

# Coal and Coalbed Methane (CBM) Potential of Colombia

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## Abstract

Colombia is one of the world's most prominent high-quality bituminous coal producers. The nation's 4,881 million tonnes (Mt) of proved coal reserves are the greatest in South America (ANM, 2016; 2018). The northern departments of La Guajira and La Cesar are home to Colombia's largest coal deposits. The Guajira Basin is located in northern onshore and just offshore Colombia and has historically accounted for the greatest percentage of domestic natural gas production (EPA, 2019). Colombia's 4,881 Mt of proved coal reserves are thought to hold significant volumes of coalbed methane (CBM) utilization potential. According to the National Hydrocarbons Agency (ANH), coalbed methane (CBM) reserves are estimated to be 11-35 Tcf. Under the laws of Colombia, the National Hydrocarbon Agency (ANH), which operates under the Ministry of Mines and Energy (MinMinas), is the body that authorizes the exploration and production of all hydrocarbon resources, including coalbed methane (CBM). The coal industry remains integral to Colombia's economy. From 2010 to 2015, coal production grew from 75 Mt to 85 Mt, and by 2020 production is expected to reach 105 Mt (BP, 2016); (World Coal, 2016). Colombia's exposure to growing export markets such as Turkey and Europe will also continue to support coal production growth. Because of the coal industry's impact on Colombia's economy, favorable policies and regulations exist to encourage capital investment.

**Key words:** Colombia, coal, coalbed methane (CBM)

There are different gas formations in the earth (Figure 1). Underground coal gasification (UCG) converts coal in-situ into a gaseous product, commonly known as synthesis gas or syngas through the same chemical reactions that occur in surface gasifiers (Figure 2). Gasification converts hydrocarbons into a synthesis gas (syngas) at elevated pressures and temperatures and can be used to create many products (electric power, chemical feedstock, liquid fuels, hydrogen, synthetic gas). Gasification provides numerous opportunities for pollution control, especially with respect to emissions of sulfur, nitrous oxides, and mercury.

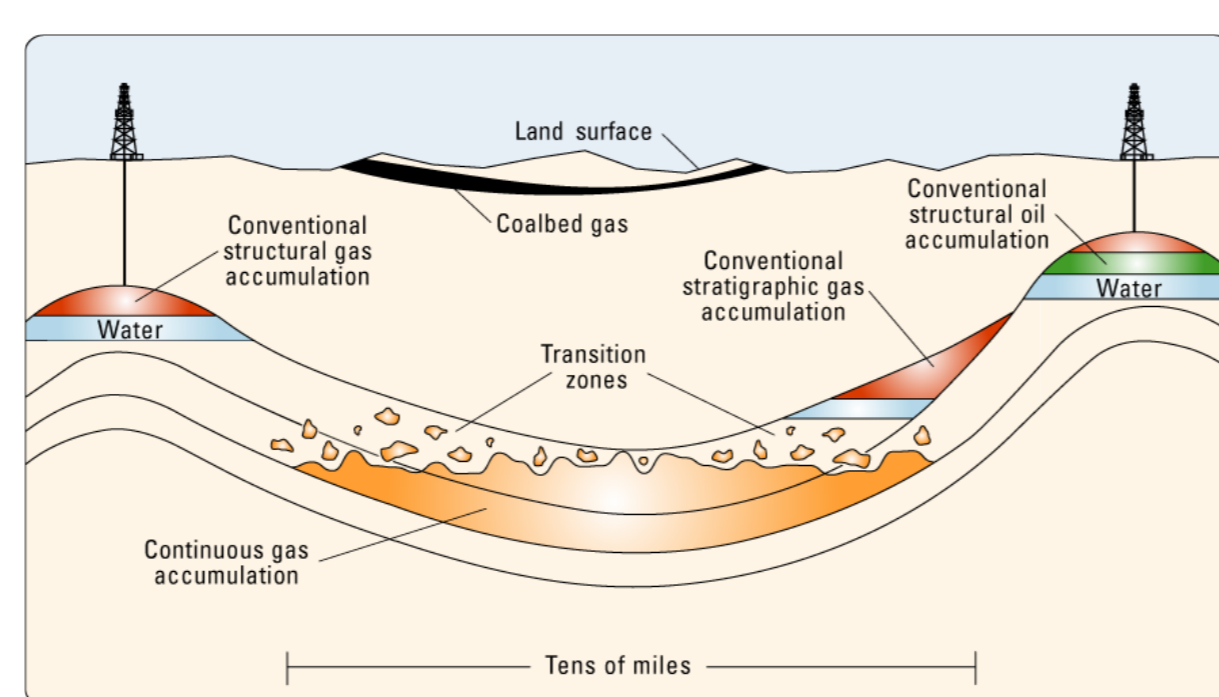


Figure 1. Schematic diagram of gas accumulation types

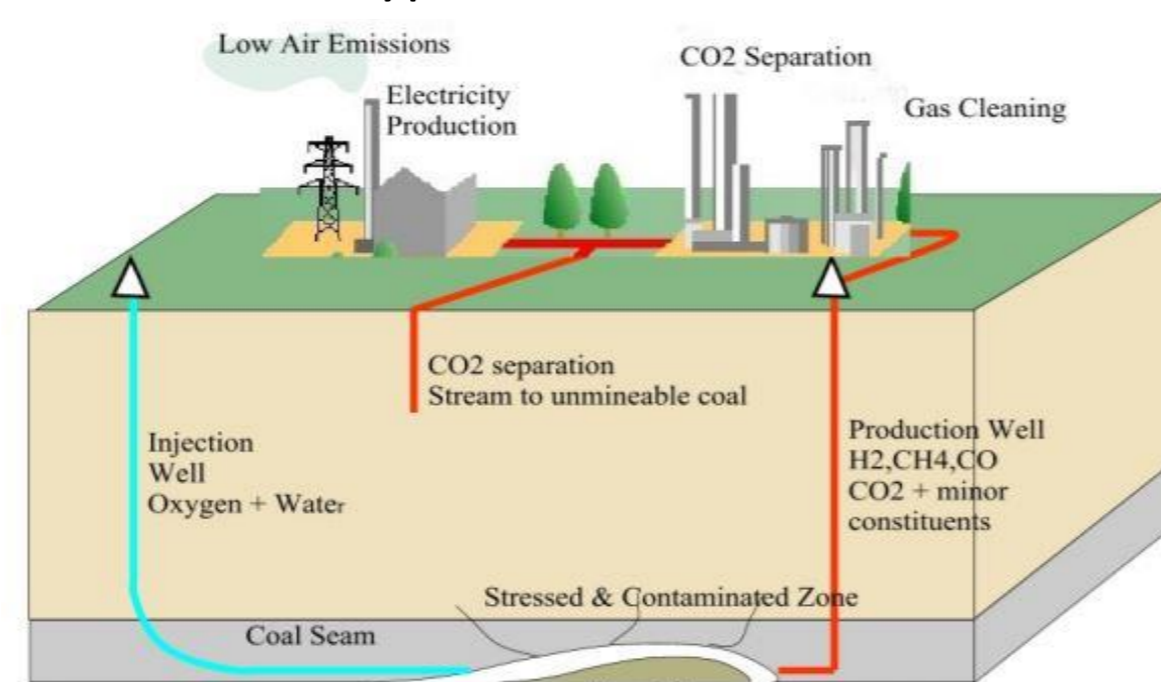


Figure 2. Coal seam and UCG

The mining industry is mainly developed by private foreign and national companies, and has gained importance during the past decade since the issuance of the 2001 Mining Code (including all amendments thereto, generally referred to simply as the "Mining Code"). Due to the great potential of the country in this industry, the government considers that as of 2019, the Colombian mining industry will be among the most important ones in Latin America. The Colombian Constitution, Article 332, establishes that all natural nonrenewable resources belong to the state, as a consequence of which no individual or entity may appropriate natural resources without having first obtained an authorization for such purpose. Furthermore, the Mining Code establishes that it is in the public interest to promote a technical exploration and exploitation of natural non-renewable resources. While these are the basis for government intervention in the mining industry, they are not considered as drawbacks for investors, because they do not impose limitations on the right of a private entity to own the mineral resources obtained from an exploitation made under a lawful concession or other type of contract.

## Geographic Distribution

Colombia's coal production largely comes from the northern departments of Guajira and Cesar (Figure 3). There are also, however, widespread small and medium-sized coal producing areas in Norte de Santander, Santander, Antioquia, Cundinamarca, Boyaca, Valle de Cauca, Cauca, Borde Llanero, and Llanura Amazónica. Most of Colombia's coal export infrastructure is located on the Caribbean coast.

## Coal Type and Quality

Colombia's proved coal reserves consist mainly of high-quality bituminous coal and a small amount of metallurgical coal. Furthermore, Colombia's high-quality bituminous coal reserves are the largest in Latin America. Coal from the El Cerrejón and La Loma mines have sulfur contents less than 1 percent and ash contents between 7.5-7.7 percent. Due to its relatively clean-burning nature, Colombia's coal is in high-demand and used almost entirely for export.

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Figure 3. Coal fields in Colombia