

## COUNTRY ANALYSIS BRIEFS

# Colombia

Last Updated: February 2009

### Background

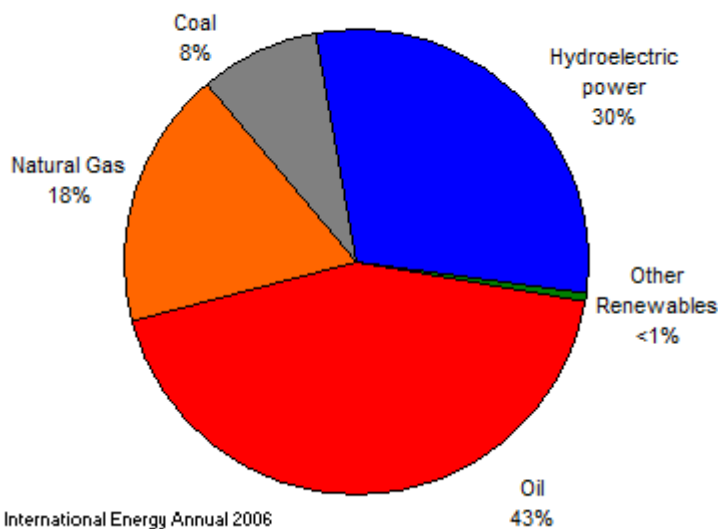
***Colombia is an important petroleum and coal exporter.***

Colombia has seen an increase in oil production in recent years following a period of steady declines. The Colombian government has implemented a partial privatization of state oil company Ecopetrol in an attempt to revive its upstream oil industry. In addition, it has enacted a series of regulatory reforms to make the sector more attractive to foreign investors. Historically, the oil sector has been targeted by attacks from insurgent groups, though the situation has improved in recent years with a substantial reduction in the number of attacks against Colombia's energy infrastructure. While the security situation has improved, Colombia's longstanding civil conflict has taken its toll on the country's energy sector, with the country's pipelines and power lines still experiencing occasional sabotage by insurgent groups.



In 2006, Colombia consumed 1.3 quadrillion Btus of total energy. Oil constituted the largest part of this amount, followed by hydroelectricity. Colombia is also an important producer of high quality coal. Because Colombia relies upon hydropower for the bulk of its electricity needs, it is able to export almost all of its coal production, making it one of the world's largest coal exporters.

### Total Energy Consumption in Colombia, by Type (2006)

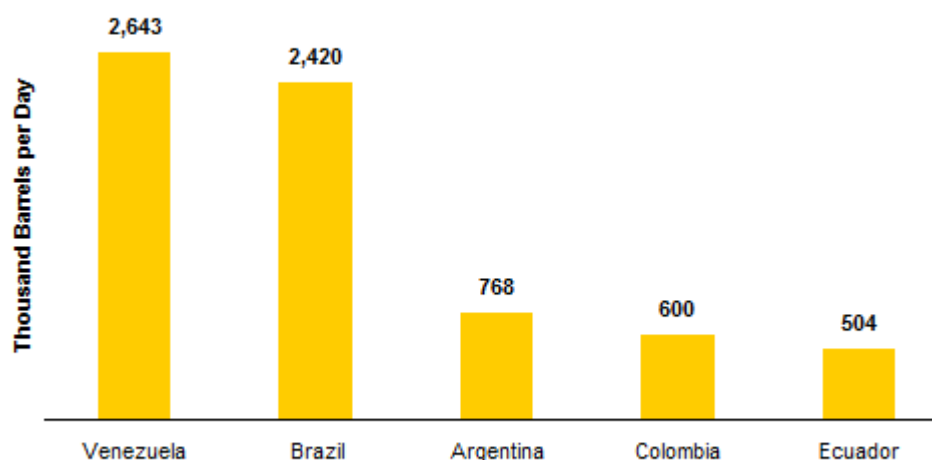


## Oil

**Colombia's oil production has stabilized in the past few years, following a period of steep decline.**

According to *Oil and Gas Journal (O&GJ)*, Colombia had 1.36 billion barrels of proven crude oil reserves in 2009, the fifth-largest in South America. The country produced 600,000 barrels per day (bbl/d) of oil in 2008, up from 540,000 bbl/d in 2007. Before the increase in production in 2008, Colombia's oil production had remained largely flat, following a period of steady declines: in 1999, Colombia's oil production peaked at 830,000 bbl/d. The principle cause of the falling oil production was natural declines at its existing oil fields and a lack of sizable new reserve discoveries. However, a combination of changes to the regulatory framework and an improved security situation (see below) have contributed to increasing investment in the country. With oil consumption reaching an estimated 267,000 bbl/d in 2007, Colombia exports about half of its oil production. The bulk of those exports (155,000 bbl/d) to the United States in 2007. Much of Colombia's crude oil is lighter and sweeter than other major Latin American oil producers, with its three export crude oils (Cusiana, Cupiagua and Orito) ranging between 28° and 36° API.

### Top 5 South American Oil Producers, 2008



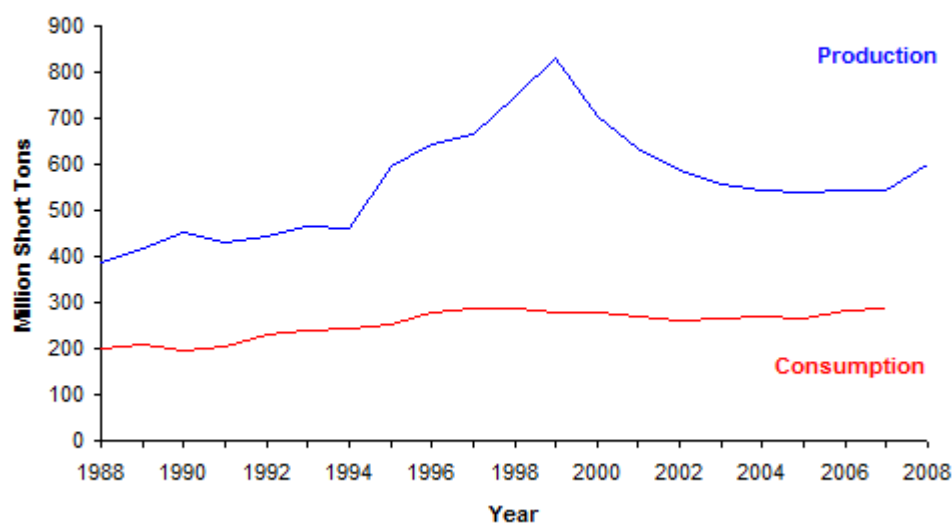
Source: EIA Short Term Energy Outlook

Since 1999, Colombia's government has taken measures to make the investment climate more attractive to foreign oil companies. Upstream sector initiatives include allowing foreign oil

companies to own 100 percent stakes in oil ventures; the establishment of a lower, sliding-scale royalty rate on oil projects; longer exploration licenses; and forcing Ecopetrol, the national oil company, to compete with private operators. The government has floated shares of Ecopetrol on the New York Stock Exchange, though it retains a majority stake in the company. The reforms have sparked a renewed interest in Colombia's upstream sector, with record levels of exploratory and development drilling. The improvement in Colombia's security situation has also been a significant contributor to the renewed interest by international oil companies.

As a result of these improvements, Colombia has begun to arrest the decline in its oil production and experience some growth. Nevertheless, Colombia still faces many challenges in its upstream oil sector, including a lack of proven oil reserves and steep decline rates at its largest oil fields. In addition, it is possible that the rise in production seen in 2008 was largely influenced by higher world oil prices, which provided additional incentives to invest in marginal fields. Finally, it is unclear if the recent investment flows can be maintained in the near term due to the weakening global economy. As a result, EIA forecasts that Colombian oil production will decline at an average of 4 percent per year in the short term, reaching 590,000 bbl/d in 2009 and 550,000 bbl/d in 2010.

### Colombia's Oil Production and Consumption



Source: EIA Country Energy Profiles; Short Term Energy Outlook

### Exploration and Production

The bulk of Colombia's crude oil production occurs in the Andes foothills and the eastern Amazonian jungles. The largest field in the country is the Cusiana/Cupiagua complex operated by BP. Cusiana/Cupiagua represents the bulk of the decline in Colombia's national oil production, with production at the field falling by over 50 percent since 1999. Colombia's second largest field is Cano Limon, operated by Occidental, which has also witnessed significant declines in production. Other important oil projects in Colombia include the Surorientado field, operated by a consortium led by Petrotesting Colombia; the Guando field, operated by Petrobras; the Rubiales field, operated by Meta Petroleum; and the Orito block, operated by Canada's Petrobank Energy and Resources.

Colombia has numerous, smaller fields spread throughout the oil-producing regions of the country. Vast unexplored and potentially hydrocarbon-rich territories remain in Colombia, which shares many of the geological features of its oil-rich neighbor Venezuela. In September 2008, Colombia awarded licenses to nine companies to explore the Llanos Basin, near the border with Venezuela, an area that has received little attention and could potentially hold large quantities of heavy oil.

### Pipelines

Colombia has five major oil pipelines, four of which connect production fields to the Caribbean export terminal at Covenas. These include the 500-mile Ocesa pipeline, which transports

615,000 bbl/d from the Cusiana and Cupiagua fields; the 460-mile Cano Limon pipeline; and the smaller Alto Magdalena and Colombia Oil pipelines. The fifth pipeline, the TransAndino, transports crude from Colombia's Orito field in the Putumayo basin to Colombia's Pacific port at Tumaco; TransAndino can also carry crude oil produced in Ecuador. In 2008, Ecopetrol awarded a tender for the construction of a new, 24-inch pipeline connecting the Rubiales oil field. The Llanos Orientales pipeline would help sustain investment in new production in the region.

### Downstream

According to *OGJ*, Colombia had 285,850 bbl/d of crude oil refining capacity in 2008. The country has five major refineries, all owned by Ecopetrol. The largest is the Barrancabermeja-Santander facility, with a capacity of 205,000 bbl/d. In 2006, Switzerland's Glencore International and Ecopetrol launched an \$800 million expansion of the Cartegena refinery. The project, scheduled for completion by 2010, will increase output from 75,000 bbl/d to 140,000 bbl/d and upgrade the facility to produce refined products that meet higher specifications. Although Colombia is a net oil exporter, it must import some refined products, as domestic demand outstrips production capacity. In 2008, Ecopetrol awarded a tender to Foster Wheeler to upgrade the Barrancabermeja refinery, improving its ability to process heavy crude oil, increase its production of cleaner fuels, and expanding its distillation capacity to 300,000 kb/d.

### Biofuels

According to a Colombian industry group, Colombia produced 5,800 bbl/d of ethanol during the first half of 2008. In addition, a Colombian trade group estimated that the country produced 17,000 bbl/d of biodiesel in 2008. There have been several new biofuels projects announced in Colombia in recent years. In 2006, a consortium of Colombian companies announced that they would build three ethanol plants in the country, with a total production capacity of 5,600 bbl/d. The plants will mainly target export markets, but will also sell some of their production domestically.

Ecopetrol formed a joint venture in 2007 with local palm oil producers to build a biodiesel plant in Barrancabermeja, with a capacity of 2,000 bb/d. Ecopetrol aimed to blend most of the plant's output with conventional diesel fuel produced by its refinery in the city. Colombian law requires that gasoline contain a 10 percent ethanol blend, while diesel must contain a 5 percent biodiesel blend.

## Natural Gas

*OGJ* reported that Colombia had proven natural gas reserves of 3.7 trillion cubic feet (Tcf) in 2009. The country produced and consumed 255 billion cubic feet (Bcf) in 2006, both slightly higher than 2005. Colombia has natural gas reserves spread across 18 basins, seven of which have active production. The bulk of Colombia's natural gas reserves are located in the Llanos basin, although the Guajira basin accounts for most of current production. According to a Colombian natural gas industry group, the country has sufficient production and reserves to meet domestic demand through at least 2018.

### Pipelines

There are some 2,000 miles of natural gas trunk pipelines in Colombia. The three main lines include the Ballena-Barrancabermeja, linking Chevron's Ballena field on the northeast coast to Barrancabermeja in central Colombia; the Barrancabermeja-Nevia-Bogota line, which integrates the Colombian capital into the transmission network, and the Mariquita-Cali line through the western, Andean foothills. There are other small stretches of pipeline operated by private firms. In 2008, natural gas distributor Transoriente announced that it would build a new natural gas pipeline to connect the Gibraltar field with the national network, with a capacity of 30 million cubic feet per day (MMcf/d).

### Export Pipelines

In early 2008, the Antonio Ricaurte pipeline came online, linking northeastern Colombia with Venezuela. Initially, the pipeline will allow Colombia to export natural gas from the Punta Ballenas area to western Venezuela, with contracted volumes ranging from 80-150 MMcf/d. However, current plans call for the flow of the pipeline to be reversed in 2012, with Venezuela exporting 140 MMcf/d of natural gas to Colombia.

## Coal

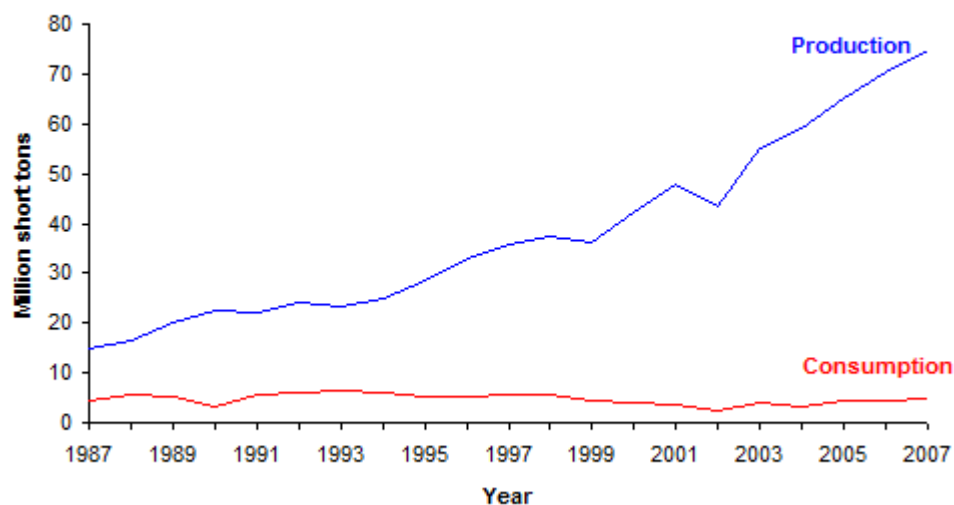
Colombia had 7,670 million short tons (MMst) of recoverable coal reserves in 2006, consisting largely of bituminous coal and a small amount of metallurgical coal. The country has the second-largest coal reserves in South America, slightly behind Brazil, with most of those reserves

***Colombia is self-sufficient in natural gas and recently began exports to Venezuela.***

***Colombia is one of the world's largest coal exporters.***

concentrated in the Guajira peninsula in the north and the Andean foothills. Colombia's coal is relatively clean-burning, with a sulfur content of less than 1 percent. Over the past decade, production has more than doubled, reaching 70.2 MMst in 2006. It is likely that Colombia's coal production will continue to increase in coming years, as exploration and profitable developments continue throughout the north and interior of the country. Colombia's coal consumption was 4.4 MMst in 2006, leaving most of the country's production available for export.

### Colombia's Coal Production and Consumption



Source: EIA Country Energy Profiles

### Sector Organization

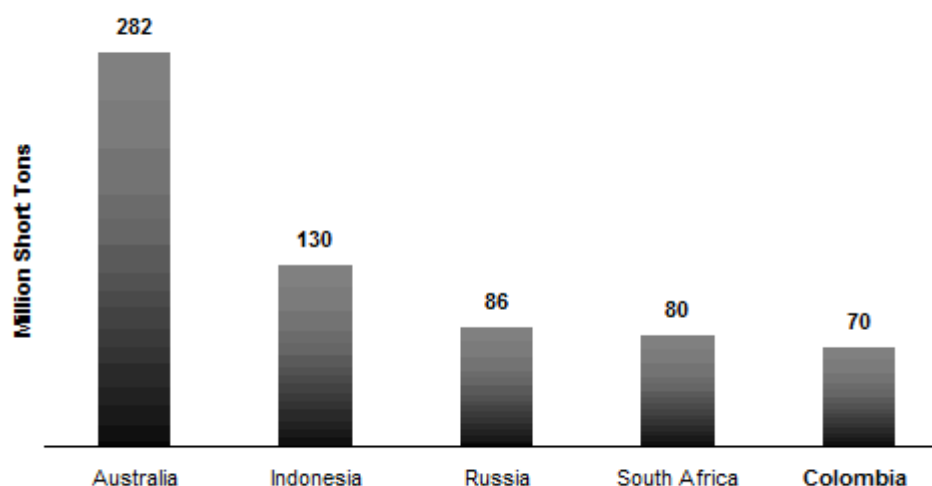
Colombia completed the privatization of its coal sector in 2004 with the closing of Minercol, the former state-owned coal company. The largest coal producer in the country is the Carbones del Cerrejon consortium, composed of Anglo-American, BHP Billiton, and Glencore. The consortium operates the Cerrejon Zona Norte (CZN) project, the largest coal mine in Latin America and the largest open-cast coal mine in the world. CZN, which consists of an integrated mine, railroad, and coastal export terminal, produces about 30 MMst per year.

Drummond operates the second-largest coal mine in Colombia, La Loma, also an integrated mine-railway-port project, producing about 25 MMst per year. In 2008, Drummond received a permit to begin operations at the El Descanso mine, near La Loma, which is expected to produce 20 MMst per year by 2010. Glencore operates the Jagua and Prodeco coal mines, with total production capacity of 8 MMst per year.

### Exports

Currently, most Colombia coal exports go to Europe, North America, and Latin America, as the vast majority of Colombia's coal producing and exporting infrastructure is located on the Caribbean coast. In 2006, the U.S. imported 25.3 MMst of coal from Colombia, about one-half of Colombia's total coal exports and 70 percent of total U.S. coal imports. There has been discussion that a planned expansion of the Panama Canal would allow Colombia to export coal to new markets in Asia. Some of the non-integrated coal mines in Colombia export their production via the Venezuelan ports of La Cieba and Maracaibo.

### Top 5 World Net Coal Exporters, 2007



Source: EIA International Energy Annual

In order to sustain the rise in coal exports, Colombia will need to invest in transportation infrastructure to remove potential production bottlenecks. In May 2006, President Uribe announced plans to build a \$300 million export terminal near Santa Marta. The facility will have special features to reduce the spreading of coal dust in the nearby area, a popular tourist destination. Industry reports indicate that the Colombian government gave approval in 2008 to begin construction of the port, which will have an export capacity of 35 MMst per year.

#### Coal Bed Methane

Coal bed methane (CBM) is a gaseous hydrocarbon that occurs along with coal reserves. It is similar to natural gas and can be added to natural gas pipelines without any special treatment. In 2008, media reports indicate that Drummond had made a discovery of 2.3 Tcf of CBM at its mines in Colombia. CBM has the potential to dramatically increase Colombia's proven natural gas reserves, facilitate greater domestic production, and potentially allow additional exports to neighboring countries.

## Profile

### Energy Overview

<b>Proven Oil Reserves (January 1, 2009E)</b>	1.36 billion barrels
<b>Oil Production (2008E)</b>	599.6 thousand barrels per day
<b>Oil Consumption (2007E)</b>	290 thousand barrels per day
<b>Crude Oil Distillation Capacity (2007E)</b>	285 thousand barrels per day
<b>Proven Natural Gas Reserves (January 1, 2009E)</b>	3.7 trillion cubic feet
<b>Natural Gas Production (2006E)</b>	255 billion cubic feet
<b>Natural Gas Consumption (2006E)</b>	255 billion cubic feet
<b>Recoverable Coal Reserves (2006E)</b>	7,300 million short tons
<b>Coal Production (2006E)</b>	70.2 million short tons
<b>Coal Consumption (2006E)</b>	4.4 million short tons
<b>Electricity Installed</b>	12.8 gigawatts

**Capacity (2007E)**

**Electricity Production (2006E)** 51.8 billion kilowatthours

**Electricity Consumption (2006E)** 39.6 billion kilowatthours

**Total Energy Consumption (2006E)** 1.3 quadrillion Btu

**Total Per Capita Energy Consumption (2006E)** 29.8 million Btu

**Energy Intensity (2006E)** 6,399 Btu per 2000\$

**Environmental Overview**

**Energy-Related Carbon Dioxide Emissions (2006E)** 62.0 million metric tons

**Per-Capita, Energy-Related Carbon Dioxide Emissions (2006E)** 1.42 metric tons

**Carbon Dioxide Intensity (2006E)** 0.3 metric tons per 2000\$

**Environmental Issues** deforestation; soil and water quality damage from overuse of pesticides; air pollution, especially in Bogota, from vehicle emissions

**Major Environmental Agreements** party to: Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Marine Life Conservation, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands signed, but not ratified: Law of the Sea

**Oil and Gas Industry**

**Organization** Mostly privatized and open to foreign investors. State-controlled Ecopetrol still controls some production resources.

**Major Oil/Gas Ports** Tumaco, Cartagena, Covenas

**Foreign Company Involvement** BP, Occidental, ChevronTexaco

**Major Oil Fields** Cupiagua/Cusiana; Cano Limon, Suroriente, Guando.

**Major Natural Gas Fields** Chuchupa, Ricohacha, and Ballena.

**Major Pipelines** Ocesa, Cano Limon pipeline, Alto Magdalena, Colombia Oil, TransAndino, Mariquita-Cali, Ballena-Barrancabermeja, Barrancabermeja-Neiva-Bogota

**Major Refineries (capacity, bbl/d)** Barrancabermeja - Santander (205,000 bbl/d), Cartegena (75,000 bbl/d); Apiay (2,250 bbl/d), Orito (1,800 bbl/d), and Tibu (1,800 bbl/d)

\* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power.

\*\*GDP figures from Global Insight estimates based on purchasing power parity (PPP) exchange rates.

**Links****EIA Links**

[EIA - Colombia Country Energy Profile](#)

**U.S. Government**

[CIA World Factbook, Colombia](#)

[U.S. Census Bureau, U.S.-Colombian Trade](#)

[U.S. State Department Consular Information Sheet, Colombia](#)

**Foreign Government Agencies**

[Colombia Government Trade Bureau in Washington, D.C.](#)

[Ministry of Energy and Mines](#)

[Departamento Administrativo Nacional de Estadística](#)

**Oil and Natural Gas**[Ecogas](#)[Ecopetrol, Colombian National Oil Company](#)**Coal**[Cerrjon Coal Project](#)[Drummond](#)**Sources**

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Associated Press  
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International Oil Daily  
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Lloyd's List  
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Oil Daily  
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Petroleum Intelligence Weekly  
Portafolio  
Platts  
South American Business Information  
U.S. Coal Review  
U.S. Energy Information Administration  
U.S. Geological Survey  
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