

Brazil

International energy data and analysis

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[full report](#)

Overview

Brazil is the 8th-largest total energy consumer and 9th-largest liquid fuels producer in the world.

In 2014, Brazil was the eighth-largest energy consumer in the world and the third-largest in the [Americas](#), behind the United States and [Canada](#), according to BP statistics. Total primary energy consumption in Brazil has nearly doubled in the past decade¹ because of sustained economic growth. The largest share of Brazil's total energy consumption is oil and other liquid fuels, followed by hydroelectricity and natural gas.²

Brazil is also a significant energy producer. In 2014, Brazil produced 2.95 million barrels per day (b/d), representing a 9.5% increase from 2013, making it the world's 9th-largest producer and 3rd-largest in the Americas behind the U.S. and Canada. Fossil fuels represented about 60% of Brazil's domestic energy supply in 2014, an increase of nearly 5% compared with 2013. Renewable energy sources, including hydropower and biomass, accounted for slightly less than 40% of Brazil's energy supply in 2014, a decrease of 0.5% from 2013, primarily the result of a reduction in hydropower generation (-5.6%).³

Increasing domestic oil production has been a long-term goal of the Brazilian government, and discoveries of large offshore, presalt oil deposits have already transformed Brazil into a top-10 liquid fuels producer. Weak economic growth and corruption scandals implicating the head of State-controlled Petróleo Brasileiro S.A.(Petrobras) dampen prospects for production growth in the short term.



Source: Central Intelligence Agency, *The World Factbook*

Petroleum and other liquids

Brazil was the second-largest producer of petroleum in South America in 2014, behind Venezuela.

Sector organization

State-controlled *Petróleo Brasileiro S.A.* (Petrobras) is the dominant participant in Brazil's oil sector, holding important positions in upstream, midstream, and downstream activities. The company held a monopoly on oil-related activities in Brazil until 1997, when the government opened the sector to competition. Royal Dutch Shell was the first foreign crude oil producer in the country, and it has been joined by Chevron, Repsol, BP, Anadarko, El Paso, Galp Energia, Statoil, BG Group, Sinopec, ONGC, TNK-BP, among others. Competition in the oil sector is not just from foreign companies. Brazilian oil company OGX, which is staffed largely with former Petrobras employees, started to produce oil in the Campos Basin in 2011.

The principal government agency charged with regulating and monitoring the oil sector is the *Agência Nacional do Petróleo, Gás Natural e Biocombustíveis* (ANP), which is responsible for issuing exploration and production licenses and ensuring compliance with relevant regulations. Recent legislation concerning presalt exploration and production has changed the operating environment somewhat. See the [Presalt Oil](#) section for additional information.

Reserves

The U.S. Energy Information Administration (EIA) estimates that in 2015, Brazil had 15 billion barrels of proved oil reserves, although ANP's estimates are somewhat higher at 16.2 billion barrels of proved oil reserves at the end of 2014. This amounts to the second-largest level in South America after [Venezuela](#), and about 1% of the world's total reserves.⁴ More than 94% of Brazil's reserves are located offshore, and 80% of all reserves are found offshore near the state of Rio de Janeiro. The next largest accumulation of reserves is located off the coast of Espírito Santo state, with 9% of the country's reserves.⁵ Reserves are expected to rise as presalt resources are further explored.

Production and consumption

More than 91% of Brazil's oil production is offshore in very deep water and consists of mostly heavy grades.

In 2014, Brazil produced 2.95 million b/d of petroleum and other liquids. Crude oil made up 2.2 million b/d, and 551,000 b/d was biofuels, with the remainder produced as condensate and natural gas liquids (NGLs). The state of Rio de Janeiro produced 1.54 million b/d in 2014, accounting for 68.4% of the total production. São Paulo recorded the highest percentage growth in oil production in 2014 (134.4%) with 93,000 b/d as a result of increased production from the Baúna and Sapinhoá fields in the Santos Basin. Espírito Santo state remained the second-largest producer in the country with 352,700 b/d average production in 2014.⁶

A growing share of production is coming from Brazil's oil deposits in the presalt layer, making up about a quarter of total Brazilian output by April 2015 and increasing 63% year-over-year.⁷ In July 2015, oil production in the presalt layer hit a record 865,000 b/d, as new wells came onstream in the Santos basin.⁸ Presalt production has seen a dramatic rise over the past few years: it accounted for 0.4% of total production in 2008 when oil from the presalt was first produced.⁹ The 10% year-over-year increase in liquid fuels production was undoubtedly boosted by the delivery of four new floating production, storage and offloading (FPSO) facilities: P-62, P-58, Cidade de Ilhabela, and Cidade de Mangaratiba, with the last three FPSOs producing in the presalt layer.¹⁰

Brazil's consumption of petroleum and other liquid fuels continues to surpass its production. In 2014, Brazil's demand for petroleum and other liquid fuels was 3.2 million b/d, up from 3.0 million b/d in 2013.¹¹ However, EIA projects that production will exceed consumption in 2016 for the first time since 2008. This forecast is highly uncertain because the effect of lower crude oil prices since 2014 may adversely affect development and production plans. Furthermore, the fallout from the corruption scandal may further dampen Brazil's prospects.

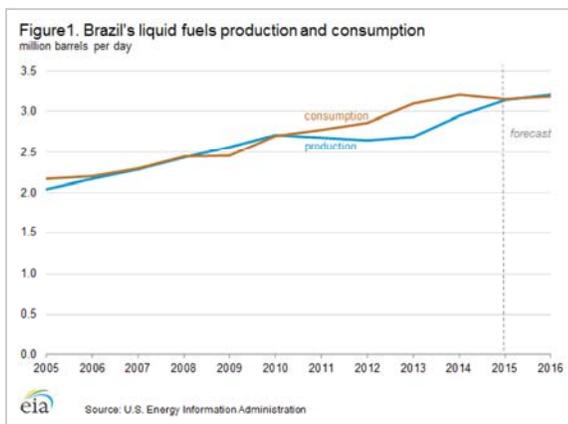
Petrobras is under investigation in Brazil and in the United States for bribery and money laundering. The multi-billion-dollar corruption scandal (Operation Car Wash scandal) started with the arrest in March 2014 of Paulo Roberto Costa, head of refining operations for Petrobras (2004–2012), who was accused of money laundering. The scandal escalated further with allegations of government corruption and a kick-back scheme, resulting in losses of more than \$8 billion, multiple arrests, and the resignation of the CEO, Maria das Graças Foster. The new CEO, Aldemir Bendine, was appointed in February 2015.

While the investigation is ongoing, the company's auditor would not certify its financial statements, which has kept Petrobras from accessing international capital markets, compounding the company's problems that have partly resulted from falling oil prices. The corruption scandal has altered Petrobras' investment plans in Brazil's oil industry, and instead of increased investments, the company was forced to undertake a sizeable divestment plan in order to raise funds.

Petrobras's investments in 2014 totaled BRL87.1 billion (\$27.4 billion), which represents a 17% decrease from 2013 investments. In February 2015, Petrobras announced its 2015–16 divestment plan, which totals \$13.7 billion, divided between the areas of exploration and production in Brazil and internationally (30%), refining, transportation, and marketing (30%), and natural gas and power (40%).

In its 2015 five-year Business and Management Plan, Petrobras revised its total production target of oil and natural gas (including international production) to 3.7 million barrels of oil equivalent per day in 2020. This production level represents another downward revision from its 2014 and 2013 expectations of 4.0 million b/d and 5.0 million b/d, respectively, as lower crude oil prices and the significant dollar-denominated debt of Petrobras dampen growth prospects.

For 2015 and 2016, the company is targeting production growth of 4% and 3%, respectively.¹² The newest Business and Management Plan estimates that the presalt will represent more than 50% of total oil production by 2020.¹³



Downstream

Nearly one-third of all crude oil processed in Latin America takes place in Brazil, according to IHS Energy.¹⁴ Brazil had a total of 2.4 million b/d of crude oil refining capacity at 17 refineries in 2014, a 6.8% increase in capacity from 2013. Petrobras operates 13 of these refineries that refine a total of 2.0 million b/d of product.¹⁵ The largest facility is the 434,000 b/d Replan refinery in São Paulo. Because Brazil's oil refineries do not have the technical capabilities to process heavier crudes, the country must export some of its heavy crude oil and import light crude oil. In 2014, Brazil's refineries were operating at about 95% capacity—slightly lower than the 98% capacity in 2013—as the Abreu e Lima refinery began its partial operation.¹⁶

The Abreu e Lima refinery began partial operation in December 2014, with an installed crude distillation capacity of 74,000 b/d, a volume that is expected to rise to 115,000 b/d, according to the Petrobras Management Report 2014.¹⁷ The refinery initially began as a joint venture with Petróleos de Venezuela (PDVSA), but it moved forward without PDVSA when it was unable to provide the 40% equity (\$17 billion).¹⁸ Once fully operational, the Abreu e Lima refinery is expected to have an ultra-low-sulfur diesel yield of 70%. The cost of the refinery is

estimated at nearly \$20 billion.¹⁹ The second phase of the Abreu e Lima refinery, which would add a second crude tower and an upgrading unit, has been postponed. Petrobras is also postponing the Complexo Petroquímico do Rio de Janeiro (Comperj) refinery project, and the company decided in January 2015 to terminate the investment projects for the construction of the Premium I and Premium II refineries.²⁰

Petrobras's downstream investments for 2015–19 are set at \$12.8 billion, with 69% for maintenance and infrastructure, 11% for the Abreu e Lima refinery, 10% for distribution, and 10% for other expenses.²¹

Exports and imports

The United States imported 145,000 b/d of Brazilian crude oil and exported 215,000 b/d of petroleum products to Brazil in 2014.

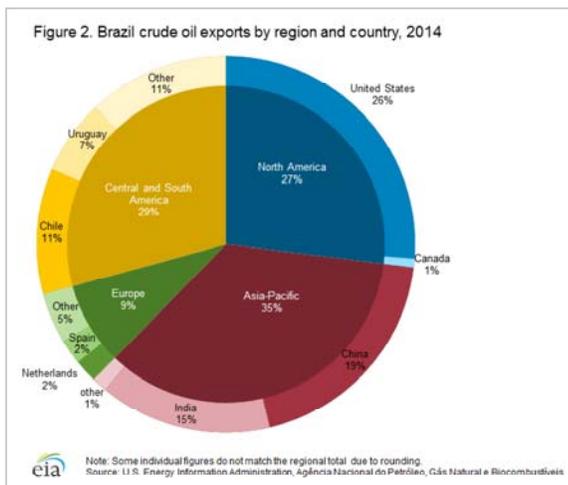
Brazil exported 518,904 b/d of crude oil in 2014, a 36% increase from the previous year.²² The United States imported 145,000 b/d of crude oil from Brazil in 2014, an increase of more than 30% from 2013, making it the largest importer of Brazil's crude oil. **China**, the second-largest importer of Brazilian crude oil, imported 106,849 b/d in 2014. **India** was the third-largest importer of Brazilian crude oil in 2014, with 81,643 b/d.²³

The regions that exported the largest volume of crude oil to Brazil were Africa and the Middle East, making up 68.7% and 26.3%, respectively, of the total. **Nigeria** by itself accounted for 52.4% of total crude oil exports to Brazil in 2014, with 75.5 million barrels. Imported oil from China in 2014 dropped 4.5% compared to 2013.²⁴

To meet the rising demand, compensate for its fuel price subsidies²⁵, and supplement its underinvested refining sector²⁶, Brazil continues to be a significant importer of petroleum products. In 2014, the country imported 144.2 million barrels of petroleum products.²⁷

The United States was the largest source country of petroleum products for Brazil, exporting 217,000 b/d in 2014. Brazil's imports of petroleum products from the United States in 2014 rose 20% compared with the previous year. India was Brazil's second-largest source of imported petroleum products at 78,932 b/d.²⁸

The transportation sector accounts for a large share of petroleum products demand. Because of continued fuel price subsidies and a struggling refining sector, Brazil must import petroleum products to satisfy demand in the transportation sector. In 2014, energy consumption in the transportation sector was 86.3 million tons of oil equivalent (Mtoe), with diesel oil accounting for 45%, gasoline accounting for about 30%, and ethanol accounting for 15%.²⁹



Presalt oil

The world's largest oil discoveries in recent years are in Brazil's offshore, presalt basins.

Presalt oil is generally characterized as oil reserves situated exceptionally deep under thick layers of rock and salt and requiring substantial investment to extract. The large depth and pressure involved in presalt production present significant technical hurdles that must be overcome. Post-salt oil is characterized as oil found above the rock and salt layers.

In 2005, Petrobras drilled exploratory wells near the Tupi field and discovered hydrocarbons below the salt layer. In 2007 a consortium of Petrobras, BG Group, and Petrogal drilled in the Tupi field and discovered an estimated 5–8 billion barrels of oil equivalent (boe) resources in a presalt zone 18,000 feet below the ocean surface under a thick layer of salt. For comparison, EIA defines ultradeep drilling in the Gulf of Mexico as 5,000 feet or more. Further exploration showed that hydrocarbon deposits in the presalt layer extended through the Santos, Campos, and Espírito Santo basins.

Petrobras has developed its major presalt assets in three discrete phases: 1) extended well tests; 2) pilot projects; and 3) large-scale production through multiple, duplicate floating production, storage, and offloading (FPSO) facilities.

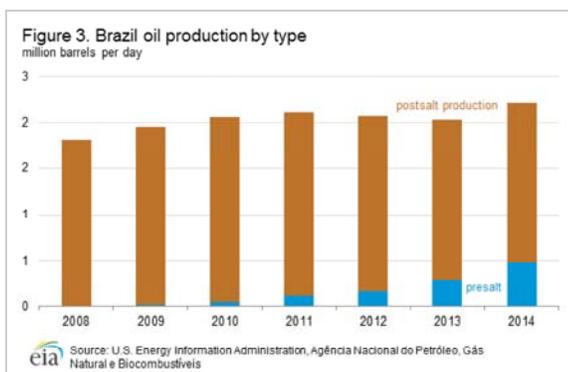
Following Tupi, many presalt finds were announced in the Santos Basin. Pilot projects in the Lula and Sapinhoá fields began production in 2009 and 2010, respectively. Oil production in the presalt rose from 110.5 million barrels in 2013 to 179.8 million barrels in 2014, an increase of 62.7% and an average production of 492,700 b/d.³⁰ Brazil's oil output decreased between 2012 and 2013 as project delays, coupled with high decline rates at legacy fields, made production growth unattainable. However, as long-delayed FPSOs were delivered, 2014 saw a jump in production, reversing the declines in the previous two years. So far in 2015, the increasing trend has continued.

With the exception of the Libra field, all presalt areas currently under development were non competitively granted to Petrobras. Through the Transfer of Rights Agreement of 2010, in exchange for \$42 billion of Petrobras shares, the government gave Petrobras rights to explore and produce 5 billion boe from six presalt areas in the Santos Basin: Florim, Búzios, Sul de Guará, Entorno de lara, Sul de Lula, and Nordeste de Tupi. Petrobras discovered significant reserves in addition to the original 5 billion boe. In June 2014, the government granted Petrobras the rights to produce surplus volumes estimated at 9.8–15.2 billion boe found in the Búzios, Entorno de lara, Florim, and Nordeste de Tupi areas. Petrobras expects first production from the Transfer of Rights areas by 2016 and from the surplus volumes by 2021.³¹

In October 2013, Brazil concluded its first presalt licensing round for the Libra field, estimated to hold 8-12 billion barrels of recoverable reserves. The only and thus winning bid was a consortium of Petrobras, Royal Dutch Shell, Total, and Chinese national oil companies China National Petroleum Corporation (CNPC) and China National Offshore Oil Corporation (CNOOC). Brazil anticipates oil production from the presalt layer will account for most of the projected growth from 2020–30.

In November 2013, a month after concluding the first presalt licensing round for the Libra field, Brazil's Petrobras announced the discovery of the Franco field, a presalt find, which could be larger than the 8-12 billion barrels of recoverable reserves found in the Libra field.³² Additionally, in May 2014, Petrobras made another presalt find of potentially 5 billion barrels in the Entorno de lara block.³³

ANP has approved 34 of the 39 companies that will participate in Brazil's 13th licensing round, which will take place on October 7, 2015.³⁴



Regulatory reforms

Petrobras is currently the sole operator of each production-sharing agreement, but, a new bill in Brazilian Congress has the potential to remove this obligation and ease the pressure on Petrobras.

Prior to the presalt discoveries, Brazilian law allowed all companies to compete in auctions to win concessions and to operate exploration blocks. This changed in 2010, under the PT (Workers' Party), when the Brazilian government passed legislation instituting a new regulatory framework for the presalt reserves. Included in the legislation were four notable attributes: First, the legislation created a new agency, Pré-Sal Petróleo SA, to administer new presalt production and trading contracts in the oil and natural gas industry. The second component allowed the government to capitalize Petrobras by granting the company 5 billion barrels of unlicensed presalt oil reserves in exchange for a larger ownership share. The other two components established a new development fund to manage government revenues from presalt oil and to lay out a new production-sharing agreement (PSA) system for presalt reserves. In contrast to the concession-based framework for non-presalt oil projects, where companies are largely uninhibited by the state in exploring and producing, Petrobras will be the sole operator of each PSA and will hold a minimum 30% stake in all presalt projects. However, to incentivize companies, the PSA will also include a signing bonus of \$6.6 billion and a low-cost recovery cap.

In its first and, thus far, only competitive licensing round (October 2013) for a presalt field, the winning bid was a consortium made up of Petrobras (with 40% stake), Royal Dutch Shell (20%), Total (20%), CNPC (10%), and CNOOC (10%).³⁵

Hit by the global decline in oil prices, high levels of debt (estimated at \$110 billion), and the Operation Car Wash scandal, Petrobras is struggling to meet its growth targets. See the [Production and Consumption section](#) above for more information on the Operation Car Wash scandal. The proposed offshore oil bill would allow greater private and foreign investment in the development of Brazil's offshore oil blocks. The bill is expected to pass later this year.³⁶

Brazil also has strict local content requirements, which commit companies to source specific percentages of their work force, equipment, and services in Brazil. According to Brazil's oil regulator, the ANP, in the bidding rounds, companies that offer higher percentages of local content have better chances of acquiring the rights to explore an oil block. The weight of the local content offer corresponds to 20% of the final grade given to the company's bid.³⁷

Under the first presalt production-sharing agreement, the government set the local content requirement for the Libra field at 37% in the exploration phase, 55% in the development phase, and 59% after 2022. Currently, oil companies are required to buy as much as 65% of their goods and services from domestic companies. The ambitious local content requirements have come into question over the past few years, however, as many companies have complained that Brazil lacks the domestic capacity to meet these requirements.³⁸ According to the IEA, the highly sophisticated technology and equipment needed for ultra-deepwater fields is often not found in Brazil. Pre-existing bottlenecks stemming from the lack of domestic capacity have been exacerbated by the corruption probe, which has touched several local suppliers.

In addition, Brazil's local content requirements, intended to create jobs in Brazil and build up local supply chains, are the source for cost overruns and project delays that have resulted in oil production declines in 2012 and 2013. Petrobras alone requires more than 50 FPSOs and other production units to meet its production targets, according to Platts.³⁹

Despite calls for change, Brazilian President Dilma Rousseff said that her government would maintain the rules for production-sharing contracts as well as for Brazil's local content policies.⁴⁰

Biofuels

To address the country's dependence on oil imports and its surplus of sugar cane, the government implemented policies to encourage ethanol production and consumption beginning in the 1970s.

Total biofuel production in Brazil in 2014 was 16.7 million tons of oil equivalent (Mtoe), a 5.5% increase from 2013.⁴¹

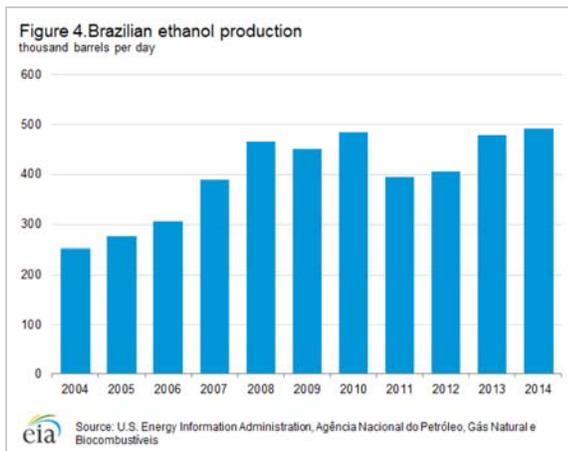
Brazil is the second-largest producer and consumer of ethanol in the world after the United States. Ethanol production grew 4% in 2014 compared to 2013, exceeding Brazil's 2010 record level and reaching 492,844 b/d, according to the Empresa de Pesquisa Energética (EPE).⁴²

The Brazilian government raised the ethanol blend requirement in gasoline to 27% in February 2015. The government is now considering an increase to 27.5% as a measure to reduce gasoline imports.⁴³ However, the ethanol industry is struggling, because of land and labor cost increases as well as government-imposed gasoline price controls, which are undermining the competitiveness of ethanol as an oil substitute.

In 2014, Brazil exported 24,125 b/d of ethanol, down 52% compared to 2013.⁴⁴ Ethanol exports to the United States represented 52% of total Brazilian ethanol exports.⁴⁵ Africa imported 490,605 barrels (1,344 b/d), a decrease of 39.2% from 2013; Europe imported 141,521 barrels of ethanol (388 b/d), down 88.2% from 2013; and Central and South America imported 37,109 barrels of ethanol (101 b/d), a decrease of 97% from the previous year. The only region that saw an increase in Brazilian ethanol imports from the previous year was the Asia-Pacific, with 3.5 million barrels of ethanol (9,554 b/d), an increase of 9.6% compared to 2013.⁴⁶

Brazil imported 7,789 b/d of ethanol in 2014 (down 243.2% from 2013), and nearly all imported ethanol came from the United States. Although Brazil is a major ethanol producer, the country also imports ethanol because of several factors. Historically, droughts in Brazil have forced the country to import ethanol, mostly from the United States. Additionally, if sugarcane is not quickly processed into ethanol, the crop is prone to rot. The seasonality of sugarcane harvests leaves Brazil with a January-to-March off-season. In Brazil, ethanol production is also highly sensitive to commodity prices. For example, because sugarcane is used for ethanol production, high sugar prices may entice producers to switch to sugar production instead of ethanol production.

Brazil also produces biodiesel but at smaller quantities. In 2014, the country produced 58,590 b/d of biodiesel, a 17.2% increase from 2013. Soybean oil remained the main raw material for the production of biodiesel, equivalent to about 77% of the total.⁴⁷ More than 80% of production has been concentrated in the south central region of the country.⁴⁸ In 2015, Brazil raised the domestic biodiesel mandate from 5% to 7%.⁴⁹



Natural gas

Although natural gas accounted for 12% of Brazil's total primary energy consumption in 2014,⁵⁰ the country has the second-largest reserves in South America, located primarily offshore in the Campos Basin.

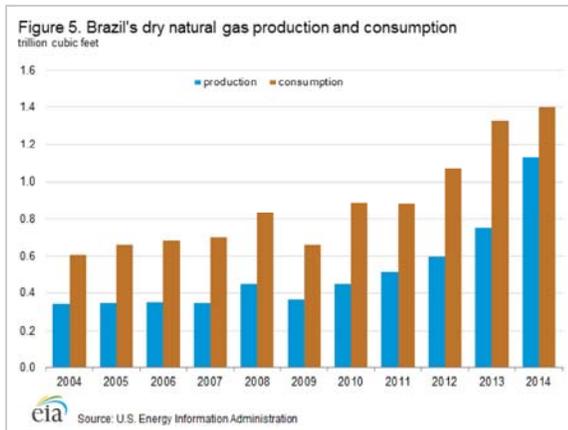
Sector organization

Petrobras plays a dominant role in all links of the natural gas supply chain. In addition to controlling most of the country's natural gas reserves, the company is responsible for most domestic Brazilian natural gas production and for natural gas imports from Bolivia. Petrobras controls the national transmission network, and it has a stake in 21 of Brazil's 27 state-owned

natural gas distribution companies. In the upstream and the midstream sector, Brazil's Ministry of Mines and Energy sets policy, and the ANP is the regulatory authority. In the downstream sector, regulation is overseen by state agencies.

Reserves

EIA estimates that Brazil had 16 trillion cubic feet (Tcf) of proved natural gas reserves at the beginning of 2015. The ANP estimates that, at the end of 2014, Brazil had an estimated 16.6 Tcf of proved natural gas reserves, second in South America after Venezuela. About 85% of Brazil's natural gas reserves are located offshore, and 66% of offshore reserves are concentrated off the coast of the state of Rio de Janeiro. The state of Rio de Janeiro increased its percentage of the volume of proved natural gas reserves from 56.1% in 2013 to 58.3% in 2014.⁵¹ About 72% of the country's onshore natural gas reserves are located in the state of Amazonas.⁵²



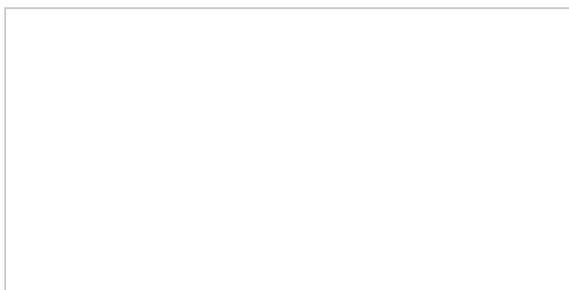
Production and consumption

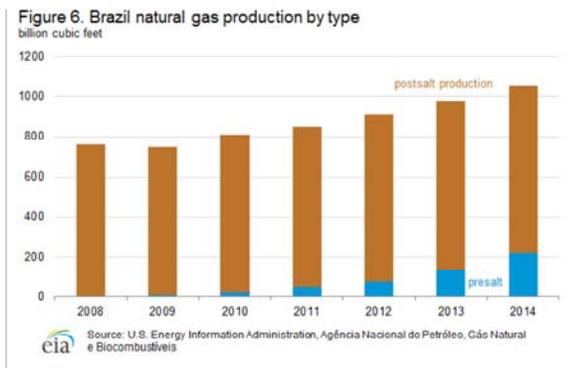
Along with the potential to significantly increase oil production in the country, the presalt areas are estimated to contain sizable natural gas reserves as well.

In 2014, Brazil produced 1.13 trillion cubic feet (Tcf) of natural gas, up 13.2% from 2013. Offshore production accounted for 73.3% of the natural gas produced in Brazil, totaling 826.4 billion cubic feet (Bcf), and onshore production increased by 13.3% and reached 300.2 Bcf. Nearly half of offshore natural gas production is concentrated off the coast of Rio de Janeiro. Regarding onshore natural gas production, the state of Maranhão accounted for 6.2% of the volume produced in 2014, with production at 70.6 Bcf. This production level was mostly because of the development of the Parnaíba Basin, which holds the largest private field of onshore gas in Brazil.⁵³

Brazil's consumption of natural gas was 1.4 Tcf in 2014, an increase of 6.3% from 2013, with imports from neighboring countries adding to domestic production. Natural gas demand from the industrial sector was 38.9% of the country's total natural gas consumption in 2014.⁵⁴

Recent announcements about additional natural gas discoveries in Brazil's offshore presalt layer have generated excitement about new natural gas production. Along with the potential to significantly increase oil production in the country, the presalt areas are estimated to contain sizable natural gas reserves as well. Production in the presalt layer reached 222.5 Bcf in 2014, according to ANP.⁵⁵





Pipelines

Petrobras operates Brazil's domestic natural gas transport system through its subsidiary company Transpetro. The network has more than 7,270 miles of natural gas pipelines,⁵⁶ predominantly along the southeast and northeast areas of the country, from the state of Rio Grande do Sul to Ceará. For years these systems were not interconnected, which hindered the development of domestic production and consumption. However, in March 2010, the Southeast Northeast Integration Gas Pipeline (GASENE) linked these two markets for the first time. This 860-mile pipeline, which runs from Rio de Janeiro to Bah a, is the longest pipeline in Brazil.

The other major natural gas market in Brazil is the Amazon region. In 2009, Petrobras completed construction of the Urucu pipeline linking Urucu to Manaus, the capital of Amazonas state. This project is expected to facilitate development of the Amazon's considerable natural gas reserves.

Imports

Brazil imported 614.5 Bcf of natural gas in 2014, a 5.4% increase from 2013. Bolivia was the source of more than 68% of Brazilian natural gas imports.

Brazil imported 614.5 Bcf of natural gas in 2014, a 5.4% increase from 2013, as a result of large increases in domestic natural gas demand. Of this amount, 68% came from [Bolivia](#) (via pipeline), and the remainder corresponds to liquefied natural gas (LNG) imports primarily from Nigeria, [Qatar](#), [Spain](#), and [Trinidad and Tobago](#).⁵⁷

Brazil imports natural gas from Bolivia through two pipelines. The Gasbol pipeline, established in 1999, links Santa Cruz, Bolivia to Corumb a, Brazil and continues to S o Paulo, Brazil. The 1,960-mile pipeline has a maximum capacity of 1.1 Bcf per day (Bcf/d).⁵⁸ The San Mat as pipeline (98 million cubic feet per day (Mcf/d)) runs from San Jos e de Chiquitos, Bolivia to San Mat as, Brazil, and then connects to the GasOccidente pipeline to supply the Empresa Productora de Energia Ltda power plant in Cuiab a.⁵⁹

Liquefied natural gas

Brazil has three LNG regasification terminals with a combined capacity of 1.4 Bcf/d: the Pec m terminal in the northeast, the Guanabara Bay terminal in the southeast, and the TRB terminal, which opened in January 2014 in the state of Bahia.⁶⁰ The facilities are floating regasification and storage units (FRSU). The Pec m received its first LNG cargo from Trinidad and Tobago in July 2008. The Guanabara Bay terminal came online in May 2009.

Brazil re-exported 3.2 Bcf of LNG to Argentina in 2014.⁶¹

Electricity

Brazil has the third-largest electricity sector in the Americas, behind the United States and Canada.

Brazil had an installed generating capacity of 134 gigawatts (GW) in 2014, representing a 7.2 GW expansion from 2013, according to the Ministry of Mines and Energy.⁶² Hydroelectricity

accounted for 89.2 GW of generating capacity, fossil fuel sources 25.5 GW, biomass 12.3 GW, and small amounts from wind, nuclear, and solar made up the remainder. Brazil also had 5.9 GW of contracted imports, bringing the total power supply to 139.8 GW.⁶³

Brazil generated 590 billion kilowatthours (kWh) of electricity in 2014.⁶⁴ Public service power plants accounted for 572 billion kWh, self-producers accounted for 52.2 billion kWh, and the remainder was either traded or accounted for as losses.⁶⁵

In 2014, final end-use consumption of electricity was 531 billion kWh, an increase of almost 3% from the previous year. The industrial sector accounted for 206 billion kWh, the residential sector consumed 132 billion kWh, and the commercial sector consumed 91 billion kWh.⁶⁶ Hydroelectric power accounted for 65.2% of total electricity generated in Brazil. Natural gas and oil represented 13% and 6.8%, respectively, and biomass accounted for 7.4%.⁶⁷

Sector organization

The government plays a substantial role in the Brazilian electricity sector. Until the 1990s, the government controlled the electricity sector almost completely. Brazil initiated an electricity sector privatization process in 1996 that led to the establishment of the National Electric Energy Agency (Aneel). However, when drier-than-average weather led to severe energy shortages in 2000 and 2001, the privatization process stalled. Although the electricity sector was privatized in the early 2000s, the bulk of Brazil's major generation assets remain under government control. Eletrobras, a state-owned holding company, is the dominant player in the electricity market. The government also owns almost the entire electricity transmission network.

In 2004, the Brazilian government implemented a new model for the electricity sector. This hybrid approach to government involvement splits the sector into regulated and unregulated markets for different producers and consumers. This approach allows for both public and private investment in new generation and distribution projects. Under the plan, however, Eletrobras was formally excluded from privatization efforts.

The government removed electricity tariffs for households and businesses in January 2013, but has since reinstated the tariffs following the October 2014 elections.⁶⁸

Hydroelectricity

Brazil is planning new hydroelectric power projects, such as the Belo Monte plant, which upon completion will be the third-largest hydroelectric power plant in the world.

Brazil generated 373 billion kWh of hydroelectric power in 2014, a decrease of 4.5% from 2013.⁶⁹ Many of Brazil's hydropower generating facilities are located far from the main demand centers, resulting in high transmission and distribution losses.

The world's largest hydroelectric plant by generation is the 14,000 MW Itaipu hydroelectric dam on the Paraná River, which Brazil operates with Paraguay. According to Itaipu Binacional, the facility generated 87.8 billion kWh of electricity in 2014, a decrease of about 11%.⁷⁰ Although Brazil plans to move away from hydropower to mitigate the risk of supply shortages as a result of dry weather, new hydro projects continue to move forward. Most notable among these projects is the Belo Monte plant in the Amazon Basin, which upon completion will be the third-largest hydroelectric plant in the world behind China's Three Gorges Dam and the Itaipu Dam.

Nuclear power

Brazil has two nuclear power plants, the 640-megawatt (MW) ANGRA 1 and the 1,350-MW ANGRA 2. State-owned Eletronuclear, a subsidiary of Eletrobras, operates both plants. The ANGRA 1 nuclear power plant began commercial operations in December 1984, and the ANGRA 2 began commercial operations in December 2000. Construction of a third plant, the 1,405-MW Admiral Alvaro Alberto Nuclear Power Station (CNAEA), formerly ANGRA 3, started in 1984 and is still under construction. Eletronuclear anticipates that the power plant

will enter into commercial operations by May 2018.⁷¹ Nuclear power accounted for 1,990 GW of installed generating capacity (1.5% of total) in Brazil in 2014.⁷²

Nuclear power accounted for 15.3 MW of electricity generation, a decrease of 0.5% from the previous year.⁷³ Nuclear energy consumption was 40.7 terrawatt-hours (TWh) in 2014, up 5% from 38.4 TWh in 2013.⁷⁴

Notes

- Data presented in the text are the most recent available as of October 9, 2015.
- Data are EIA estimates unless otherwise noted.

Endnotes

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