U.S. Energy Information Administration

Colombia

International energy data and analysis

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full report

Overview

Colombia has seen a dramatic increase in oil, natural gas, and coal production since the implementation of a series of regulatory reforms in 2003.

In recent years, Colombia has increased its importance as an energy producer in the Western Hemisphere. Colombia is currently the third-largest oil producer in Latin America and is the seventh-largest crude exporter to the United States. Colombia is also the largest coal producer in South America. The enactment of a series of regulatory reforms to make the oil and natural gas sector more attractive to foreign investors led to an increase in Colombian production. The government implemented a partial privatization of state oil company Ecopetrol (formerly known as Empresa Colombiana de Petróleos S.A.) in an attempt to revive its upstream oil industry. However, after nearly a half-decade of relatively secure operations, attacks on oil and natural gas pipelines have increased, and disruptions to oil supply averaged about 45,000 barrels per day (bbl/d) in 2014. Expanded oil production will require discoveries of reserves and improvements to infrastructure safety.

The U.S. Energy Information Administration (EIA) estimates that Colombia consumed 1.545 quadrillion British thermal units (Btu) of energy in 2012. Oil consumption constituted 40%, followed by hydroelectricity, natural gas, and coal. The country relies on hydropower for the bulk of its electricity needs and uses very little coal domestically. Of the 94.2 million short tons (MMst) of coal produced, Colombia exported 87% in 2013. Natural gas consumption in Colombia has grown, rising by more than 54% in the past decade.

Source: Central Intelligence Agency, *The World Factbook*

Oil

Colombia's oil production has increased since 2007 because of increased exploration and development. New exploration and development were spurred by the regulatory reforms of 2003.

According to the *Oil and Gas Journal* (OGJ), Colombia had more than 2.4 billion barrels of proved crude oil reserves as of January 1, 2015.[1] Although exploration continues and discoveries are announced, Colombian officials estimate that, at current reserve levels, the current oil reserves will last about seven years.[2]

Much of Colombia's crude oil production occurs in the Andes foothills and in the eastern Amazonian jungles.[3] Meta Department, in central Colombia, is also an important production area, predominately of heavy crude oil. The area's Llanos basin contains the Rubiales oilfield, the largest producing oil field in the country.[4]

Sector organization

Ecopetrol, the national oil company of Colombia, formerly controlled the development of all hydrocarbon resources. However, Colombia decided reforms were needed as a result of declining reserves and production, and in 2003, President Álvaro Uribe enacted energy sector reforms. President Uribe moved administrative and regulatory responsibility for the country's hydrocarbon resources from Ecopetrol into a new regulatory agency, Agencia Nacional de Hidrocarburos (ANH).[5] In 2012, additional restructuring consolidated responsibility for upstream and downstream planning and oversight in the Ministry of Mines and Energy.[6]

Colombia's government has taken measures to make the investment climate more attractive to foreign oil companies. Upstream sector initiatives give foreign oil companies the right to own 100% stakes in oil ventures and to compete with Ecopetrol.[7] In addition, the government has sold shares of Ecopetrol to private investors, reducing its share to roughly 90%. According to the Colombian central bank, the oil sector received $4.9 billion in foreign direct investment (FDI) in 2013, accounting for 30% of total FDI in Colombia.[8]

In August 2014, ANH concluded a bid round of 90 exploration blocks that included both onshore and offshore blocks. About 20% of the available blocks are believed to contain shale or coalbed methane gas, but only one of these blocks received a bid. A total of 15 companies were awarded blocks.[9]

Exploration, production, and consumption

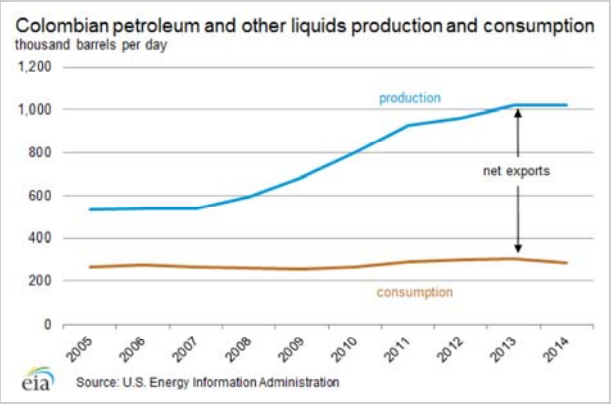
Colombia produced 1 million bbl/d of petroleum and other liquids in 2014, which includes crude oil, condensate, natural gas plant liquids, other liquids, and refinery processing gain. Colombia's oil production has increased by an annual average of almost 10% since 2008, but growth has slowed in recent years, and production was relatively flat from 2013 to 2014. Colombia consumed 290,000 bbl/d in 2014, allowing the country to export most of its oil production.

Prior to 2008, Colombia's oil production had been largely flat for many years, following a period of steady decline that started in 1999 when Colombia's oil production peaked at 830,000 bbl/d. The principal causes of the fall in oil production were natural declines at existing oil fields and a lack of new reserve discoveries. However, a combination of changes to the regulatory framework led to higher levels of investment in the country by international oil companies.

As a result of these improvements, Colombia experienced rapid growth in oil production between 2008 and 2013. However, increased rebel attacks on oil infrastructure and a lower world oil price led to a leveling off of production in 2014. In the May 2015 edition of the *Short-*

Term Energy Outlook, EIA projected that Colombian oil production will remain steady over the next two years, averaging 1 million bbl/d in 2015 and 2016.

The largest producing oil field in Colombia is the Rubiales heavy oil field, located in Meta department (state/region). Low levels of production began at Rubiales in the late 1980s, but increasing investment and the completion of a new pipeline allowed production rates to rise from 96,000 bbl/d in 2009 to 212,000 bbl/d by August 2013.[10] Since 2013, however, production at Rubiales has fallen, reaching 163,000 bbl/d by December 2014.[11] Other large oil fields include Castilla, Chichimene, and Quifa.[12]



Oil exports

The United States is the top destination for Colombia's oil exports.

In 2014, the United States was Colombia's top oil export destination, followed by China, Panama, and India. In that year, Colombia exported 294,000 bbl/d of crude oil to the United States. Crude oil exports to the United States have fallen more than 100,000 bbl/d since 2012 because of strong crude production growth in the United States. China expressed interest in financing new infrastructure projects in Colombia to facilitate the transport of oil to the Pacific coast for export. In May 2012, agreements were made for China Development Bank to finance a 600,000 bbl/d pipeline to transport Colombian and Venezuelan oil to the south Colombian Pacific coast starting in 2016.[13]

Pipelines

Colombia has seven major oil pipelines, five of which connect production fields to the Caribbean export terminal at Coveñas. These include the 520-mile Ocensa pipeline, which has the capacity to transport 590,000 bbl/d from the Cusiana/Cupiagua area; the 485-mile, 220,000 bbl/d-capacity Cano Limon pipeline; and the smaller Alto Magdalena (9,200 bbl/d) and Colombia Oil (15,000 bbl/d) pipelines, which were sold to Perenco by Petrobas in 2013.[14] The Llanos Orientales pipeline (also known as ODL) came online in late 2009, linking the Rubiales field to the Ocensa pipeline, with a capacity of 340,000 bbl/d.[15] The 190-mile Trasandino pipeline has a capacity of 85,000 bbl/d and transports crude from Colombia's Orito field in the Putumayo basin to Colombia's Pacific port at Tumaco.[16]

In November 2010, Ecopetrol announced that it would be partnering with an international consortium to develop the Oleoducto Bicentenario pipeline.[17] This $4.2 billion project, currently under construction, will have a peak capacity of 450,000 bbl/d. The first phase (110,000 bbl/d) began operations in late 2013, transporting hydrocarbons from Araguaney to Banadia, where it connects to the Cano Limon pipeline. The Oleoducto Bicentenario will eventually connect to the export terminal in Coveñas.[18]

Pipelines and other energy infrastructure in Colombia are still the targets of attacks by anti-government guerrillas. Pipeline attacks declined significantly from 155 in 2005 to 31 in 2010 according to Colombia's Ministry of Defense.[19] Since 2010, however, the number of attacks has increased substantially, reaching 259 in 2013 and 141 in 2014.[20] This rise in the number

of attacks has led to significant increases in unplanned production disruptions in Colombia. EIA estimates Colombia averaged 45,000 bbl/d of unplanned production disruption in 2014, nearly a three-fold increase since 2012. After suffering several military setbacks in recent years, anti-government fighters may have increased attacks to strengthen their negotiating position as part of Colombia's ongoing peace talks.[21]

Downstream

According to *Oil & Gas Journal*, Colombia had 290,850 bbl/d of crude oil refining capacity in 2014 at five refineries, owned by Ecopetrol, which are shown in Table 1.[22] The 205,000 bbl/d Barrancabermeja-Santander facility and the 80,000 bbl/d Cartagena refinery possess most of the country's crude distillation capacity.

Although Colombia is a net oil exporter, it must import some refined products, especially diesel fuel. As a result, Ecopetrol has begun efforts to expand refining capacity in the country. The expansion of the Cartagena refinery, scheduled to be completed in 2015, will more than double its current capacity to 165,000 bbl/d.[23] Ecopetrol is also expanding the Barrancabermeja plant, which will increase its capacity to 300,000 bbl/d and improve the refinery's ability to process heavier crude oils.[24] The expansion, currently under construction, is expected to be completed in 2018.

Table 1. Refining capacity and expansion, Jan. 2015

Refinery	Location (department)	Current capacity (bbl/day)	Capacity under construction (bbl/day)
Barrancabermeja	Santander	205,000	95,000
Cartagena	Bolivar	80,000	85,000
Apiay	Meta	2,250	
Tibu	Norte de Santander	1,800	
Orito	Putumayor	1,800	

Source: U.S. Energy Information Administration, Oil & Gas Journal

Natural gas

Colombia is self-sufficient in natural gas supply and recently began exporting to neighboring Venezuela.

Colombia had proved natural gas reserves of 6.4 trillion cubic feet (Tcf) as of January 2015. The bulk of Colombia's natural gas reserves are located in the Llanos basin, although the Guajira basin accounts for most current production. Natural gas production, like oil production, has risen substantially in the past few years, because of increasing international investment in exploration and development.

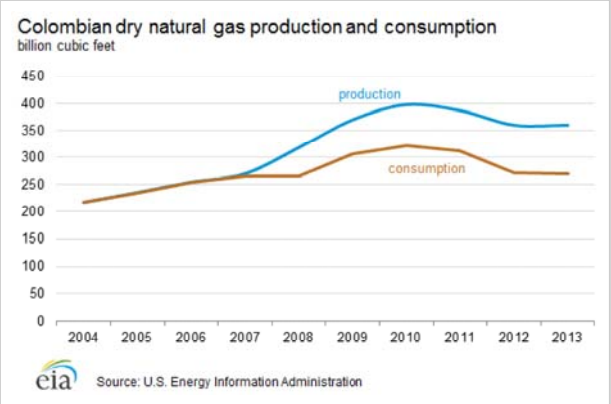
Exploration and production

Colombia produced 360 billion cubic feet (Bcf) of dry natural gas in 2013 and consumed 269 Bcf. Of the country's total gross natural gas production, about half was reinjected to aid in enhanced oil recovery. In 2007, natural gas production began to exceed consumption, allowing for exports.

Three companies—Ecopetrol, Equion Energia (a partnership between Ecopetrol and Talisman Energy), and Chevron—account for most of Colombia's natural gas production.[25] Ecopetrol operates the Cupiagua and Cupiagua Sur fields in the large Llanos Basin in eastern Colombia. Equion Energia, formed after Ecopetrol and Talisman Energy acquired BP's Colombian assets in 2010, operates the Cusiana, Cusiana Norte, and Cupiagua Liria fields, also in the Llanos Basin.[26] Chevron, in partnership with Ecopetrol, operates the

Caribbean Chuchupa offshore field in the Guajira basin, the largest nonassociated natural gas field in the country.[27] The company also operates the nearby onshore Ballena and Riohacha fields.[28]

The Colombian government published a decree in March 2011 outlining a plan to increase domestic natural gas production, including production from shale or coalbed methane gas fields. Policies aimed at increasing domestic natural gas consumption and exports, combined with increased demand from the power sector as a result of weather-related hydroelectric shortages, have made expanding natural gas production a priority for the government.



Pipelines

There are about 3,100 miles of natural gas pipelines in Colombia.[29] Transportadora de Gas Internacional (TGI), a subsidiary of Grupo Energia de Bogota, is the largest operator of natural gas pipelines in Colombia, with a network of approximately 2,300 miles.[30] TGI was formed after Grupo Energia de Bogota acquired the state-owned Empresa Colombiana de Gas (Ecogás) at auction in 2006.[31]

Colombia has three main lines that transport natural gas: the Ballena-Barrancabermeja, with a capacity of 260 million cubic feet per day (MMcf/d), links Chevron's Ballena field on the northeast coast to Barrancabermeja in central Colombia;[32] the Barrancabermeja-Nevia-Bogota line, which connects the Colombian capital to the transmission network; and the Mariquita-Cali line through the western Andean foothills.[33]

Export pipeline

In 2007, the Trans-Caribbean Gas Pipeline, also known as the Antonio Ricaurte pipeline, came online, linking fields in northeastern Colombia's Guajira department with western Venezuela.[34] Venezuela's Petróleos de Venezuela S.A. (PdVSA) financed the $335 million pipeline. In November 2011, an agreement was signed to extend the Ricaute pipeline across Colombia to Panama and Ecuador. Although initial contracted volumes for export from Colombia ranged from 80-150 million cubic feet per day (MMcf/d), actual exports to Venezuela have often exceeded these levels because of rising Venezuelan demand for natural gas for power generation and reinjection. Exports through the pipeline, which reached levels of 250 MMcf/d, were halted in May of 2014 amidst fears that Colombia's power supply, derived primarily from hydroelectric facilities, would be impacted by drought.[35] Since then, Colombia has resumed exports, albeit at a lower level of approximately 50 MMcf/d.

Coalbed methane

Coalbed methane (CBM) is a gaseous hydrocarbon that occurs along with coal reserves. This source of natural gas is transported and used in the same way as natural gas found in shale or other deposits. CBM has the potential to increase Colombia's proved natural gas reserves dramatically, to facilitate greater domestic production, and to allow additional natural gas exports to neighboring countries. Estimates of Colombia's total potential coalbed methane resources range from 11 to 35 trillion cubic feet (Tcf); however, only some of those reserves may ultimately be economically recoverable.[36]

Coal

Colombia was the fifth-largest coal exporter in the world in 2013.

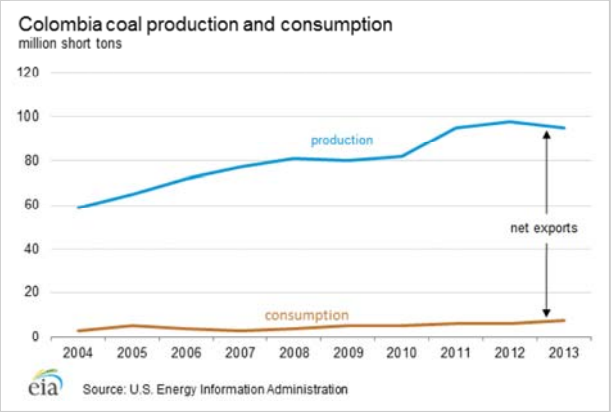
Colombia had 6,746 million short tons (MMst) of probable coal reserves (mostly bituminous coal) in 2013, the largest in South America, according to the *BP Statistical Review of World Energy 2014*.[37] These deposits are concentrated in the Guajira peninsula bordering the Caribbean and in the Andean foothills. Most of Colombia's coal production and export infrastructure is located on the Caribbean coast. Colombia's coal is relatively clean-burning, with a sulfur content of less than 1%. The country exports most of its coal production and was the fifth-largest coal exporter in the world in 2012 after Indonesia, Australia, Russia, and the United States.

Production

Colombia produced 94.2 MMst of coal in 2013, while only consuming 7.4 MMst. Colombian coal production is exclusively carried out by private companies and has doubled since 2002.

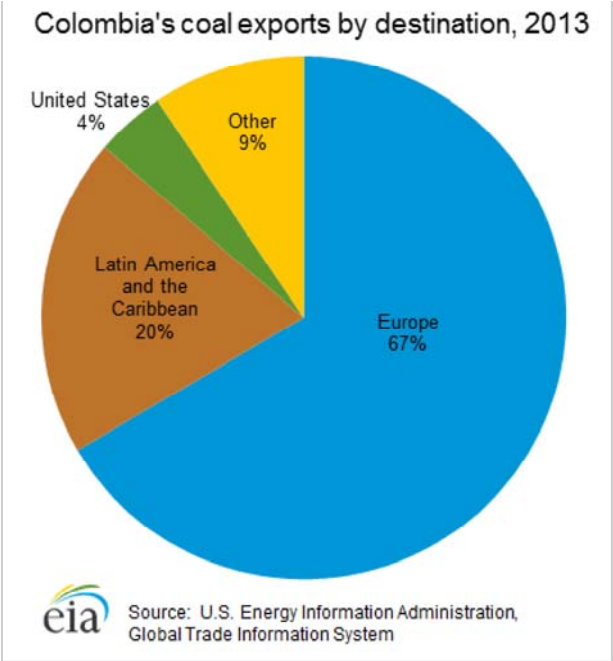
The largest coal producer in Colombia is the Carbones del Cerrejon (Cerrejon) consortium, composed of Anglo-American, BHP Billiton, and Xstrata.[38] The consortium operates the Cerrejon Zona Norte (CZN) project, the largest coal mine in Latin America and among the largest open-pit coal mines in the world. CZN is an integrated system connecting the mine, railroad, and a Caribbean coast export terminal.[39]

U.S.-based Drummond Company, the second-largest coal producer in Colombia, operates two mines near La Loma, in the Cesar Basin.[40] In June 2011, Drummond entered into an 80%-20% partnership with Japan's Itochu Corporation known as Drummond International, which now owns and operates its Colombia interests.[41] Itochu's initial investment of $1.5 billion enabled expansion construction of a new export facility, increasing Drummond's export capacity to 60 MMst per year. The partnership aims to increase coal exports to Japan and other Asian countries.[42]



Exports

Preliminary customs data show that Colombia exported 96 MMst in 2014, mainly to Europe, other South American countries, and the United States.[43] Coal exports are an important part of the Colombian economy. Coal was the country's second-largest export after oil and petroleum products and represented 19% of export earnings in 2012. The United States and Colombia have an important trading relationship in this sector, and in 2014, Colombian coal represented 73% of U.S. coal imports, or 8.3 MMst.[44]



Electricity

In October 2014, Colombia had 15.5 gigawatts (GW) of installed electricity generation capacity, almost 70% derived from hydropower, according to the Unidad de Planeación Minero Energética (UPME), the federal special administrative unit responsible for the sustainable development of the mining and energy sectors of Colombia.[45]

In October 2013, Colombia generated 5.3 terawatt hours (TWh) of electricity. Of the electricity generated, hydroelectric plants provided 68%, natural gas accounted for 18%, coal accounted for 8%, oil accounted for less than 1%, and the remaining electricity was from other sources.[46]

Exports

Colombia is a net exporter of electricity. According to the UPME, Colombia exported a net total of 60.4 gigawatt hours (GWh) of electricity in September 2014.[47] In 2013, most of Colombia's exports were to Venezuela; however, in 2014, nearly all electricity exports were to Ecuador.[48] In September 2014, Colombia imported 3.6 GWh of electricity from Ecuador.[49]

Notes

- Data presented in the text are the most recent available as of May 27, 2015.
- Data are EIA estimates unless otherwise noted.

Endnotes

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