

# COUNTRY ANALYSIS BRIEFS

## Colombia

Last Updated: March 2010

### Background

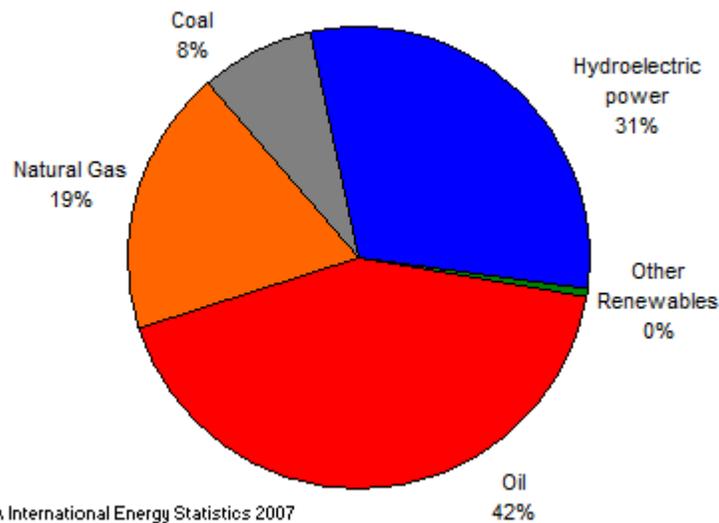
***Colombia is an important petroleum and coal exporter.***

Colombia has seen an increase in oil production in recent years following a period of steady decline. The Colombian government has enacted a series of regulatory reforms to make the sector more attractive to foreign investors. In addition, it has implemented a partial privatization of state oil company Ecopetrol in an attempt to revive its upstream oil industry. The security situation in the country has also improved, with few attacks against oil and natural gas infrastructure in recent years.



In 2007, Colombia consumed 1.3 quadrillion Btus of total energy. Oil constituted the largest part of this amount, followed by hydroelectricity. Colombia is a large producer of coal, but, because Colombia relies upon hydropower for the bulk of its electricity needs, it is able to export almost all of its coal production.

### Total Energy Consumption in Colombia, by Type (2007)

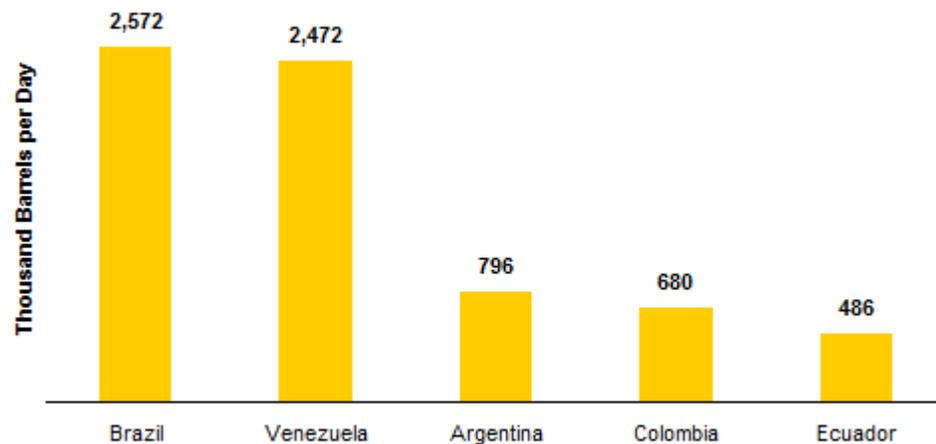


## Oil

**Colombia's oil production has increased 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 2010, the fifth-largest in South America. The country produced an estimated 680,000 barrels per day (bbl/d) of oil in 2009, up from 600,000 bbl/d in 2008. With oil consumption reaching an estimated 282,000 bbl/d in 2008, Colombia exports about half of its oil production, with much of this going to the United States.

### Top 5 South American Oil Producers, 2009



Source: EIA Short Term Energy Outlook

## Sector Organization

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 sold some shares of Ecopetrol to private investors. The reforms have sparked a renewed interest in Colombia's upstream sector, with record levels of exploratory and development drilling. According to Colombian government, the oil sector received \$2.95 billion in foreign direct investment (FDI) in 2009, and FDI was

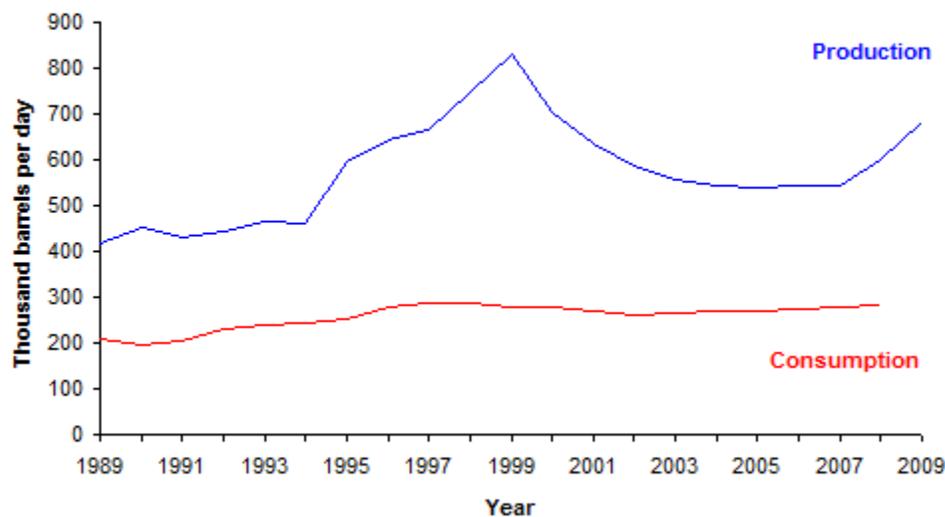
expected to increase to \$3.5 billion in 2010.

In early 2010, Colombia conducted its latest oil sector bidding round, including 255 exploratory blocks covering 130,000 acres. The round includes acreage in frontier areas as well as more-established parts of the country. In addition, the round includes offshore blocks in both the Caribbean Sea and the Pacific Ocean.

### Exploration and Production

Ecopetrol is the largest oil producer in the country, representing about one-third of total national production. The bulk of Colombia's crude oil production occurs in the Andes foothills and the eastern Amazonian jungles. Meta department, in central Colombia, is also becoming an important production area, predominately of heavy crude oil. The largest field in the country is the Rubiales field, located in Meta department. Low levels of production began at Rubiales in the late 1980s, but increasing investment and the completion of a new pipeline have allowed production rates to rise in recent years. Production at Rubiales exceeded 100,000 bbl/d in December 2009, up from only 12,000 bbl/d in June 2007. According to the Colombian government, the field could contain 500 million barrels of total reserves. The crude oil produced at the Rubiales field is very heavy (below 15° API), so a diluent (such as naphtha) must be added to it in order for the crude oil to flow through pipelines.

### Colombia's Oil Production and Consumption



Source: EIA Country Energy Profiles; Short Term Energy Outlook

Other large oil fields include Cano Limon, Castilla, and Cupiagua. In the past, the Cusiana/Cupaigua complex and Cano Limon represented the bulk of Colombia's oil production, but steep declines have reduced production at each to less than 50,000 bbl/d. Colombia's current oil production is somewhat more diffuse, with a large number of relatively small oil fields. According to industry analysts, the country is relatively under-appraised, with large parts of the country unexplored and with many of the geological features of its oil-rich neighbor Venezuela.

Prior to 2008, Colombia's oil production had remained largely flat for many years. This followed a period of steady decline that started in 1999, when Colombia's oil production peaked at 830,000 bbl/d. The principle cause of the fall in oil production was natural declines at 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 have contributed to increasing investment in the country. The improvement in Colombia's security situation has also been a significant contributor to the renewed interest by international oil companies. Pipelines and other energy infrastructure are still the targets of attacks by guerrillas, but the number and severity of these attacks is much lower than the past. According to the Colombian government, there were about 11 attacks against pipelines in 2008, versus hundreds of such incidents that occurred per year in the early 2000s.

As a result of these improvements, Colombia has halted the decline in its oil production and begun to experience some growth. EIA forecasts that Colombia should continue to see an increase in oil production in the next two years: according to the March 2010 edition of the [Short Term Energy Outlook](#), EIA expects Colombian oil production to rise to 760,000 bbl/d in 2010 and 810,000 bbl/d in 2011, versus 680,000 bbl/d in 2009.

#### *Oil Exports*

The United States is the largest destination of Colombia's oil exports. In 2009, Colombia exported 278,000 bbl/d of crude oil and refined products to the United States. The weighted-average API gravity of Colombia's crude oil exports to the United States was 24° in 2009, and most exports flowed into PADD 3 (Gulf Coast, 79 percent), followed by PADD 5 (West Coast, 17 percent) and PADD 1 (East Coast, 4 percent).

#### **Pipelines**

Colombia has six major oil pipelines, four of which connect production fields to the Caribbean export terminal at Covenas. These include the 500-mile Ocesa pipeline, which has the capacity to transport 615,000 bbl/d from the Cusiana/Cupiagua area; the 460-mile Cano Limon pipeline; and the smaller Alto Magdalena and Colombia Oil pipelines. The Llanos Orientales came online in late 2009, which links the Rubiales field to the Ocesa pipeline. The system will eventually have a capacity of 260,000-bbl/d. The sixth 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.

#### **Downstream**

According to *OGJ*, Colombia had 285,850 bbl/d of crude oil refining capacity in 2009. 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, with the Cartagena refinery (75,000 bbl/d) representing most of the rest of the country's capacity. In May 2009, Ecopetrol assumed complete ownership of the Cartagena plant after purchasing the stake formerly held by Glencore.

Although Colombia is a net oil exporter, it must import some refined products, as domestic demand outstrips production capacity. As a result, Ecopetrol has begun efforts to expand refining capacity in the country. The company approved a \$3.8-billion expansion of the Cartagena refinery in late 2009, which would increase capacity to 165,000 bbl/d and improve the quality of produced refined products. Ecopetrol is also embarking on an expansion plan at the Barrancabermeja plant, which would increase its capacity to 300,000 bbl/d and improve the refinery's ability to process heavier crude oils.

## **Natural Gas**

According to *OGJ*, Colombia had proven natural gas reserves of 3.96 trillion cubic feet (Tcf) in 2010. The country produced 318 billion cubic feet (Bcf) of dry natural gas in 2008, while consuming 265 Bcf. A large portion of the country's gross natural gas production (43 percent in 2008) is re-injected to aid in enhanced oil recovery. 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 the majority of current production. Similar to the oil sector, natural gas production has risen substantially in the last few years, owing to greater investment at existing fields, rising domestic consumption, and new export opportunities.

#### **Exploration and Production**

According to Colombia's Ministry of Energy and Mines, BP and Chevron are the two largest natural gas producers in the country. Chevron operates the offshore Chuchupa field in Guajira department, the largest non-associated natural gas field in the country. In December 2009, the field produced 680 million cubic feet per day (MMcf/d) of dry natural gas. The company also operates the nearby onshore Ballena and Riohacha fields. BP operates the Cupiagua and Cusiana natural gas fields in Casenare department, which are the two largest natural gas fields in the country. However, almost all natural gas from these fields is utilized for re-injection, leaving dry natural gas production of a combined 200 MMcf/d in December 2009. State-owned Ecopetrol is also an important natural gas producer.

#### **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

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

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.

#### Export Pipelines

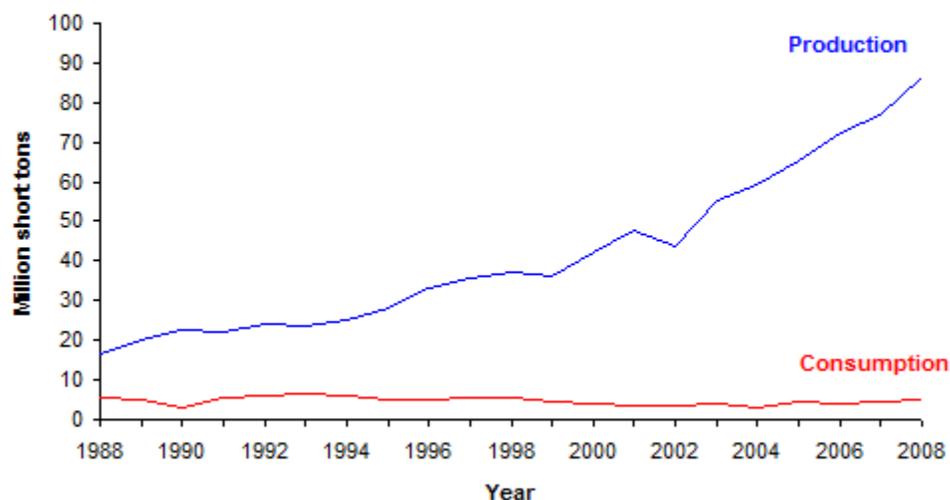
In early 2008, the Antonio Ricaurte pipeline came online, linking northeastern Colombia with Venezuela. Initially, the pipeline will allow Colombia to export natural gas from the Punta Ballenas area to western Venezuela. Current plans call for the flow of the pipeline to then be reversed in 2012, with Venezuela exporting 140 MMcf/d of natural gas to Colombia. While initial contracted volumes for export from Colombia ranged from 80-150 MMcf/d, actual exports to Venezuela have often exceeded these levels. According to media reports, natural gas exports to Venezuela peaked near 300 MMcf/d in late 2009, partly due to rising demand in Venezuela for natural gas for power generation and re-injection. Media reports indicated that export flows had fallen to near contracted volumes by the end of 2009.

## Coal

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

According to the World Energy Council, Colombia had 6,814 million short tons (MMst) of recoverable coal reserves in 2007, 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 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 86.7 MMst in 2008. 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 only 5.2 MMst in 2008, leaving most of the country's production available for export; in 2008, Colombia was the fourth-largest net coal exporter in the world.

**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 Colombia 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, exported over 30 MMst in 2009.

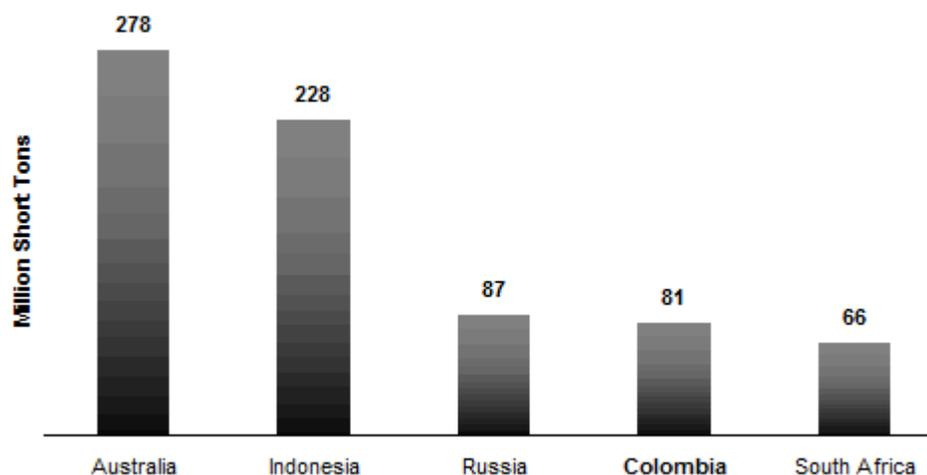
Drummond operates the second-largest coal mine in Colombia, La Loma, also an integrated mine-railway-port project, producing about 20 MMst per year. In 2009, Drummond ships its first coal exports from the El Descanso project, which could reach production of 20 MMst by 2010. Glencore operates the Jagua and Prodeco coal mines, with total production capacity of about 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. Coal is an important part of the Colombian economy: in 2009, coal represented about one-quarter of total export earnings, and mining taxes and royalties paid to the Colombian government exceeded \$1 billion. During the first nine months of 2009, the United States imported 13.6 MMst of coal from Colombia, about 80 percent of total U.S. coal imports.

**Top 5 World Net Coal Exporters, 2008**



Source: EIA International Energy Annual

According to media reports, Colombia began exporting sizable quantities of coal to Asian markets, especially China, in 2009. A combination of higher prices in Asia, lower freight costs, and falling exports to the United States created the conditions for such an opportunity. It is possible that the expansion of the Panama Canal (currently slated for completion by 2015) could facilitate greater exports of Colombian coal to Asia in the future.

### 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 transported and used in similar ways. Drummond has stated that its Colombian mines could contain up to 2.2 Tcf of CBM, and the company has signed contracts with Ecopetrol to extract CBM from both the La Loma and El Descanso mines. 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, 2010E)</b>	1.36 billion barrels
<b>Oil Production (2009E)</b>	680 thousand barrels per day
<b>Oil Consumption (2008E)</b>	282 thousand barrels per day
<b>Crude Oil Distillation Capacity (2009E)</b>	286 thousand barrels per day
<b>Proven Natural Gas Reserves (January 1, 2010E)</b>	3.96 trillion cubic feet
<b>Natural Gas Production (2008E)</b>	318 billion cubic feet
<b>Natural Gas Consumption (2008E)</b>	265 billion cubic feet

<b>Recoverable Coal Reserves (2007E)</b>	6,814 million short tons
<b>Coal Production (2008E)</b>	86.7 million short tons
<b>Coal Consumption (2008E)</b>	5.2 million short tons
<b>Electricity Installed Capacity (2007E)</b>	13.2 gigawatts
<b>Electricity Production (2007E)</b>	50.6 billion kilowatthours
<b>Electricity Consumption (2007E)</b>	30.6 billion kilowatthours
<b>Total Energy Consumption (2007E)</b>	1.35 quadrillion Btu
<b>Total Per Capita Energy Consumption (2007E)</b>	31.6 million Btu
<b>Energy Intensity (2007E)</b>	4,696 Btu per 2005\$

## Environmental Overview

<b>Energy-Related Carbon Dioxide Emissions (2008E)</b>	65.1 million metric tons
<b>Per-Capita, Energy-Related Carbon Dioxide Emissions (2008E)</b>	1.51 metric tons
<b>Carbon Dioxide Intensity (2008E)</b>	0.22 metric tons per 2005\$

## Oil and Gas Industry

<b>Organization</b>	Mostly privatized and open to foreign investors. State-controlled Ecopetrol plays an important role in the sector.
<b>Major Oil/Gas Ports</b>	Tumaco, Cartagena, Covenas
<b>Foreign Company Involvement</b>	BP, Occidental, ChevronTexaco
<b>Major Oil Fields</b>	Cupiagua/Cusiana; Cano Limon, Suroriente, Guando.
<b>Major Natural Gas Fields</b>	Chuchupa, Ricohacha, Ballena, Cupiagua, Cusiana.
<b>Major Pipelines</b>	Ocensa, Cano Limon pipeline, Alto Magdalena, Colombia Oil, TransAndino, Mariquita-Cali, Ballena-Barrancabermeja, Barrancabermeja-Neiva-Bogota
<b>Major Refineries (capacity, bbl/d)</b>	Barrancabermeja - Santander (205,000 bbl/d), Cartagena (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](#)

[Colombia National Hydrocarbons Agency \(ANH\)](#)

[Departamento Administrativo Nacional de Estadística](#)

### Oil and Natural Gas

[Ecogas](#)

[Ecopetrol, Colombian National Oil Company](#)

### Coal

[Cerrion Coal Project](#)

[Drummond](#)

## Sources

ADP News  
Agence France Presse  
American Oil and Gas Insights  
APS Review  
Argus LatAm Energy and Latin American Power Watch  
Associated Press  
Biofuels Digest  
Business News Americas  
Business Wire  
Calgary Herald  
Cambridge Energy Research Associates  
Canada Newswire  
Canwest News Service  
Coal Americas  
Colombia Ministry of Mines and Energy  
Daily Oil Bulletin  
EcoPetrol  
Economist Intelligence Unit  
El Pais  
El Universal  
Energy Resource  
Energy Weekly News  
Global Insight  
Global Refining and Fuels Report  
Global Power Report  
International Oil Daily  
La Prensa de Panama  
La Republica  
Latin America News Digest  
Latin Finance  
Lloyd's List  
Market News Publishing  
Ministerio de Energia y Minas  
Mining Journal  
Mining Magazine  
Noticias Financieras  
Newsbase  
Oil Daily  
Oil and Gas Journal  
Petroleum Intelligence Weekly  
Portafolio  
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