the largest single investment in Angola in history. Operations were set to begin in the first

quarter of 2012, but numerous delays pushed the scheduled start date back to the beginning of 2013. Angola LNG has seven LNG carriers at its disposal, each with a capacity of 160,000 cubic meters, though due to the delays at the facility in Soyo several of the vessels have been contracted out to other companies. Initial plans called for the LNG cargoes to be shipped to a re-gasification facility in Pascagoula, Mississippi operated by Gulf LNG; however, the market conditions in the United States are no longer favorable due to the gas-glut caused by the boom in unconventional gas. Instead, Angola LNG is targeting consumers in Europe and Asia, and is rumored to want to send its first shipment to fellow Lusophone country \*Brazil\*.

## Electricity

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*Angola's fractured electricity system serves 30 percent of the population and progress towards providing greater access is proving difficult. The Angolan government plans to invest billions of dollars in the country's electricity system, but in the short-term access to power will remain a challenge.*

Angola's electricity sector is run almost exclusively by the state company Empresa Nacional de Electricidade (ENE), but some private companies in the extractive industries have built power plants to run their operations. Angola is a member of the Southern African Power Pool (SAPP), a group that includes Botswana, the DRC, Lesotho, Malawi, Mozambique, Namibia, \*South Africa\*, Swaziland, Tanzania, Zambia, and Zimbabwe. The SAPP is designed to promote cooperation between member countries with the aim of creating a common electricity market that can provide reliable, and affordable, electricity to the citizens of member countries.

At present, Angola does not have a national electricity grid, instead relying on three independent systems that provide electricity to different parts of the country: The Northern, Central, and Southern Systems. The Northern System is connected to the Cuanza river basin and is the country's largest, serving the country's capital, Luanda. The Central and Southern Systems are linked to the Catumbela and Cunene river basins, respectively. The government hopes to link the three independent grids as part of a national grid system, and eventually to link its grid with neighboring SAPP members.

Currently, only 30 percent of Angolans have regular access to electricity, with that figure declining to below 10 percent in rural areas according to IHS. Limited existing infrastructure and a lack of funding for the power sector mean that Angola's ability to improve these rates substantially is limited. In late 2011, the Angolan government announced that it intends to invest \$16 billion in the electricity sector by 2016 in an effort to improve the country's transmission and distribution networks, and to help bring electricity to the country's remote rural regions. The plan proposes to increase overall electricity supplies by 12 percent in order to help meet rising domestic demand.

In 2010, over 68 percent of Angola's electricity was generated at the country's hydroelectric facilities, primarily from hydroelectric dams on the Cuanza, Catumbela, and Cunene rivers. Some analysis suggests that the country's potential hydroelectric generating capacity is well over 10 times the currently-installed generating capacity, but tangible plans to develop the country's hydroelectric resources have not yet emerged. The largest facility is the Capanda hydropower dam, which has installed capacity of 520 megawatts.

Given Angola's vast natural gas reserves, thermal generation is likely to gain increasing importance in the coming years. There have been discussions about building gas-fired facilities near the country's oil operations, in part to support industry there, but firm proposals have yet to emerge. In that same vein, in 2006 Angola began discussions with the International Atomic Energy Agency about developing a domestic nuclear power program, but details remain scarce and any project is still decades away from becoming a reality.

*Numbers cited in the text are EIA estimates unless otherwise noted.*

## Sources

Africa Energy Intelligence

AfrOil: Newsbase Africa Oil and Gas Monitor

Bloomberg

Business Monitor International – BMI Middle East and Africa Oil and Gas Insights

British Petroleum

Cedigaz

The Center for Strategic and International Studies

Central Intelligence Agency Country Reports

Chevron Corporation

Cobalt International Energy

The Economist

Economist Intelligence Unit

Energy Intelligence Group, Inc.

The Financial Times

Global Witness

Human Rights Watch

IHS CERA

IHS Global Insight

The International Monetary Fund

International Oil Daily

Offshore Magazine

Oil and Gas Journal

Petroleum Intelligence Weekly

PFC Energy

Platts Oilgram News

Reuters News Corporation

Rigzone

Sonangol

Total

Wood Mackenzie

The World Bank