

# 8 Colombia



## 8.1 Summary of Coal Industry

### 8.1.1 ROLE OF COAL IN COLOMBIA

Coal accounted for eight percent of Colombia's energy consumption in 2007 and one-fourth of total exports in terms of revenue in 2009 (EIA, 2010a). As the world's tenth largest producer and fourth largest exporter of coal (World Coal, 2012; Reuters, 2014), Colombia provides 6.9 percent of the world's coal exports (EIA, 2010b). It exports 97 percent of its domestically produced coal, primarily to the United States, the European Union, and Latin America (EIA, 2010a).

Colombia had 6,746 million tonnes (Mmt) of proven recoverable coal reserves in 2013, consisting mainly of high-quality bituminous coal and a small amount of metallurgical coal (Table 8-1). The country has the second largest coal reserves in South America, behind Brazil, with most of those reserves concentrated in the Guajira peninsula in the north (on the country's Caribbean coast) and the Andean foothills (EIA, 2010a). Its reserves of high-quality bituminous coal are the largest in Latin America (BP, 2014).

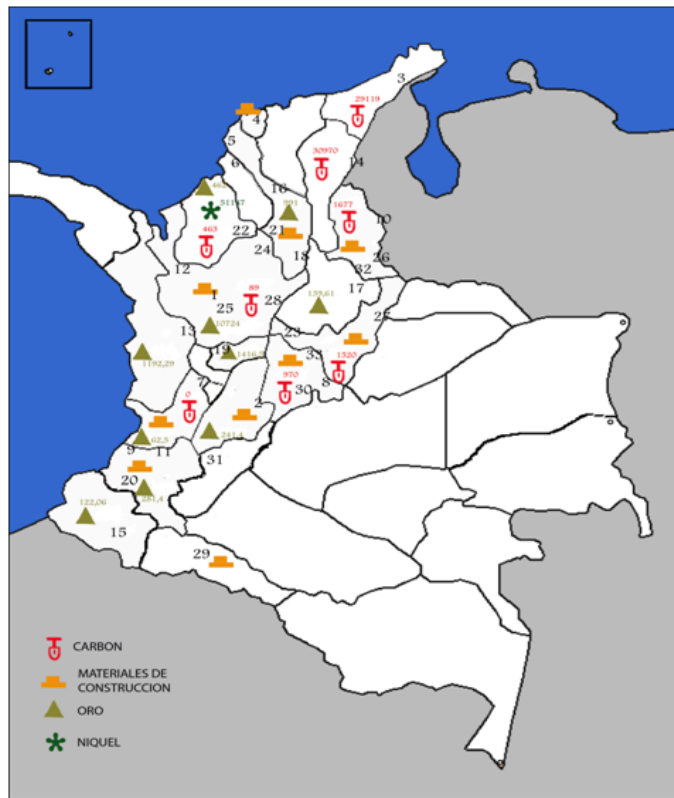
**Table 8-1. Colombia's Coal Reserves and Production – 2013**

Indicator	Anthracite & Bituminous (million tonnes)	Sub-bituminous & Lignite (million tonnes)	Total (million tonnes)	Global Rank (# and %)
Estimated Proved Coal Reserves (2013)	6,746.0	0.0	67469.0	11 (0.8%)
Annual Coal Production (2013)	85.5	0.0	85.5	10 (1.4%)

Source: BP (2014)

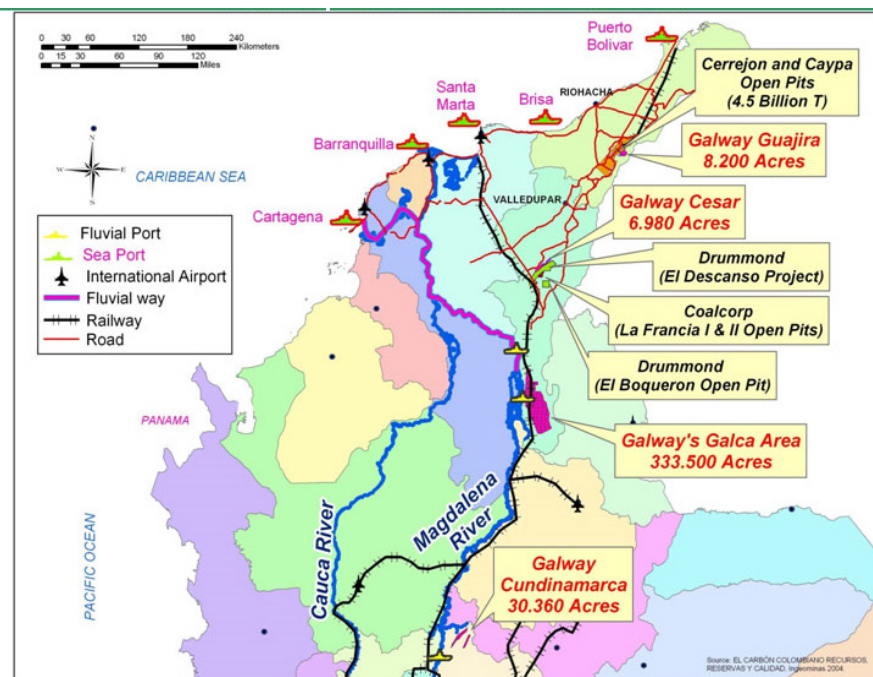
Coal production for export occurs mainly in the northern states of Guajira (Cerrejón deposit), Cesar, and Cordoba. There are widespread small and medium-size coal producers in Norte de Santander (metallurgical coal), Cordoba, Santander, Antioquia, Cundinamarca, Boyaca, Valle del Cauca, Cauca, Borde Llanero, and Llanura Amazónica (MB, 2005). Figures 8-1 and 8-2 illustrate the locations of coal deposits and mines in Colombia.

Figure 8-1. Map of Colombian Minerals



Source: ANDI (2010)

Figure 8-2. Map of Colombian Coal Mines



Source: Galway (2007a)

## 8.1.2 STAKEHOLDERS

Table 8-2 lists potential stakeholders in Colombia's coal mine methane (CMM) industry.

**Table 8-2. Key Stakeholders in Colombia's CMM Industry**

Stakeholder Category	Stakeholder	Role
Mining Companies	<ul style="list-style-type: none"> <li>▪ Prodeco (owned by Xstrata)</li> <li>▪ Carbones de La Jagua (owned by Glencore)</li> <li>▪ Cerrejón Coal Company (joint venture of Anglo-American, BHP, and Xstrata)</li> <li>▪ Anglo American (AA)</li> <li>▪ BHP Billiton (BHB)</li> <li>▪ Glencore Xstrata</li> <li>▪ Vale SA</li> <li>▪ Carbones del Cerrejón LLC</li> <li>▪ C.I. Prodeco S.A.</li> <li>▪ CCX</li> <li>▪ MPX</li> <li>▪ Carbones de La Jagua S.A.</li> <li>▪ SATOR</li> <li>▪ Minas PazdelRio</li> <li>▪ CoalCorp</li> <li>▪ CERX</li> <li>▪ Drummond Ltd.</li> <li>▪ Acerías Paz del Río, S.A.</li> <li>▪ New Age Exploration (NAE)</li> </ul>	Project hosts
Equipment Manufacturers	<ul style="list-style-type: none"> <li>▪ Wood Group Power Solutions, Inc. (part of the Gas Turbine Services Division of John Wood Group PLC)</li> <li>▪ GE Transportation Systems – Electric drive systems (loaders and haulage)</li> <li>▪ Goulds Pumps – Slurry and process pumps (pumps, compressors, valves and actuators)</li> <li>▪ Grindex – Submersible drainage, sludge and slurry pumps (pumps, compressors, valves and actuators)</li> <li>▪ Hansen Transmissions – Gear units and power transmission products (power supply, engines, transmission and drives)</li> <li>▪ Voith Turbo GmbH &amp; Co. KG – Start-up components (power supply, engines, transmission and drives)</li> </ul>	Methane treatment and utilization equipment
Developers	<ul style="list-style-type: none"> <li>▪ See <a href="http://www.epa.gov/coalbed/networkcontacts.html">http://www.epa.gov/coalbed/networkcontacts.html</a></li> </ul>	Project opportunity identification and planning
Engineering, Consultancy, and Related Services	<ul style="list-style-type: none"> <li>▪ See <a href="http://www.epa.gov/coalbed/networkcontacts.html">http://www.epa.gov/coalbed/networkcontacts.html</a></li> </ul>	Technical assistance
Natural Gas Transmission & Distribution Companies; Power Companies	<ul style="list-style-type: none"> <li>▪ Andina Electrica</li> </ul>	Pipeline sales for power generation
Natural Gas Production and Transport	<ul style="list-style-type: none"> <li>▪ Chevron</li> <li>▪ Ecopetrol</li> </ul>	
Government Groups	<ul style="list-style-type: none"> <li>▪ Ministry of Mines and Energy</li> </ul>	Regulation and policymaking

Sources: MT (2007); World Coal (2012); BP (2014)

### 8.1.3 STATUS OF COAL AND THE COAL MINING INDUSTRY

Colombia produced 85.5 Mmt of coal in 2013, while only consuming 4.9 Mmt. Colombian coal production is exclusively carried out by private companies and has increased about 78 percent in the past decade (Mining, 2014). Colombia's mining minister Carlos Rodado said coal output will reach 100 Mmt by 2015 and 144 Mmt in 2020 (Sourcewatch, 2012a).

Tables 8-3 and 8-4 list available specifics on Colombia's coal mining companies as of 2010.

The largest coal producer in Colombia is the Carbones del Cerrejon consortium, composed of Anglo-American, BHP Billiton, and Xstrata. 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 of mine, railroad, and a Caribbean coast export terminal (EIA, 2014).

The open pit mine produces 33 Mmt per year (2013) and plans to increase production up to 50 Mmt per year are being considered, owing to the \$1 billion investment by Carbones del Cerrejon (MT, 2007). The country's second largest coal mine, La Loma, is a mine-railway-port project operated by Drummond, which produced 25 Mmt in 2011 (Drummond, 2014). In 2008, Colombia gave Drummond permission to open the El Descanso Mine, which is expected to produce up to 25 Mmt by 2015 (Sourcewatch, 2012b).

Also in 2008, Galway began exploration drilling in the Carboluis project in San Luis Coal basin located in Santander—an area with some 300 Mmt of coal (Galway, 2007b) — but the company has put that project on hold while it looks for equity partners (Union, 2010).

Colombia's coal is relatively clean-burning, with a sulfur content of less than one percent.

**Table 8-3. Major Colombian Coal Producing Companies\Regions**

Mine	Production in 2010 (million tonnes)
Cerrejón Coal Company (2013)	33
Drummond (2013)	25
Prodeco	10.2
Otros	3.8
Boyacá	2.7
Cundinamarca	2.1
Norte de Santander	2.2

Source: ANH (2014)

Table 8-4. Major Colombian Coal Mines

Mine	Type	Location	Owner	Production (million tonnes per year)	Mineable Reserves (million tonnes)
Cerrejón Zona Norte	surface	La Guajira	Cerrejón Coal Company	28.4 (2010)	1,600
Carbones del Cerrejón	surface	La Guajira	Cerrejón Coal Company	3.7 (2010)	-
El Cerrejón Corte	surface	La Guajira	Cerrejón Coal Company	5.6 (2010)	-
Mina Pribbenow /La Loma	surface	Cesar	Drummond	18.1 (2010)	485
El Descanso	surface	Cesar	Drummond	3 (2010)	960
El Hatillo	surface	Cesar	Vale S.A.	1.8 (2008)	500
Calenturitas	surface	Cesar	Glencore/Prodeco	5.2 (2010))	
La Jagua	surface	Cesar	Glencore/Prodeco	8.5 (2003) 4.4 (2009)	260
La Jagua	underground	Cesar	Glencore/Prodeco	0.9 (1994)	-
GALCA	exploratory	Cesar	Galway/Prodeco	exploratory	60-200
La Francia	surface	Cesar	Goldman Sachs (from CoalCorp Mining)	1.5	
Caypa	surface	Cesar	Carbones Colombianos del Cerrejon/CoalCorp Mining	0.175 (2007)	8.8
Río de Oro		Norte de Santander	Geominas		60-320
Paz del Río		Boyaca	Acerías Paz del Río S.A.	2.6 (2010)	
Puerto Libertador	surface	Cordoba	SATOR-	0.1 (2010)	-

Sources: Jahnig (2007); USGS (2008); ANDI (2010); Mining Weekly (2008); Mining Weekly (2010); MB (2005); ANH (2014)

## 8.2 Overview of CMM Emissions and Development Potential

### 8.2.1 CMM EMISSIONS FROM OPERATING MINES

A pilot project to measure methane emissions is underway at the La Loma/Pribbenow Mine, operated by U.S.-based Drummond Company, Inc., one of the largest coal producers in Colombia, and located near La Loma in Cesar Department; the mine has estimated reserves in excess of 534 Mmt of high-Btu, low-ash and low-sulfur coal. There have been no published results although the project was confirmed by a general engineer at Drummond Inc., USA. Drummond estimates that there are 62.2 billion cubic meters (2.2 trillion cubic feet) of coal bed methane (CBM) in its mines and it has signed a contract with Ecopetrol to extract CBM from the La Loma and El Descanso mines (EIA, 2014).

Table 8-5 provides Colombia's total CMM emissions.

**Table 8-5. Colombia's CMM Emissions (million cubic meters)**

Emission Category	2000	2005	2010	2015 (projected)
Total CH <sub>4</sub> Emitted (= Total liberated – recovered & used)	231.1	357.1	511.2	651.3

Source: USEPA (2012)

The current potential for CMM projects in Colombia is limited to pre-mine drainage as most coal is surface mined; however, as mines target deeper seams, there should be significant potential for CMM projects.

## 8.2.2 CMM EMISSIONS FROM ABANDONED COAL MINES

No data on CMM from abandoned mines are available for Colombia at this time.

## 8.2.3 CBM FROM VIRGIN COAL SEAMS

Colombia has included CBM in its tender for oil and gas exploration and production contracts beginning in 2014. Drummond and Cerrejon have both announced that they will develop a CBM gas project in Colombia's La Guajira department. The project will be developed in Cerrejon's mining area where Drummond holds the right to produce methane gas. The companies are expected to soon reach an agreement (SeeNews, 2014).

## 8.3 Opportunities and Challenges to Greater CMM Recovery and Use

Colombia signed and ratified the UNFCCC and Kyoto Protocol, as indicated in Table 8-6. As a Non-Annex I Party to the Kyoto Protocol, Colombia has no national emissions targets and is eligible to host mitigation projects under the Clean Development Mechanism. Therefore, Colombia is eligible to secure project revenues from the sale of greenhouse gas (GHG) emission reduction credits.

**Table 8-6. Colombia's Climate Change Mitigation Commitment**

Agreement	Signature	Ratification
UNFCCC*	June 13, 1992	March 22, 1995
Kyoto Protocol**	---	November 30, 2001

Source: UNFCCC (2014)

In 2012, the Colombian government launched the Colombian Low Carbon Development Strategy (CLCDS). While recognizing that Colombia's carbon emissions are low relative to developed countries, without mitigation actions they could increase significantly based on the country's projected economic growth. The strategy states that Colombia should consider international financial incentives to promote sustainable growth and prepare the economy for a "future carbon-

conscious global economy.” The CLCDS is a medium and long-term development program led by the Ministry of Environment and Sustainable Development (MADS), the Department of National Planning (DNP), and the Industry, Energy, Mining, Transport, Housing, Waste, and Agriculture ministries of Colombia. The goal of CLCDS is to strengthen Colombia’s economic and social development while concurrently meeting global requirements of efficiency, competitiveness and environmental performance.

The strategy of CLCDS is to:

- Identify and assess different actions that would reduce greenhouse gas emissions and support sectoral growth,
- Develop Mitigation Action Plans for each Colombian productive sector, and
- Create and promote tools for their implementation.

In 2014, Fundación Natura, a Colombian environmental charity, announced that it would launch a carbon trading platform in 2015 to individuals and companies seeking to offset carbon emissions. The platform is being developed by the Bolsa Mercantil de Colombia (BMC), a commodities exchange used by physical producers and consumers of farm produce (FNC, 2014).

### 8.3.1 MARKET AND INFRASTRUCTURE FACTORS

The International Finance Corporation (IFC) has financed a project to increase production of coal in Colombia and to help privatize the coal sector. Several large international corporations are involved in coal mining in Colombia such as the Drummond Company, Anglo American, BHP Billiton, and Glencore (MB, 2005).

Colombia has an open, emerging market economy, and it is known that the Colombian mining authorities are supportive of CMM development initiatives. The most significant challenge to CMM/CBM production in Colombia is the ability for this unconventional gas to compete with conventional natural gas that is produced in offshore fields. Conventional natural gas is transported to Bogotá and other cities via a pipeline and sold for about \$0.50/Mmcf (million cubic feet); whereas CBM/CMM will require a wellhead price of around \$1.50/Mmcf to become marginally profitable. Voluntary carbon trading schemes, such as the one initiated by Fundación Natura Colombia, could encourage investment in the CMM/CBM industry.

### 8.3.2 REGULATORY INFORMATION

The key governmental body involved in the energy sector in Colombia is the Ministry of Mines and Energy, which is responsible for formulating and adopting policies directed towards the sustainable use of the country’s mining and energy resources in order to contribute to the country’s economic and social development. This is done by establishing policies that regulate:

- The exploration and extraction of hydrocarbons,
- The exploration, extraction and export of minerals,
- The production, expansion, distribution and supply of energy services, and
- The distribution and consumption of fuel gas.

On 25 March 2014, the Ministry of Mines and Energy adopted Resolution 90325, which allows mining companies to utilize the methane gas released during mining operations to provide energy

for the mine. A draft of the implementation plan was scheduled for release at the end of November 2014.

## 8.4 Profiles of Individual Mines

No profiles are available for Colombia at this time.

## 8.5 References

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