Independent Statistics & Analysis
U.S. Energy Information Administration

Country Analysis Brief: Angola

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Overview

Angola is the second-largest oil producer in sub-Saharan Africa, behind Nigeria. The country experienced an oil production boom between 2002 and 2008 as production started at several deepwater fields. In 2007, Angola became a member of the Organization of the Petroleum Exporting Countries (OPEC).

Source: U.S. Department of State

The first commercial oil discovery in Angola was made in 1955 in the onshore Kwanza (Cuanza) basin.[1] Since that discovery, Angola's oil industry has grown substantially, despite a civil war that occurred from 1975 to 2002. Currently, oil production comes almost entirely from offshore fields off the coast of Cabinda and deepwater fields in the Lower Congo basin. There is small-

scale production from onshore fields, but onshore exploration and production have been limited in the past because of conflict.

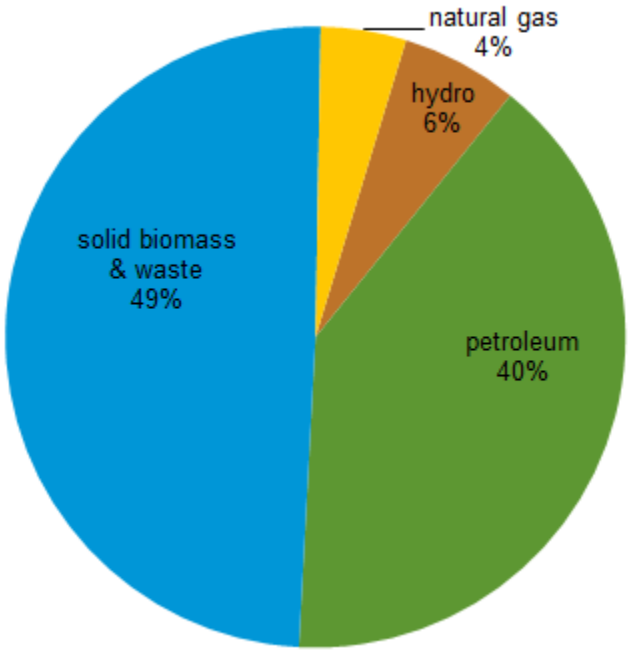
In 2014, Angola produced 1.75 million barrels per day (bbl/d) of petroleum and other liquids, of which almost 1.7 million bbl/d was crude oil. Angola's oil production grew by an annual average of 15% from 2002 to 2008 as production started from multiple deepwater fields that were discovered in the 1990s. The first deepwater field to come online was the Chevron-operated Kuito field (Block 14) in late 1999.[2] Since then, international oil companies (IOCs), led by Total, Chevron, ExxonMobil, and BP have started production at additional deepwater fields and are in the process of developing new ones.

Angola is a small natural gas producer. The vast majority of Angola's natural gas production is associated gas at oil fields, and it is vented and flared (burned off) or re-injected into oil wells to enhance oil recovery. Angola lacks the infrastructure needed to commercialize more of its natural gas resources. The country's new liquefied natural gas (LNG) plant at Soyo was developed to commercialize more of its natural gas. However, the plant experienced chronic problems and was temporarily shut down almost a year after it exported its first cargo in June 2013 to Brazil. It is not expected to resume operations until the end of 2015 or sometime in 2016.

Angola's economy is largely dependent on oil production. Oil export revenue accounted for close to 97% of total export revenue in 2012, according to the International Monetary Fund (IMF).[3] The U.S. Energy Information Administration estimates that Angola earned $24 billion in net oil export revenue in 2014 (unadjusted for inflation), $3 billion less than in 2013 because of decreased production and the decline in average annual crude oil prices. Angola's dependence on oil revenue makes it vulnerable to a decline in oil prices. During Angola's oil production boom from 2002 to 2008, gross domestic product (GDP) grew by an annual average of 15%, according to data from the World Bank. GDP growth fell to 2.4% in 2009 following the global financial crisis and the drop in oil prices, but it recovered to 5.2% in 2012 and 6.8% in 2013 as oil prices increased.[4] The recent decline in oil prices, coupled with Angola's stagnant production, is expected to adversely impact the country's economic growth this year.

Despite being the third-largest economy in sub-Saharan Africa (in terms of nominal GDP) more than 30% of Angolans live below the poverty line (living on less than $1.25 per day), although that proportion has declined substantially from 68% in 2001.[5] The latest 2012 estimate from the International Energy Agency indicates that only 30% of Angolans have access to electricity, leaving 15 million people without access.[6] As a result, most people use traditional solid biomass and waste (typically consisting of wood, charcoal, manure, and crop residues) to meet off-grid heating and cooking needs, mainly in rural areas where the electrification rate is only 8%. In 2012, almost 50% of the Angola's primary energy consumption consisted of traditional solid biomass and waste (Figure 1). However, that amount may be understated as estimates of traditional biomass consumption are imprecise because biomass sources are not typically traded in easily observable commercial markets.

Figure 1. Angola's primary energy consumption, 2012



Source: U.S. Energy Information Administration and International Energy Agency

Regulation of oil and natural gas industries

Sonangol, Angola's national oil company, is a shareholder in almost all oil and natural gas exploration and production projects. International oil companies from the United States and Europe lead oil and natural gas exploration and production in Angola. Companies from China have been increasing their participation in the industry.

In 1976, the government of Angola created a national oil company, the Sociedade Nacional de Combustiveis de Angola (Sonangol). Sonangol is currently a shareholder in almost all oil and natural gas production and exploration projects in Angola, with the exception of a couple of deepwater producing projects, and the company operates Angola's only oil refinery. Sonangol owns 17 subsidiaries that operate throughout the oil and natural gas industry, performing functions such as exploration, production and marketing of crude oil, storage, and marketing of petroleum derivatives.

Key subsidiaries include: Sonangol Pesquisa e Produção (P&P), which undertakes exploration and production activities for Sonangol in Angola; Sonaref, which runs refining operations in Angola; and Sonangás, which runs Angola's natural gas sector. 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.[7]

IOCs involved in Angola operate under joint-venture operations and production-sharing agreements (PSAs) with Sonangol. Major operators and shareholders include Total, Chevron, ExxonMobil, BP, Statoil, and Eni, among others. China's national oil companies Sinopec and the China National Offshore Oil Corporation (CNOOC) and the Hong Kong-based New Bright International Development are also involved in Angola and provide development assistance as well as oil-backed loans and trade. China Sonangol, established in 2004, is a joint venture between Sonangol and New Bright International Development. China Sonangol and Sinopec have a joint venture in a company called Sonangol Sinopec International (SSI), which is a non-operator shareholder in three major producing deepwater projects, while New Bright International Development is a shareholder in the less prolific assets within Block 3 (see Table 1).[8] There have been questions about Sonangol and New Bright's relationship and how the Hong Kong-based company has quickly become a dominant player in Angola's oil industry.[9]

Sonangol is becoming more involved in international ventures, and the company currently has interests in Brazil, Cuba, São Tome and Principe, Venezuela, and in the Gulf of Mexico. In early 2012, Sonangol pulled out of Iran's South Pars-12 natural gas project after U.S. sanctions on Iran were tightened. Sonangol was also forced to pull out of Iraq in 2014. The company had been experiencing repeated attacks on the oil fields it was operating (Qaiyarah and Najmah) because of militant violence in Iraq's northwest Ninawa Province.[10] Sonangol continues to explore opportunities around the globe as it aims to establish itself as a major international player.

Angola has strict local content requirements in its oil and natural gas industry. The requirements are under the umbrella of the "Angolanization" policy, which aims to increase the number of Angolans in management positions and Angolans hired as local contractors. The regulations require IOCs operating in the country to meet a 70% Angolanization threshold, but to date this figure has rarely—if ever—been met. IOCs are also required to use local banks for all their transactions and contribute to training programs in Angola. Companies are expected to provide $200,000 per year per block during the exploration phase of their operations and $0.15 per barrel of oil during the production phase to fund training programs. These regulations are designed to improve the technical and financial capacity of Sonangol, its subsidiaries, and Angola's citizens.[11]

Petroleum and other liquids

Sonangol is targeting a crude oil production rate of 2.0 million bbl/d by 2016 as new deepwater oil fields are scheduled to come online. However, in recent years Angola has continuously fallen short of its production targets, and crude oil production slightly declined in 2014. Frequent technical problems and steep production decline rates at older deepwater fields have resulted in lower-than-expected production levels despite new fields coming online.

Angola holds 9 billion barrels of proved crude oil reserves, according to the latest estimates from the *Oil & Gas Journal* (OGJ) released in January 2015.[12] Most of the proved reserves are located in the offshore parts of the Lower Congo and Kwanza basins. Typically, most exploration and production activities have been located in the offshore part of the Lower Congo basin, but the

onshore and offshore Kwanza basin is receiving more attention from IOCs because of its presalt formations.

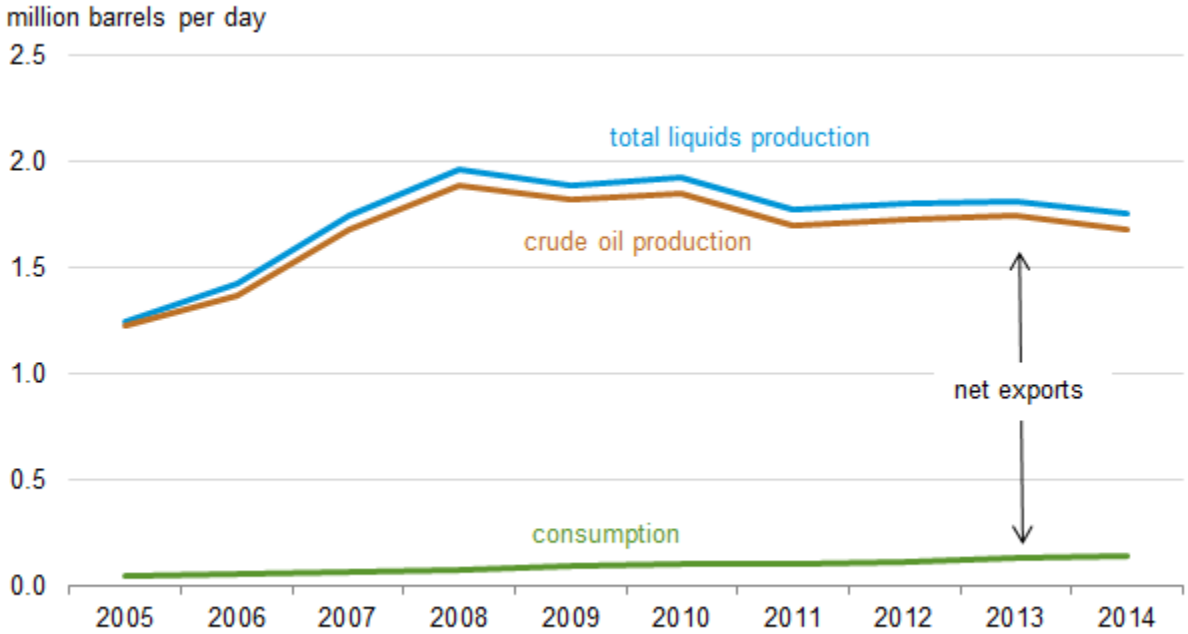
The west coast of Angola (along with some neighboring countries) shares geological similarities with Brazil's east coast, which contains presalt formations estimated to hold large quantities of hydrocarbon resources. The geological similarities stem from the separation of the African and South American tectonic plates through the Early Cretaceous period, explained by the scientific theory of plate tectonics and continental drift.

Three basins in Angola—the Lower Congo, Kwanza, and the not-yet-explored Namibe basinsâ [illegible] are also believed to be similar with Brazil's prolific Campos and Santos basins, is the current area targeted for presalt exploration by the IOCs and Sonangol.

Production and exploration

Oil production in Angola gradually increased from the 1960s to the 1990s, reaching almost 750,000 bbl/d by 2000. During this period, production came mostly from offshore fields off the coast of Cabinda, an enclave and province of Angola that has been disputed. Deepwater exploration in Angola began in the early 1990s. In 1994, deepwater blocks were licensed out, which led to more than 50 significant discoveries. As a result, between 2002 and 2008 oil production boomed as multiple deepwater fields came online.

Figure 2. Angola's petroleum and other liquids production and consumption



eia Source: U.S. Energy Information Administration

Angola's total oil (petroleum and other liquids) production peaked in 2008, reaching nearly 2.0 million bbl/d, of which 1.9 million bbl/d was crude oil (Figure 2). Despite some new oil fields coming online, Angola's total oil production remained relatively stagnant over the past few years and declined slightly by 50,000 bbl/d to average 1.75 million bbl/d in 2014. Angola's production has been stagnant as a result of persistent technical problems related to water injection systems, gas cooling, and floating, production, storage, and offloading (FPSO) units associated with some projects. The technical problems have caused lengthy maintenance work and disruptions to supply from some fields. Rapid reservoir depletion has also resulted in steep decline rates at some fields.

Table 1. Producing oil projects, operators, and loading ports in Angola

Operator	Partners	Location	Projects	Crude Streams	Loading Ports	2014 Loadings ('000 bbl/d)
ExxonMobil	BP, Eni, Statoil	Block 15 deepwater	Kizomba A (Hungo, Chocalho, Marimba)	Hungo	Kizomba A FPSO	375
			Kizomba B (Kizomba, Dikanza)	Kissanje	Kizomba B FPSO	
			Kizomba C (Mondo, Saxi Batuque)	Mondo; Saxi Batuque	Mondo FPSO; Saxi Batuque FPSO	
			Kizomba satellites project (Clochas, Mavacola)	blended with Hungo & Kissanje	Kizomba A & B FPSOs	
Chevron	Sonangol, Total, Eni	Block 0- Area A offshore	Takula, Malongo, Mafumeira Norte	Cabinda	Malongo terminal	400
		Block 0- Area B offshore	Bomboco, Kokongo, Lomba, N'Dola, Sanha			
		Block 0- Area B offshore	Nemba, Tombua, Landana	Nemba		
	Eni, Sonangol, Total, Galp Energia, Inpex	Block 14 deepwater	Kuito, BBLT (Benguela-Belize-Lobito-Tomboco)			
BP	Sonangol Sinopec International (SSI)	Block 18 deepwater	Greater Plutonio (Plutonio, Galio, Cromio, Paladop, Cobalto)	Plutonio	Plutonio FPSO	130
	Statoil, Sonangol, Marathon, SSI	Block 31 ultra deepwater	PSVM (Plutão, Saturno, Vênus, Marte)	Saturno	PSVM FPSO	100
Total	Statoil, ExxonMobil, BP	Block 17 deepwater	Dalia	Dalia	Dalia FPSO	200
			Pazflor (Perpetua, Zinia, Hortensia, Acacia)	Pazflor	Pazflor FPSO	200
			Girassol, Jasmin, Rosa	Girassol	Girassol FPSO	150
			CLOV (Cravo, Lirio, Orquidea and Violeta)	CLOV	CLOV FPSO	50

Eni	Sonangol, SSI, Falcon	Block 15/06 deepwater	West Hub[1]	NA	N'Goma FPSO	NA
Pluspetrol	Sonangol, Force Petroleum, Cubapetroleo	123-5 Cabinda onshore	Cabinda C (South)	Cabinda	Malongo terminal	10
Somoil	Chevron, Sonangol	onshore	Soyo	Palanca	Palanca terminal	20
Sonangol	Total, Chevron, Petrobras, Somoil, Kotoil, Poliedro, BTG Pactual	Block 2/85 offshore	Lombo East			
	Total, Eni, Inpex, Mitsui, Naftagas, Naftaplin, Mitsubishi, Somoil, Svenska, New Bright International Development	Block 3 offshore	Palanca, Cobo, Pambi, Oombo, Nunce Sul			
	Statoil, Somoil, Angola Consulting Resources	Block 4/05 deepwater	Gimboa	Gimboa	Gimboa FPSO	5

[1] West Hub Development's production started in December 2014.
Source: U.S. Energy Information Administration based on company reports, Energy Intelligence, and Lloyd's List Intelligence (APEX tanker data)

There are several oil projects scheduled to start production over the next five years in Angola. The latest projects to come online were the CLOV (Cravo, Lirio, Orquidea, and Violeta) and the West Hub development. CLOV, operated by the France-based Total, started commercial production in June 2014. CLOV's production capacity is 160,000 bbl/d.[13] The West Hub development, operated by the Italy—based Eni, started commercial production in December 2014. The West Hub's production capacity is 100,000 bbl/d (Table 1).[14] Two more deepwater fields are expected to start production in 2015: the Mafumeira Sul (110,000 bbl/d of crude oil) and the Lianzi (23,000 bbl/d of crude oil) fields. Non-crude oil liquids (condensate) and natural gas will also be produced from these fields (Table 2). The Lizani field, operated by the U.S.—based Chevron, is located in a unitized offshore zone between Angola and the Republic of Congo (Brazzaville), and it is the first cross-border development of its kind in the region.

Angola has more than 10 offshore and/or deepwater oil projects projected to come online in the medium term (within the next five years). Of those planned projects, six have received a final investment decision (FID) to develop and could potentially contribute 500,000 bbl/d of new crude oil production within five years. Despite the recent drop in global oil prices, projects that are past the FID stage will most likely not be canceled because the procurement and construction phase has already started. However, project start times could be delayed if global crude oil prices remain low. Because several of Angola's older deepwater fields are past their peak production, the new capacity additions from the upcoming projects are more likely to sustain Angola's crude oil production around or slightly above current levels over the medium term rather than provide a substantial boost.

Table 2. Upcoming crude oil projects in Angola

Project	Plateau output (000 bbl/d)	Operator	Est. Start	Location	FID[1]	Notes
Mafumeira Sul	110	Chevron	2015	Block 0 offshore	yes	Associated natural gas will be sent to the LNG plant in Soyo, Angola. An additional 10,000 bbl/d of non-crude liquids will be produced.
Lianzi field	23	Chevron	2015	Block 14 deepwater	yes	Located in the offshore unitization zone between Angola and Congo (Brazzaville). Field will produce a total of 46,000 boe/d of crude oil, non-crude liquids, and natural gas.
Kizomba Satellites Phase 2	59	ExxonMobil	2016	Block 15 deepwater	yes	Combines the development of Kakocha, Bavuca, and Mondo South fields.
East Hub project (Cabaca Norte, Sout-East)	100	Eni	2016	Block 15/06 deepwater	yes	Additional development phases are planned to start production from neighboring discoveries.
Greater Plutonio Phase 3	22	BP	2016	Block 18 deepwater	yes	The production will sustain current production at the Great Plutonio.
Kaombo Project	200	Total	2017	Block 32 ultra deepwater	yes	Final investment decision to develop the project was made April 2014.
Negage	75	Chevron	NA	Block 14 deepwater	no	Near the Lianzi field and the border with Congo (Brazzaville).
Lucapa	100	Chevron	NA	Block 14 deepwater	no	Near the Lianzi field and the border with Congo (Brazzaville).
Chissonga	100	Maersk Oil	NA	Block 16	no	The project was declared commercial in 2011.
Malange	50	Chevron	NA	Block 0- Area B offshore	no	The project is expected to supply a significant amount of natural gas to Angola LNG.
Cameia	100	Cobalt	NA	Block 21 offshore presalt	no	Cobalt expects to make a final investment decision to develop Cameia by end 2015.

[1] Companies have made a final investment decision (FID) to develop the project.
Source: U.S. Energy Information Administration based on company reports, *Oil & Gas Journal,* and International Energy Agency

Onshore production and exploration

Most exploration activity in Angola is conducted offshore at depths of more than 1,200 meters (3,937 feet). Exploration activities in Angola's onshore have been limited over the past decades because of the civil war (1975-2002). Over the past few years, onshore exploration has resumed, but at a much slower pace compared with offshore activities.

Recent onshore exploration activity is mostly conducted in the Lower Congo basin onshore area in the Cabinda North and South blocks. Sonangol, with China Sonangol, carries out exploration activity at Cabinda North. Exploration at the onshore Cabinda South block was initially led by Roc Oil Company based in Australia, but was later taken over by Pluspetrol Angola, a subsidiary of Argentinian group Pluspetrol, with partners Sonangol and Cubapetroleo. Exploration at the Cabinda South block initially started in 2007, and production started in late 2013 (see Table 1).[15]

Somoil, a privately-owned Angolan company, is pursuing exploration activities in the onshore Soyo areas. Somoil is currently producing small quantities of oil (less than 5,000 bbl/d), which is being blended and exported with the Sonangol-operated fields that make up the Palanca blend (see Table 1). Somoil is the only privately-owned company based in Angola that operates oil fields in the country.

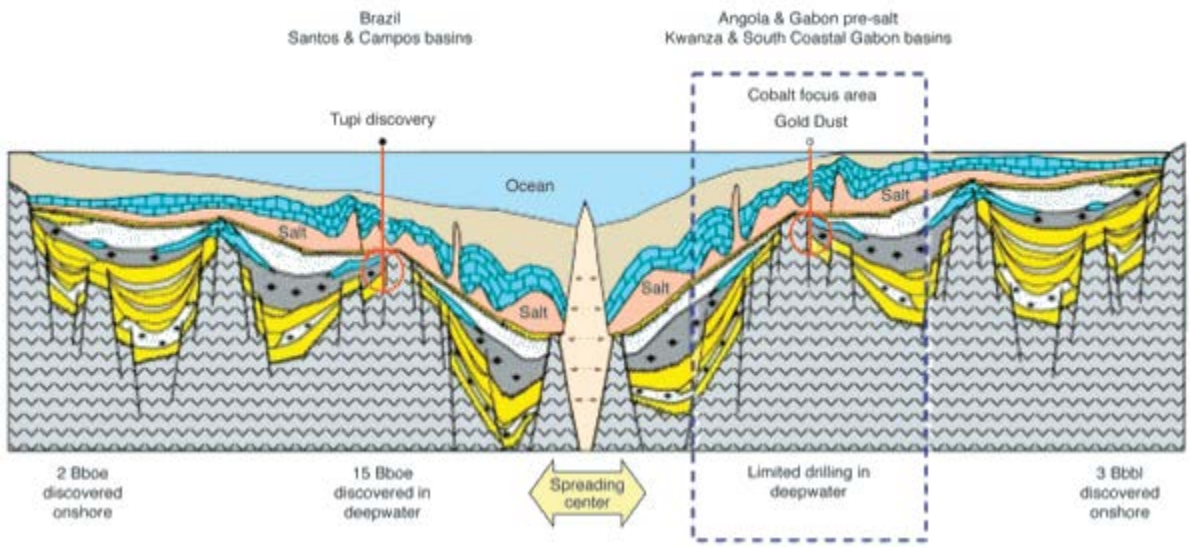
Presalt exploration

The first presalt discoveries in Angola were the Denden 1 well in block 9 in 1983, operated by Cities Services at the time, and the Baleia 1A well on block 20 in 1996, operated by Mobil (now ExxonMobil). Both blocks are now operated by the U.S.—based Cobalt International Energy.[16] The Danish company Maersk Oil made the first recent presalt discovery in the Kwanza basin in late 2011 with the Azul well on block 23. Maersk continues to study the results of the well and plans to appraise it.[17]

Cobalt has had the most success with presalt exploration in Angola, making multiple presalt well discoveries in blocks 20 and 21 (Cameia, Mavinga, Lontra, Bicuar, and Orca). Cobalt's finds have encountered presalt hydrocarbons in the form of liquid and gas. Cobalt is the only company to have made a presalt discovery (Cameia field) in Angola that is commercially viable. The company plans to move toward sanctioning the Cameia field by the end of 2015.[18] However, if oil prices remain low, a decision to develop will most likely be postponed.

In January 2011, Angola announced that it awarded 11 presalt offshore blocks in the Kwanza basin, following a closed licensing round in which a few selected IOCs were invited. IOCs that were awarded blocks include Petrobras, Maersk Oil, Cobalt, BP, Repsol, Total, Eni, ConocoPhillips, and Statoil. Some of those companies have slowed their investments in Angola's presalt, and some wells have been closed and abandoned.[19] The combination of disappointing results and geological complexity, compounded by the low-oil-price environment, has resulted in reduced investment in Angola's presalt areas. Nonetheless, Angola is in the early stages of auctioning off 10 onshore blocks believed to hold presalt prospects in the Kwanza and Lower Congo basins.

Angola - Brazil sub-sea geology



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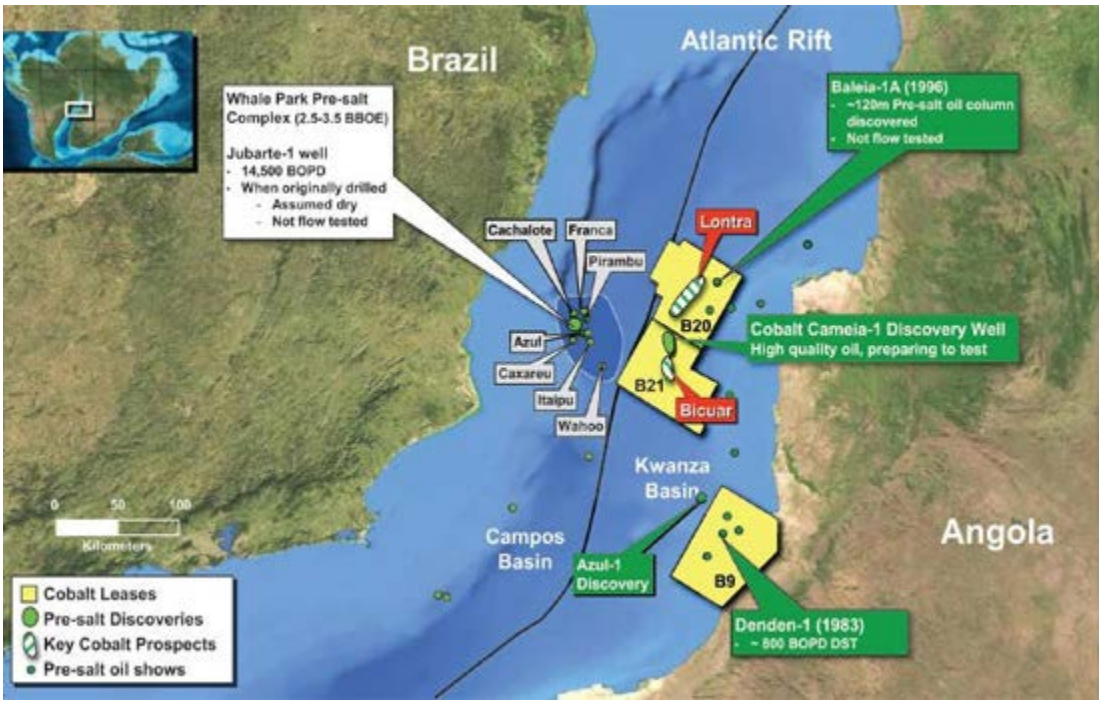
Presalt formations in Angola and Brazil



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Refining, consumption, and fuel subsidies

Angola has one small refinery that was constructed in 1955 and has a capacity of 39,000 bbl/d, although it typically operates at 70% capacity.[20] Construction on a new Sonaref refinery in Lobito started in December 2012. The refinery will have an initial processing capacity of 120,000 bbl/d and is scheduled to come online in 2017-18, although the start date has been pushed back before. The refinery's capacity is scheduled to increase to 200,000 bbl/d a few years after it opens. The refinery is expected to run on Angola's crude oil with refined products sold to domestic and international markets. In December 2013, Sonangol hired Standard Chartered Bank UK to provide financial consulting during its construction.[21]

Angola consumed roughly 145,000 bbl/d of petroleum products in 2014, triple the volume consumed a decade ago. Angola imports about 80% of the petroleum it consumes. Low fuel prices in Angola have contributed to rising oil demand. According to a recent report from the International Monetary Fund (IMF) on fuel subsidies in Angola, fuel prices in Angola are among the lowest in the world. According to 2012 data, the average gasoline price in Angola was 55% lower and diesel 67% lower than the average prices in sub-Saharan Africa. Angola's fuel subsidies accounted for almost 4% of gross domestic product (GDP) in 2014, which included fuel subsidies for electricity generation. In September 2014, the government raised retail fuel prices (by 25% for gasoline and diesel, by 21.6% for liquefied petroleum gas, by 34.6% for kerosene, by 100% for heavy fuels, and by 18.8% for asphalt). The IMF estimates that the increase in fuel prices reduced subsidy costs by 0.5% of Angola's GDP.[22] Angola plans to increase fuel prices again in 2015.

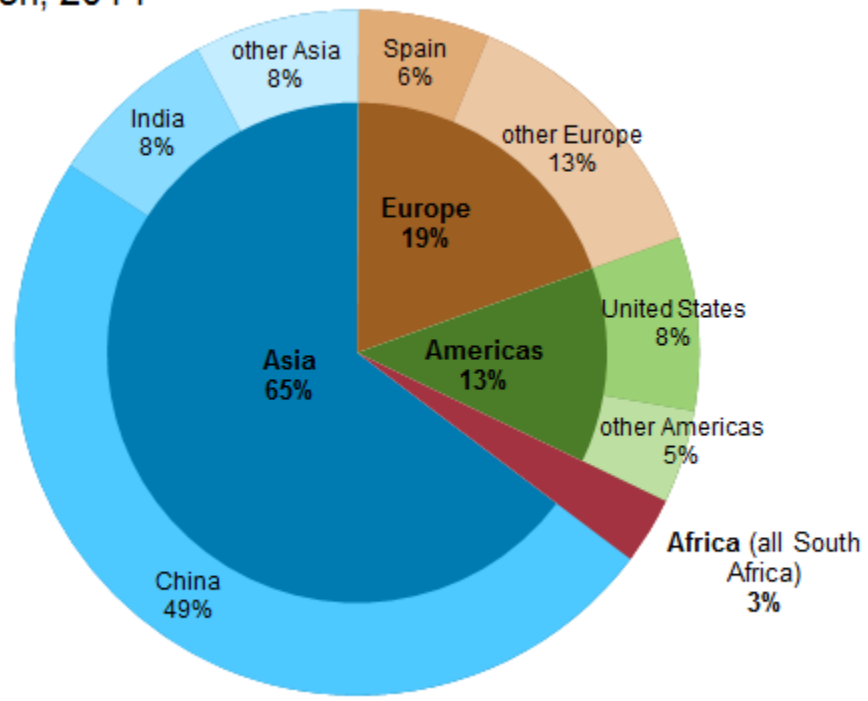
Exports

Angola has been the second-largest supplier of crude oil to China since 2005, behind Saudi Arabia. The United States, the European Union, and India are also major destinations for Angolan oil. However, U.S. imports of Angolan crude oil continue to decline because of increased U.S. production of similar quality crude grades.

In 2014, Angola exported about 1.65 million bbl/d of crude oil, including lease condensate, of which about half went to China (49%). Angola has been the second-largest supplier of crude oil to China since 2005, behind Saudi Arabia. The United States (8%), India (8%), and Spain (6%) are also major destinations for Angolan oil (Figure 3). Most of Angolan crude oil is medium-to-light in density, but some grades, such as Dalia, Pazflor, and Hungo, are heavy grades. Nearly all of Angola's oil production is exported because Angola's domestic refining capacity is limited.

The United States has been importing oil from Angola since the 1970s. Angola accounted for 5% of total U.S. crude oil imports between 2005 and 2009, supplying the United States with an annual average of 484,000 bbl/d during that period. U.S. imports of Angolan oil have decreased since then, in terms of the absolute volume and share. In 2014, the United States imported 136,000 bbl/d of crude oil from Angola, accounting for 2% of total U.S. imports. The growth in U.S. light, sweet crude oil production from the Bakken and Eagle Ford has resulted in a sizable decline in U.S. imports of similar quality crude grades.

Figure 3. Angola's crude oil exports, including lease condensate, by destination, 2014



Note: Total exports were 1.65 million barrels per day.
Source: U.S. Energy Information Administration based on Global Trade Information Services

Natural gas

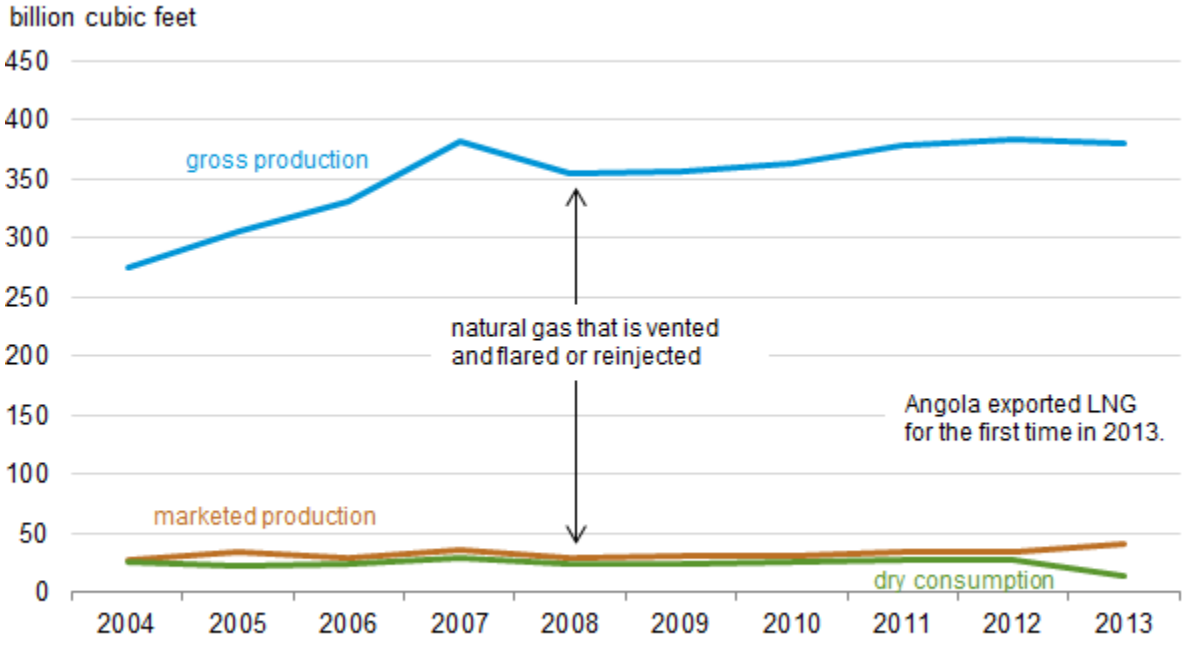
Angola currently produces small quantities of marketed natural gas because the vast majority of the country's gross production is flared (burned off) or reinjected into oil wells. In mid-2013, Angola exported its first cargo of liquefied natural gas (LNG) from its new LNG plant at Soyo. However, the LNG plant experienced chronic technical issues, which led to its temporary closure in April 2014.

Angola holds an estimated 9.7 trillion cubic feet (Tcf) of proved natural gas reserves, according to the latest OGJ estimates released January 2015.[23] Angola produces small quantities of marketed natural gas because the vast majority of its production is flared as a by-product of oil operations or reinjected into oil fields to increase oil recovery. Angola lacks the infrastructure needed to commercialize more of its natural gas resources. The country's new LNG plant at Soyo was developed to commercialize more of its natural gas. However, the plant experienced chronic problems and was temporarily shut down almost a year after it exported its first cargo to Brazil in June 2013.

Production and export

Gross natural gas production in Angola was 380 billion cubic feet (Bcf) in 2013, of which 247 Bcf was vented and flared, 91 Bcf was reinjected, and 42 Bcf was marketed (Figure 4). Angola's natural gas production comes entirely from natural gas associated with oil production, although Angola LNG, the operator of the LNG facility, plans to develop some previously-discovered nonassociated natural gas fields. 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 continue to produce. Improving LNG capabilities, developing the domestic market for commercial natural gas, and applying enhanced oil recovery techniques will be important components to Angola's natural gas strategy moving forward.

Figure 4. Angola's natural gas production and consumption



Source: U.S. Energy Information Administration

Angola exported LNG in 2013 for the first time, which totaled 18 Bcf that year.[24] The LNG was exported to Brazil, Japan, China, and South Korea.[25] The Soyo LNG plant was initially scheduled to begin operations in the first quarter of 2012, but many delays pushed the start date back. Angola LNG is a consortium that includes: Sonangol (22.8%), Chevron (36.4%), Total (13.6%), BP (13.6%), and Eni (13.6%). According to Angola LNG, the $10 billion dollar LNG project represented the largest single investment in Angola's history. The plant was built with a capacity to produce 5.2 million tons per year (250 Bcf per year) of LNG, as well as natural gas plant liquids. Associated natural gas is sourced from various offshore and deepwater oil fields within Blocks 0, 14, 15, 17, and 18. Angola LNG also plans to develop nonassociated gas fields in Blocks 1 and 2 to feed the LNG plant.[26]

In April 2014, Angola LNG temporarily shut down the plant because of continuous technical issues, which resulted in infrequent exports while it was open. The technical issues the plant experienced include electrical fires, pipeline leaks and ruptures, and a collapsed drilling rig that resulted in a worker's death. Bechtel, the plant's contractor, is working to overhaul the LNG plant.[27] The plant is expected to come back online at the end of 2015 or in 2016.

Electricity

Angola's electricity infrastructure was damaged substantially during its civil war (1975-2002). The Angolan government, with financial assistance from China, has made notable improvements to its power sector, and electricity capacity has more than doubled since the end of the war. However, more than half of the country's inhabitants still do not have access to electricity and rely on traditional biomass and waste to meet their household energy needs.

In 2012, Angola generated more than 5.5 million kilowatthours of electricity from hydro and fossil fuel sources. More than 70% was generated at the country's hydroelectric facilities, primarily from hydroelectric dams on the Kwanza (Cuanza), Catumbela, and Cunene Rivers. Some analysis suggests that the country's potential hydroelectric generating capacity is at least 10 times the currently installed capacity.[28]

The latest 2012 estimate from the International Energy Agency indicates that only 30% of Angolans have access to electricity, leaving 15 million people without access.[29] Some of the problems plaguing the electricity sector include: insufficient power generation, limited revenue collection (more than 80% of users are not metered), high costs for power generation and distribution (diesel used for generation is completely subsidized by the government), and the lack of highly skilled workers to manage the electricity sector.[30]

The Angolan government plans to invest $23 billion in the electricity sector by 2017[31] in an effort to improve the country's transmission and distribution networks, which were significantly damaged during the 27-year long civil war (1975-2002), and to help bring electricity to the country's remote rural regions, where the electrification rate is only 6%. The plan proposes to increase overall electricity supplies by more than 10% to help meet rising domestic demand. Angola has also set an ambitious long-term goal of increasing hydropower capacity to 9,000 megawatts by 2025 by building up to 15 new plants, with the help of foreign investment. The government hopes that the proposed growth in power generation capacity will double the country's electrification rate to 60%.[32]

Angola's electricity sector is dominated by the state company Empresa Nacional de Eectricidade (ENE), but some private companies in the extractive industries have built power plants to provide electricity for their operations. ENE manages and operates Angola's transmission system, along with more than 80% of the country's distribution system and power generation plants outside of the capital Luanda. Empresa de Distribuição de Electricidade (EDEL) operates the distribution system in Luanda. Currently, Angola does not have a national electricity grid, and instead the country relies on three independent systems that provide electricity to different

parts of the country: the Northern, Central, and Southern Systems. The government hopes to link the three independent grids as part of a national grid system and eventually link its grid with neighboring Southern African Power Pool (SAPP) members.

Angola is a member of SAPP, a group that includes Botswana, the Democratic Republic of the Congo (DRC), Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe. The SAPP is designed to promote cooperation among member countries with the aim of creating a common electricity market that can provide reliable and affordable electricity to the citizens of member countries.

Notes

- Data presented in the text are the most recent available as of March 19, 2015.
- Data are EIA estimates unless otherwise noted.

Endnotes

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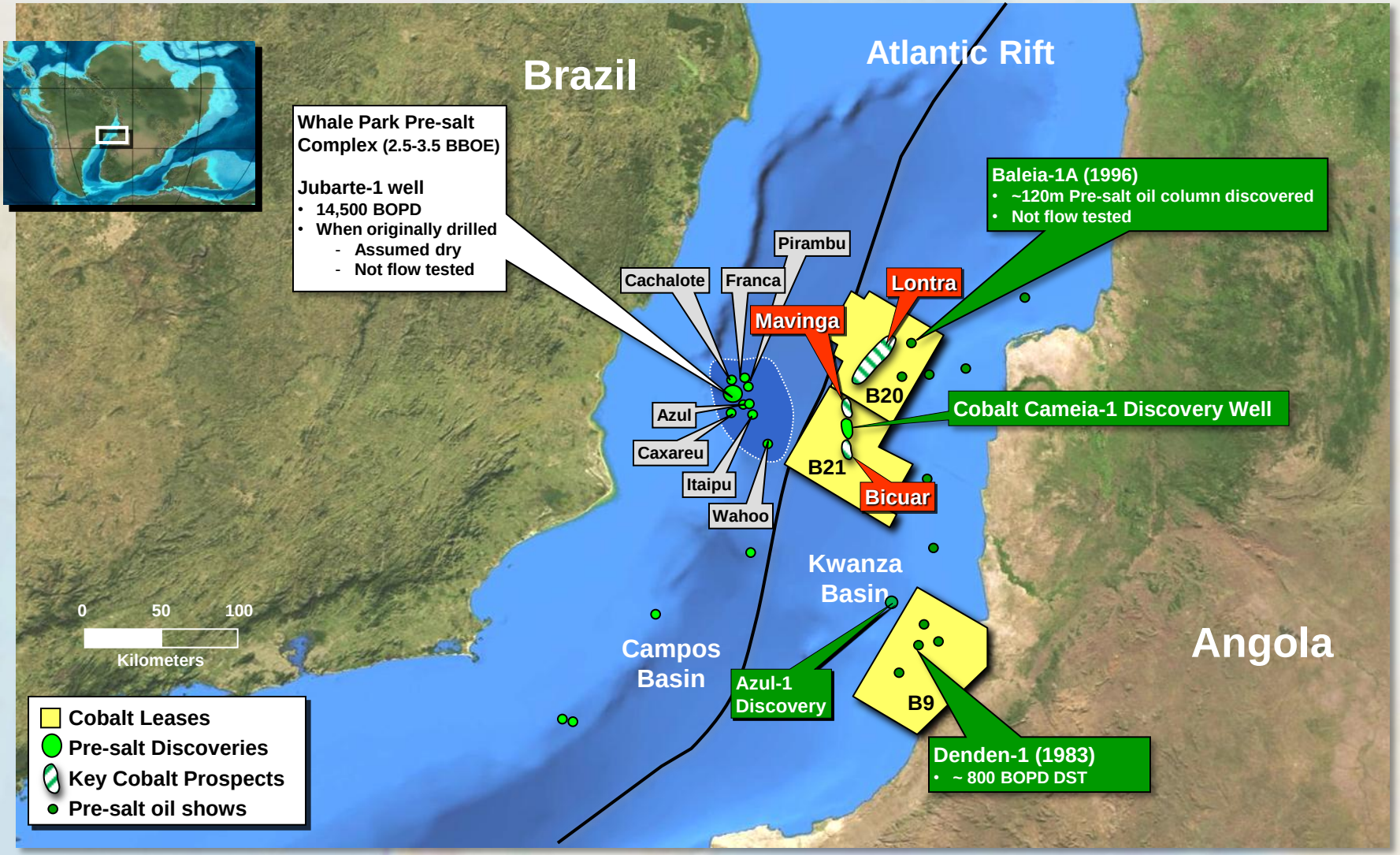
Location of Cobalt's Kwanza Basin Blocks to Campos Basin Discoveries at Time of Deposition



Sources: IHS, Reuters