



Background Reference: Colombia

Last Updated: January 7, 2019

Overview

Colombia is South America's largest coal producer and an important regional supplier of crude oil; however, persistent attacks on domestic crude oil pipelines since the 1980s have restrained production levels.

Figure 1. Map of Colombia



Source: Central Intelligence Agency, *World Factbook*

Petroleum and other liquids

Much of Colombia's crude oil production occurs in the Andes foothills and in the eastern Amazonian jungles.¹

Colombia's crude oil and product infrastructure is primarily located in the northwest and center of the country, close to major crude producing and refined product-consuming regions. Meta Department, in central Colombia, is an important production area, producing predominately heavy crude oil. The area's Llanos Basin contains the Rubiales oilfield, the largest producing oil field in the country.

Sector organization

A series of regulatory reforms enacted in 2003 made the oil and natural gas sector more attractive to foreign investors and led to an increase in Colombian oil and natural gas production.

Ecopetrol, the national oil company of Colombia, controlled the development of all hydrocarbon resources until 2003, when then President Álvaro Uribe enacted energy sector reforms. President Uribe moved administrative and regulatory responsibility for the country's hydrocarbon resources from Ecopetrol to a new regulatory agency, Agencia Nacional de Hidrocarburos (ANH).² In 2012, additional restructuring consolidated responsibility for upstream and downstream planning and oversight in the Ministry of Mines and Energy.³

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% of shares in oil ventures and to compete with Ecopetrol.⁴ In addition, the government has sold shares of Ecopetrol to private investors, reducing its ownership to about 90%.

Ecopetrol, via its wholly-owned subsidiary, Cenit, controls most of Colombia's pipeline infrastructure. Cenit also owns nearly all refined product pipeline capacity in Colombia.

Exploration and production

Colombia has fewer proved oil reserves than Argentina or Ecuador, even though it produces more oil than either country.

Colombia's oil production rose steadily until peaking in 1999. The principal causes of the fall in oil production after 1999 were natural declines at existing oil fields and a lack of new discoveries.

However, changes to the regulatory framework led to more investment from international oil companies. As a result of these investments, Colombia experienced rapid growth in petroleum and other liquids production between 2008 and 2013, peaking again more recently again at 1.03 million barrels per day (b/d) in 2015. The country once again faces declining production in the Chichimene, Castilla, and Rubiales fields as a result of continued pipeline attacks, falling oil prices, and a lack of returns made on investments resulting from the new regulatory framework.

The largest producing oil field in Colombia is the Rubiales heavy oil field, located in Meta Department.⁵ 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. Since 2013, however, production at Rubiales has fallen. In August 2015, Ecopetrol elected not to extend its production agreement with Pacific Rubiales, opting instead to maintain the field alone.

Supply disruptions

Frequent attacks by guerilla forces on oil infrastructure during the past three decades have severely affected Colombia's already declining oil production.

Colombia has a long history of attacks on oil infrastructure, roads, and personnel by its guerilla groups, and the number of attacks significantly increased between 2010 and 2013. The U.S. Energy Information Administration (EIA) began tracking disruptions in 2011. In 2014, Colombian disruptions reached a peak with a recorded annual outage of 45,000 b/d which later fell after peace agreements between the government and the guerilla groups.

Despite a 2016 peace agreement between the Revolutionary Armed Forces of Colombia (FARC) guerillas and the government, Colombia's oil industry continues to be the target of pipeline attacks.⁶ The National Liberation Army (ELN) and the Colombian government had been in peace negotiations, but those were suspended after attacks by ELN in early 2018.

The 480-mile Caño Limón–Coveñas oil pipeline, which has a capacity of up to 220,000 b/d, is the guerilla groups' most frequent target. It has been bombed more than an estimated 1,400 times during its 32-year history. Since 1986, the attacks have kept it offline for the equivalent of 11 years, approximately one-third of its life. According to Ecopetrol, 66 million gallons of crude oil have been spilled since 2000.⁷

Ecopetrol can use the bi-directional Bicentenario pipeline as a contingency to run oil through to the Covenas port on Colombia's Caribbean coastline when the Caño–Limón pipeline is damaged from bombing. However, this alternative route costs more for producers.⁸

Refining

Colombia's main oil blend is the Castilla Blend, with an API gravity of 18.8, a heavier and sourer (high sulfur-1.97%) crude oil. In addition to output from this field, the blend includes crude oil from other heavy oil fields such as the Rubiales and Quifa fields.⁹ Ecopetrol's refineries were originally built to process light, sweet crude oil from fields such as Cusiana and Cupaigua, and Colombia's increasingly heavy crude oil production has presented challenges to the refining and midstream sectors.¹⁰

Colombia's Barrancabermeja refinery and the Cartagena (aka Reficar) refinery together account for effectively all domestic fuel production. In 2016, the Cartagena refinery came back fully online from an expansion and modernization project. The project increased capacity by 85,000 b/d.¹¹ Despite the Cartagena expansion, Colombia is still a net importer of refined products.

New projects, including a major modernization project at the Barrancabermeja refinery, have stalled. Two new refineries, Meta and Sebastopol, have been proposed.¹² The 40,000 b/d Meta refinery had reached an agreement with Ecopetrol for crude oil supply beginning at the end of 2015, but it was delayed by legal and corruption issues. The 100,000 b/d Sebastopol has been put on hold because of a lack of financial support. There are no planned expansions to Colombia's refining system before 2021, and any growth will come mainly from improved refinery utilization (Table 1).

Table 1. Refining capacity

Refinery	Location (department)	Current capacity (b/d)	Ownership
Barrancabermeja	Santander	250,000	Ecopetrol
Cartagena	Bolivar	165,000	Ecopetrol
Apiay	Meta	2,500	Ecopetrol
Orito	Putumayor	2,500	Ecopetrol
Total: 420,000			

Source: Oil & Gas Journal, 2018 Worldwide Refining Survey

Pipelines

Colombia has a relatively extensive crude oil distribution infrastructure which is primarily located in the northwest and center of the country close to major crude oil-producing and refined product-consuming regions. Colombia has seven major oil pipelines, five of which connect production fields to the Caribbean export terminal at Coveñas (Table 2). The country's largest storage terminals are also located along the coast.

Ecopetrol owns more than 80% of crude oil pipeline capacity, and all product pipeline capacity in Colombia runs through its Cenit subsidiary.¹³ The combined length of crude oil and refined product pipeline is more than 6,300 miles long.¹⁴

Table 2. Major oil pipelines

Pipeline	Length	Origin	Destination	Capacity	Owner or operator
Ocena	520 miles	Cusiana-Cupiagua	Caribbean port of Coveñas	590,000 b/d	Ecopetrol/Cenit
Llanos	146 miles	Rubiales, Pirirí and Quifa fields	Ocena pipeline	340,000 b/d	Cenit/Pacific Midstream Ltd.
Caño-Limón	485 miles	Caño-Limón field	Caribbean port of Coveñas	220,000 b/d	Ecopetrol/Occidental Petroleum Corp
Bicentenario	143 miles	Casanare/ Llanos basin	Caribbean port of Coveñas	120,000 b/d	Pacific Rubiales Energy/ Hocol S.A./Cenit
Transandino	190 miles	Orito field (Ecuador)	Pacific port of Tumaco	85,000 b/d	Cenit
Colombia	298 miles	Vasconia station	Caribbean port of Coveñas	15,000 b/d	Ecopetrol
Alto Magdalena	248 miles	Upper Magdalena Valley	Vasconia	9,200 b/d	Ecopetrol/Hocol/Shell

Source: Ecopetrol, BNAmericas

Key projects such as the second and third phases of the Bicentenario pipeline and the Pacífico oil pipeline (OAP), designed to connect the Llanos Basin with the Colombian Pacific port of Buenaventura and facilitate crude oil exports to Asia, have been halted or canceled because of attacks on various parts of the pipeline system.

Trade

Colombia has one transnational pipeline, the Oleoducto Transandino pipeline (OTA). The 85,000 b/d OTA crude oil pipeline connects Colombia's southern port of Tumaco with Ecuador's oil fields. The OTA has been a frequent target for guerrilla attacks.¹⁵

Natural gas

Most of Colombia's natural gas reserves are in the Llanos Basin, although the Guajira Basin accounts for most of the current production.

Sector organization

Transport and distribution activities are competitive and subject to open access. In 2003, further liberalization measures were taken with the enactment of Presidential Decree 1760, including the creating of the ANH and allowing companies other than state-controlled Ecopetrol to perform upstream activities under ANH supervision

Three companies—Ecopetrol, Equion Energia (a partnership between Ecopetrol and Talisman Energy), and Chevron—account for most of Colombia's natural gas production.¹⁶ 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.¹⁷ Chevron, in partnership with Ecopetrol, operates the Caribbean Chuchupa offshore field in the Guajira Basin, the largest nonassociated natural gas field in the country.¹⁸ The company also operates the nearby onshore Ballena and Riohacha fields.¹⁹

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.

Exploration and production

Natural gas production, like oil production, has risen substantially in the past few years because of increasing international investment in exploration and development.

Natural gas production in Colombia comes from two main sources: associated gas from inland fields (Cusiana, Cupiagua, and Pauto Sur) and unassociated gas from offshore fields (Chuchupa field). Colombia's national oil company, Ecopetrol, is the primary producer, given its role in associated gas production, with an assortment of foreign firms, including Repsol, Anadarko, and other North American independents, also operating.

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, supporting exports.

Production is divided between two main regions: the Atlantic Coast, where large non-associated gas fields are located, and inland regions, where production is mostly associated with oil.

Colombian gross natural gas production has been steadily decreasing because fields from the Guajira Basin are mature and declining. However, over the past decade, reinjection has decreased from historical levels of over 80% to about 50% as a way to increase natural gas availability in the Colombian market.

Natural gas supplies are highly concentrated in the Cusiana-Cupiagua and Chuchupa fields and in three companies: Ecopetrol, BP, and Chevron. Although gross supplies have been decreasing, net supplies have been increasing as a result of decreasing reinjection levels at the Cusiana-Cupiagua fields.

Ecopetrol and its partner Anadarko made the biggest discovery in nearly three decades with the offshore Gorgon-1 discovery in May 2017. Gorgon-1 is estimated to hold reserves of between 4.6 Tcf – 7 Tcf.

Pipelines

Colombia has about 3,100 miles of natural gas pipelines²⁰ (Table 3).

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.²¹ TGI was formed after Grupo Energia de Bogota acquired the state-owned Empresa Colombiana de Gas (Ecogás) at auction in 2006.²²

Table 3. Major natural gas pipelines

Pipeline	Origin	Destination	Capacity (MMcf/d)	Owner or operator
Ballena-Barrancabermeja	Ballena field	Barrancabermeja	260	TGI S.A ESP
Barrancabermeja-Nevia-Bogota	Bogota	Nevia	436	TGI S.A ESP
Mariquita-Cali	Mariquita	Cali	168	Transgas de Occidente S.A.

Source: Transportadora de Gas Internacional²³

Liquefied natural gas

Designed to meet growing fuel demand and reduce reliance on hydropower, Colombia’s first liquefied natural gas (LNG) floating storage and regasification unit (FSRU), located at the Atlantic port of Cartagena and owned by Sociedad Portuaria El Cayao (SPEC), started operation in late 2016 when it received its first import cargo. It received a second cargo in mid-2017. SPEC has signed a contract with Norwegian Høegh LNG to operate the 400 million cubic feet per day (MMcf/d) facility.²⁴

Colombia’s national mining and energy planning body, Planning Unit of the Mines and Energy (UPME), has proposed a second terminal for the country’s Pacific coast, Buenaventura LNG. It would have a capacity of around 400 MMcf/d, to begin operations in 2021.

Trade

The Trans-Caribbean Gas Pipeline, also known as the Antonio Ricaurte Pipeline, came online in 2007, linking fields in northeastern Colombia's Guajira Department with western [Venezuela](#).²⁵ Venezuela's Petróleos de Venezuela S.A. (PdVSA) financed the \$335 million pipeline. In November 2011, an agreement was signed to extend the Ricaurte Pipeline across Colombia to [Panama](#) and Ecuador. Although initial contracted volumes for export from Colombia ranged from 80 to 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 to support enhanced oil recovery. Natural gas exports through the pipeline, which had reached 250 MMcf/d, were stopped in May 2014 amid fears that Colombia's power supply, derived primarily from hydroelectric facilities, would be affected by drought.²⁶ Since then, Colombia has resumed exports, but at a lower level.²⁷

Plans to reverse the pipeline so that Venezuela can export natural gas to Colombia were discussed but have not yet taken place.

In 2017, Colombian natural gas distributor Promigas and its local partner Gases de la Guajira proposed to use the Antonio Ricaurte Pipeline cross-border pipeline to import Venezuelan natural gas as an alternative to sending domestic natural gas to the Colombian border city Maicao.²⁸

Coal

Sector organization

Colombia is by far the largest producer of coal in South America, and has the second largest coal reserves in the region. The government owns all hydrocarbon reserves, and Colombian coal production is exclusively managed by private companies.

The largest coal producer in Colombia is the Carbones del Cerrejon (Cerrejon) consortium, composed of Anglo-American, BHP Billiton, and Glencore Xstrata, which operate in the region of La Guajira.²⁹ The consortium operates the Cerrejon Zona Norte (CZN) project, the largest coal mine in Latin America and one of the largest open-pit coal mines in the world.³⁰ CZN is an integrated system connecting the mine, railroad, and a Caribbean coast export terminal.

U.S.-based Drummond Company, the second-largest coal producer in Colombia, operates two mines near La Loma, in the Cesar Basin.³¹ 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.³² Itochu's initial investment of \$1.5 billion enabled expansion construction of a new export facility, increasing Drummond's export capacity to 60 million metric short tons (MMst) per year. The partnership aims to increase coal exports to Japan and other Asian countries.³³

Exploration and production

Colombia's coal reserves 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 is considered to be a low-cost producer, and its coal is highly sought after because it is considered relatively clean-burning and has a sulfur content of less than 1%.³⁴

The largest exporting coal fields are located in the Guajira and Cesar Departments at the northeast, close to the Venezuelan border. Production at these two departments accounts for approximately 90% of the country's total.

The remainder of Colombia’s domestic output is mostly produced in the interior departments of Boyacá, Cundinamarca, Norte de Santander, and Santander.

Coalbed methane

Coalbed methane (CBM) is a gaseous hydrocarbon that occurs alongside coal resources. 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 significantly increase Colombia’s proved natural gas reserves and eventually its production, which would provide additional natural gas to export to neighboring countries. Estimates of Colombia’s total potential coalbed methane resources range from 11 trillion cubic feet (Tcf) to 35 Tcf; however, only some of those reserves may be economically recoverable.³⁵

Electricity

Sector organization

The Colombian Commission for the Regulation of Energy and Gas (CREG) was established to regulate the activities of public utilities in 1994 through Laws 142 and 143.³⁶

The competitive market model for the provision of public utilities in Colombia was introduced in 1994. Law 143 of 1994 established the scheme that governs generation, transmission, distribution, and commercialization of electricity as well as the key elements and guidelines creating the Wholesale Electricity Market (Mercado de Energía Mayorista, or MEM), which came into operation in July 1995.³⁷

The planning, supervision, and control of the integrated operation of resources for generation, interconnection, and transmission of the National Interconnected System (Sistema Interconectado Nacional, or SIN) are undertaken by the subsidiaries of XM, a public utility corporation regulated by the CREG³⁸ (Table 4).

Table 4. Institutional structure of the Mercado de Energía Mayorista (MEM)

Policies	Ministry of Mines and Energy
Planning	Planning Unit of the Mines and Energy
Regulation	Commission for the Regulation of Energy and Gas
Control and surveillance	Superintendency of Public Utility Services
System operation	National Dispatch Center (Centro Nacional de Despacho, “CND”)
Market administration	Commercial Interchange System (Administrador del Sistema de Intercambios Comerciales, “ASIC”)

Source: Colombian Commission for the Regulation of Energy and Gas (CREG)

Key projects

The Ituango Hydroelectric Project is located on the Cauca River, approximately 105 miles from the city of Medellin.³⁹ The project was approved in 2009 and was expected to cover between 17%-20% of Colombia’s energy demand once in full operation. Since the start of construction, environmental activists have opposed the dam for its impact on the environment and its disruption in fishing and farming communities.⁴⁰ Extreme heavy rainfall has caused concerns that the dam may burst and Empresas Publicas de Medellin (EPM) has suspended certain activities, which has delayed completion until 2021.⁴¹

Trade

Colombia is a net exporter of electricity. According to the Planning Unit of the Mines and Energy (UPME), Colombia is looking to increase its electricity imports to neighboring Panama by 2021.⁴²

Note

- In response to stakeholder feedback, the U.S. Energy Information Administration has revised the format of the Country Analysis Briefs. As of December 2018, updated briefs are available in two complementary formats: the Country Analysis Executive Summary provides an overview of recent developments in a country's energy sector and the Background Reference provides historical context. Archived versions will remain available in the original format.
- Data presented in the text are the most recent available as of December 12, 2018.
- Data are EIA estimates unless otherwise noted.

Endnotes

- ¹ Agencia Nacional de Hidrocarburos, [Mapa de Tierras](#). Accessed September 19, 2018.
- ² Ministerio de Minas and Energia, [Decreto Numero 1760 de 26 Junio de 2003](#).
- ³ Ministerio de Minas and Energia, [Ministry Responsibilities](#).
- ⁴ Viscidi, Lisa, *Colombia's Energy Renaissance*, Americas Society and Council of the Americas, December 2010.
- ⁵ Agencia Nacional de Hidrocarburos, [Produccion fiscalizada de crudo 2014](#).
- ⁶ BNamericas, "Ecopetrol forecasts production recovery as profit surges," May 4, 2018.
- ⁷ Reuters, "[Colombia's Ecopetrol halts Cano Limon pipeline after attack](#)," April 27, 2018.
- ⁸ Argus Media, "Colombia bypasses oft-attacked oil pipeline," May 12, 2017.
- ⁹ Energy Intelligence, *World Crude Oil Handbook*, 2017.
- ¹⁰ Oil & Gas Journal, *Worldwide Reserves*, January 1, 2018; and IHS Markit, Colombia Market Profile, March 2018.
- ¹¹ [Rificar](#). Accessed September 19, 2018.
- ¹² BNamericas, "TREND: Colombia's refinery push," August 4, 2014.
- ¹³ Argus Media, "[Colombia mulls oil products supply options](#)," July 26, 2018.
- ¹⁴ Central Intelligence Agency, [The World Factbook](#), Accessed August 24, 2018.
- ¹⁵ BNamericas, "Rain hinders Colombia oil spill response," April 27, 2018.
- ¹⁶ Agencia Nacional de Hidrocarburos, [Produccion fiscalizada-gravable de gas 2014](#), Accessed March 5, 2015.
- ¹⁷ PRNewswire, [Ecopetrol and Talisman Energy Finalize the Purchase of BP in Colombia and Announce Change of Company Name](#), January 24, 2011; Agencia Nacional de Hidrocarburos, [Produccion fiscalizada-gravable de gas 2014](#).
- ¹⁸ Agencia Nacional de Hidrocarburos, [Produccion fiscalizada-gravable de gas 2014](#).
- ¹⁹ Agencia Nacional de Hidrocarburos, [Produccion fiscalizada-gravable de gas 2014](#).
- ²⁰ Central Intelligence Agency, [The World Factbook](#), Accessed August 24, 2018.
- ²¹ Business Wire, [Fitch: EEB Regains Full Control of TGI; Neutral to Ratings](#), August 24, 2018.
- ²² Camacho, Carlos, [Fitch: EEB wins bid to buy Ecogas for US\\$1.43bn](#). Accessed August 24, 2018; and BNamericas, December 6, 2006.
- ²³ Transportadora de Gas Internacional (TGI), [Mapas del Sistema de Transporte](#). Accessed August 24, 2018.
- ²⁴ BNamericas, "Colombia prepares to receive 1st LNG cargo", November 2, 2016.
- ²⁵ MercoPress, "[Colombia gas-links with Venezuela and joins Bank of the South](#)," October 12, 2007.
- ²⁶ Platts, "[Colombia to suspend natural gas exports to Venezuela next week](#)," May 2, 2014.
- ²⁷ CEDIGAZ, September 2015.
- ²⁸ Promigas, [Natural Gas Sector Report 2017](#). Accessed August 20, 2018.
- ²⁹ Cerrejon, [Neustra Empresa](#), Accessed March 5, 2015; Cerrejon, [Neustra Historia](#), Accessed August 27, 2018.

-
- ³⁰ [Cerrejón](#), Accessed August 27, 2018; Mining-Technology.com, “[The 10 biggest coal mines in the world](#),” October 21, 2013.
- ³¹ Drummond Company, Inc, [Mines](#), Accessed August 27, 2018.
- ³² Inoue, Yuko and Jackie Cowhig, “[Itochu-Drummond deal opens Asia to Colombian coal](#),” Reuters, June 16, 2011.
- ³³ Ibid; Drummond Company, Inc, [Timeline](#).
- ³⁴ [Drummond Company, Inc](#). Accessed August 27, 2018.
- ³⁵ Guzman, Rudolfo, [Potential Resources of Unconventional Hydrocarbons in Colombia](#), ANH Unconventional Hydrocarbons Workshop, June 8, 2011.
- ³⁶ [Colombian Commission for the Regulation of Energy and Gas \(CREG\)](#), Accessed August 27, 2018.
- ³⁷ [Colombian Commission for the Regulation of Energy and Gas \(CREG\)](#), Accessed August 27, 2018.
- ³⁸ [Colombian Commission for the Regulation of Energy and Gas \(CREG\)](#), Accessed August 27, 2018.
- ³⁹ [Hidroituango](#), Accessed August 27, 2018.
- ⁴⁰ South Asia Network on Dams, Rivers and People, “[Risk of collapse of Hidroituango Dam hangs over Colombia](#),” June 12, 2018.
- ⁴¹ Medellin Herald, “[UPDATE: Hidroituango crisis likely over by October 2018, completion in 2021, if challenges overcome](#),” June 19 2018.
- ⁴² Unidad de Planeación Minero Energética (UMPE), “[Plan De Expansión De Referencia Generación – Transmisión 2017 – 2031](#),” July 31, 2018.