



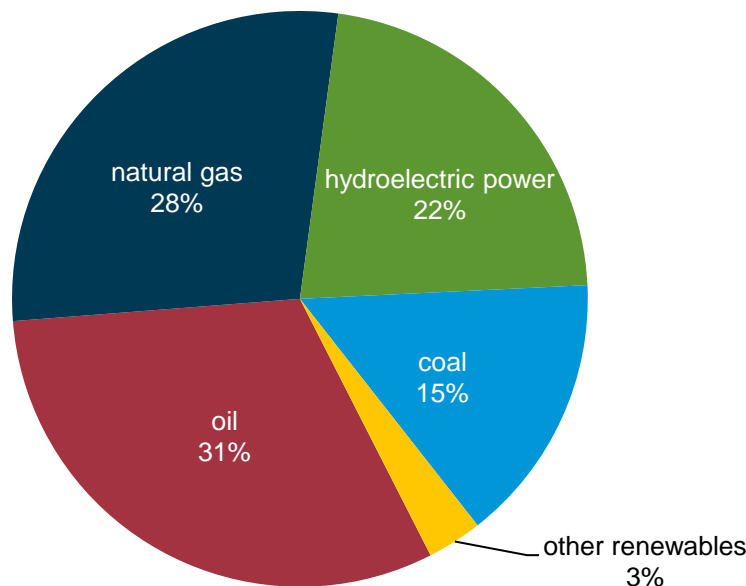
Country Analysis Executive Summary: Colombia

Last Updated: March 31, 2022

Overview

- In 2021, Colombia was South America’s largest coal producer and second-largest petroleum and other liquids producer after [Brazil](#). The country is also a significant oil exporter; in 2021, it was the fifth-largest crude oil exporter to the United States.
- Energy consumption in Colombia totaled 1.7 quadrillion British thermal units (quad) in 2020. At 31%, oil accounted for the largest share of Colombia’s total energy consumed (Figure 1).¹

Figure 1. Primary energy consumption in Colombia by fuel type, 2020



Source: Chart by the U.S. Energy Information Administration, based on the BP *Statistical Review of World Energy, 2021*

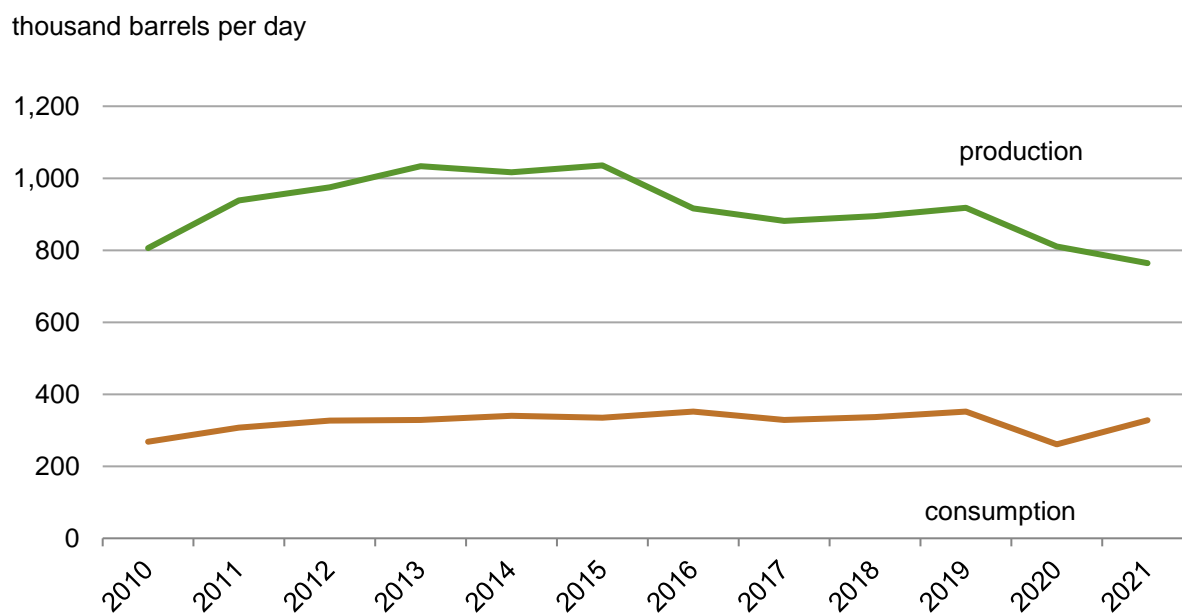
- Columbia uses hydropower for most of its electricity needs. Despite being a major coal producer, Colombia uses very little coal domestically, instead exporting most of its coal production.


Petroleum and Other Liquids

Exploration and production

- According to the *Oil & Gas Journal*, Colombia had 1.8 billion barrels of proved crude oil reserves as of January 2022.²
- Colombia's total petroleum and other liquids production fell from 808,000 barrels per day (b/d) in 2020 to an average of 760,000 b/d in 2021, continuing a production decline trend from recent years (Figure 2). Production declines in both years were the result of shut-ins driven by COVID-19-related lockdowns and delayed exploration in addition to social protests and attacks by guerilla groups on key midstream oil infrastructure.³
- All of Colombia's crude oil production occurs onshore (a mature resource base), and EIA expects that crude oil production will continue to decline. Ecopetrol, Colombia's national oil company, is focusing on increasing output from the maturing Rubiales, Castilla, La Cira, and Chichimene fields through infill drilling, rather than undertaking new exploration.⁴ The Llanos Orientales (Eastern Llanos) Basin east of the capital, Bogota, is the main source of production. Its heavy, sour crude oil make up Colombia's key export grades, Castilla Blend and Vasconia.

Figure 2. Total petroleum and other liquids production and consumption



 Source: Chart by the U.S. Energy Information Administration, *International Energy Statistics and Short-Term Energy Outlook, March 2022*

- The country's sub-soil and non-renewable natural resources belong to the state as codified in its constitution. However, any qualified local or foreign company is permitted to explore and produce hydrocarbons without having to partner with the national oil company, Ecopetrol. Although private foreign investment in the oil sector exists, Ecopetrol operates over two-thirds of the country's total oil and natural gas production.⁵ Colombia's government has attempted to

create an attractive investment environment for foreign companies, including implementing a more attractive fiscal and tax regime.⁶ In November 2015, the Ministry of Mining and Energy (Minminas) lowered tax rates for oil companies drilling in certain offshore blocks off the Caribbean coast in an effort to increase exploration. Rates were discounted 25%, and contracts were exempt from the value added tax (VAT) and customs charges. This policy was enacted to revive offshore exploration activity and has had mixed success in attracting large foreign companies.⁷ Currently foreign companies are allowed to own 100% stakes in ventures and no local content requirements are required. In 2018, the Duque administration proposed changing its bidding process, including adjusting contracts to match international crude oil price fluctuations, in an effort to increase investment and find new reserves. These changes have since stalled.⁸

- Colombia has no offshore oil production, but its plans include contracting with companies to explore and develop its offshore region in an effort to increase oil reserves. Industry reports indicate that offshore oil production could increase reserves, but production would likely not begin until the late 2020s.⁹
- The shale formations in Colombia are the Cesar-Rancheria Basin, the Middle Magdalena Valley Basin, the Llanos Basin, and the Maracaibo/Catatumbo Basin (on the border of Venezuela and Colombia). Since 2019, unconventional drilling has been under a moratorium. The Agency of National Hydrocarbon (ANH), Colombia's hydrocarbon regulator, planned to start pilot fracking projects in 2020. However, these projects were delayed as a result of the COVID-19 pandemic.
- The Colombian government has approved four companies to participate in pilot projects: Ecopetrol, ExxonMobil, Drumond Energy, and Tecpetrol Colombia.¹⁰ Ecopetrol and Repsol are scheduled to start drilling in Colombia's offshore Caribbean block this year,¹¹ while additional pilots were also approved in Colombia's Middle Magdalena Valley Basin. In 2013, an EIA report indicated that the quality of the La Luna formation (part of the Middle Magdalena Valley Basin) is similar to North America's shale plays.¹² The La Luna formation is a deep marine shale mixed with marl and limestone, much like the Eagle Ford and Niobrara Shale plays in the United States.^{13,14}

Consumption

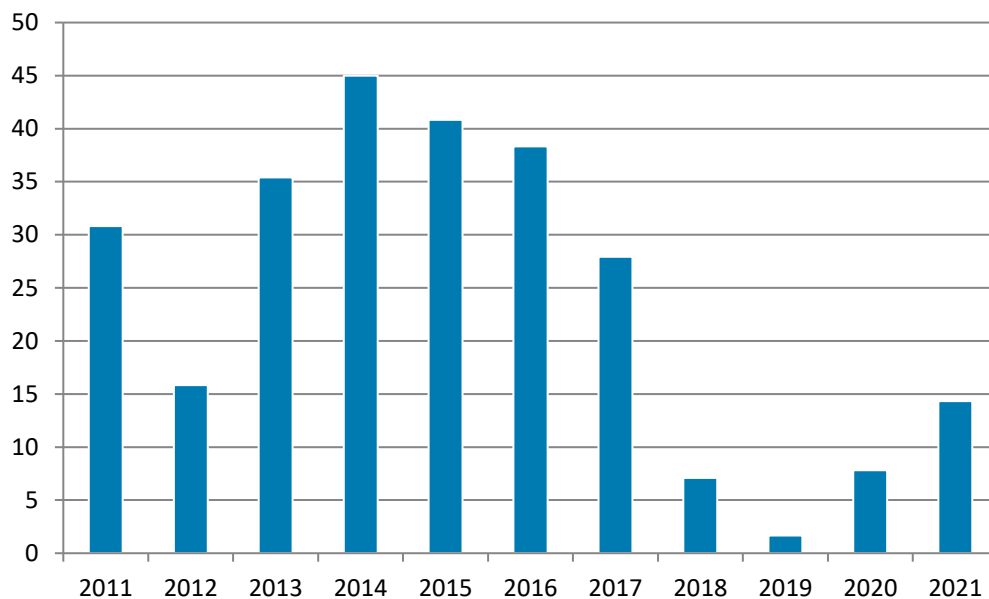
- Refined products demand declined by 20% to 282,000 b/d in 2020. The COVID-19 pandemic national quarantine measures that restricted travel also decreased refined fuel consumption (Figure 2). Gasoline and fuel oil demand typically account for over 70% of all refined petroleum products consumption in Colombia. Consumption of refined products rebounded to 328,000 b/d in 2021 as travel restrictions and quarantine measures were lifted.
- Diesel consumption has been increasing over recent years as a result of expanding cargo and passenger transportation. Legislation was enacted in 2019 to limit sulfur content in diesel fuel from 500 parts per million (ppm) to 50 ppm. As a result, there is not enough domestic refining capacity to produce the higher quality diesel fuel. Although Colombia is a net exporter of refined products, it imports diesel because domestic demand for diesel is higher than domestic supply.

Supply disruptions

- 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. 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.
- Attacks by the ELN targeting oil pipelines and other infrastructure in Colombia are frequent—over 30 such incidents were recorded in 2021. In 2020, Ecopetrol recorded 51 oil infrastructure attacks and EIA estimates that 8,000 b/d were disrupted during that year and 14,000 b/d in 2021 (Figure 3).¹⁵

Figure 3. Liquid fuels supply disruptions in Colombia, 2011–2021

thousand barrels per day



Source: Chart by the U.S. Energy Information Administration, *Short-Term Energy Outlook*, March 2022

- Attacks on key midstream infrastructure, especially the Caño Limon-Covenas pipeline, have disrupted the supply of crude oil for export. During 2020, 29 pipeline attacks occurred.¹⁶ In 2019, 71 attacks occurred against Colombian pipelines, and 42 of these attacks targeted the Caño Limon-Coveñas line. The number of attacks in 2019 was less than in 2018, when the total number of attacks reached 107. The pipeline runs from the Caño Limón oil field to the port of Coveñas, where most of Colombia’s crude oil exports leave the country. Most recently, Caño Limón-Coveñas was attacked in January 2022. The Bicentenario crude oil pipeline was reversed in 2018 to transport crude oil displaced by the attacks, but this alternative route is more costly.
- In addition to attacks, production was also shut in in 2020 because of social protests and lockdowns during the COVID-19 pandemic. Protests in April 2020 began in opposition to a tax

proposal, and these protests blocked access to oil fields in the Arauca, Meta, and Putumayo provinces until June 2020. A number of companies announced cuts in production or suspension of exploration activities amid the protests.¹⁷ EIA estimates that an average of 31,000 b/d was offline between April and June 2020. Including these shut-ins, Colombia’s petroleum and other liquids production in 2020 fell approximately 100,000 b/d year-over-year and 48,000 b/d in 2021.

Refining

- According to the *Oil & Gas Journal*, as of January 2021, Colombia had 378,600 b/d of crude oil refining capacity. Colombia’s main oil blend is the Castilla Blend, which has an API gravity of 18.8 degrees and is a heavy and sour (high sulfur-1.97%) crude oil. In addition to output from the Castilla field, the blend includes crude oil from other heavy oil fields such as the Rubiales and Quifa fields.¹⁸ 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.¹⁹
- Colombia has two large refineries, the Barrancabermeja refinery and Cartagena (Reficar) refinery, both operated by Ecopetrol (Table 1). In addition, Ecopetrol’s subsidiaries and independent refiners operate smaller units.

Table 1. Major refining capacity in Colombia

Refinery	Location (department)	Current capacity (barrels per day)	Ownership
Barrancabermeja	Santander	218,600	Ecopetrol
Cartagena	Bolivar	155,000	Ecopetrol
Apiay	Meta	2,500	Ecopetrol
Orito	Putumayor	2,500	Ecopetrol
Total: 378,600			



Source: Table by the U.S. Energy Information Administration, based on data from the *Oil & Gas Journal*, 2021 *Worldwide Refining Survey*

- In 2016, the Reficar refinery was modernized to allow the facility to run heavy and sour crude oil feedstock, which is more dominant domestically. In 2021, Ecopetrol announced plans to upgrade and expand Reficar further, investing \$180 million. According to Ecopetrol, capacity is expected to grow from 165,000b/d to 200,000 b/d.²⁰ A completion date has yet to be set. With this investment, Ecopetrol aims to position itself as a producer of low-sulfur fuel to meet new standards ([IMO 2020](#)) enacted in 2020 that require a maximum sulfur content of 0.5% in international marine fuels.²¹

Trade

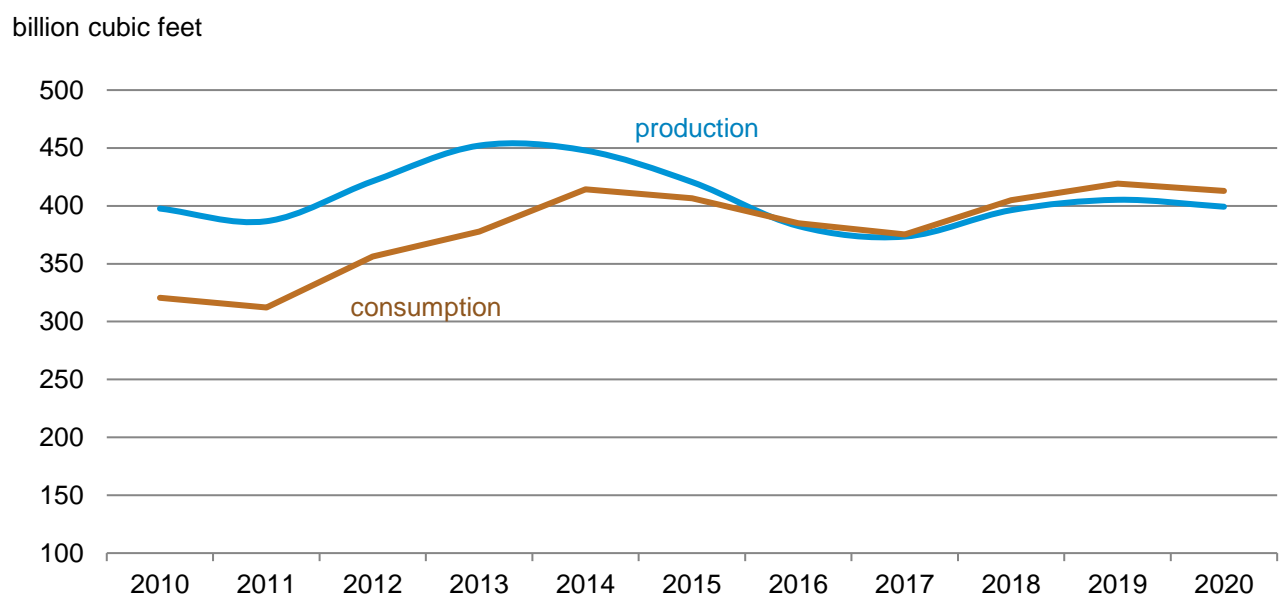
- Crude oil production far exceeds domestic demand, making Colombia a net crude oil exporter. According to Global Trade Tracker, in 2020, Colombia exported 552,000 b/d of crude oil, a decline from 618,000 b/d in 2019. This decline occurred during the start of the COVID-19 pandemic as global demand waned and domestic lockdown restrictions caused supply disruptions.
- The United States was the primary destination for Colombia’s crude oil exports in 2021, receiving 180,000 b/d. Other main destinations included China, Panama, and India.

Natural Gas

Exploration and production

- According to the *Oil & Gas Journal*, Colombia had proved natural gas reserves of nearly 3 trillion cubic feet (Tcf) as of January 2022.²²
- In 2020, Colombia produced 399 billion cubic feet (Bcf) of dry natural gas, and it consumed about 413 Bcf (Figure 4). Colombia predominantly produces associated natural gas (meaning natural gas from oil deposits). 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, but foreign firms, including Repsol, Anadarko, and other North American independents, also operate in Colombia. Among the largest fields, only one—Chuchupa—is located offshore and was operated by Chevron until the sale to Hocol in November 2019.²³

Figure 4. Colombia’s dry natural gas production and consumption



Source: Chart by the U.S. Energy Information Administration, *International Energy Statistics*

- Colombia's oil production requires the majority of the country's produced natural gas (nearly 50%) to be re-injected to bolster recovery efforts, which will become increasingly widespread as producers seek to enhance oil recovery amid declining exploration.²⁴ In addition, the Barrancabermeja and Reficar refineries use natural gas-fired plants to power their daily operations.²⁵
- Colombia has a large shale gas potential; however, only pilot projects are currently allowed. In 2019, the national oil company Ecopetrol entered into a joint venture with Occidental to develop natural gas in the United States' Permian Basin to gain relevant knowledge in shale projects that is likely to be used in Colombia once the ban on fracking is lifted.²⁶
- In November 2020, Ecopetrol announced a climate strategy to reach its sustainability goals, including a 20% emissions reduction by 2030 or zero routine flaring by 2030.²⁷ To achieve this goal, Ecopetrol committed to stop routine flaring at its operations, joining the Global Gas Flaring Reduction Program led by the World Bank.²⁸

Liquefied natural gas (LNG)

- Colombia imports a small amount to fill the gap between domestic production and demand. Concerns about supply reliability prompted the Colombian government to approve the country's first LNG import terminal in November 2014. The facility came online in November 2016. A second LNG import facility, the Pacific Regasification LNG terminal, was proposed in June 2015. The facility will be located near the Pacific coast port city of Buenaventura and could gasify up to 400 million cubic feet a day. According to media reports, the plant is expected to come online in 2026.²⁹
- Like in other South American countries, a significant drought in 2020 led to a fall in hydropower output and an increase in LNG imports to fuel natural gas-fired thermal power plants in Colombia. According to media reports, Colombia's LNG cargos increased over the first half of 2020 compared with the same period in the previous year. The Sociedad Portuaria El Cayao regasification facility received nine LNG shipments between January and May 2020, compared with six shipments in all of 2019.^{30,31}

Coal

- Colombia had 5 trillion short tons of proved coal reserves (mostly bituminous coal) in 2020, the second-largest amount in South America behind Brazil.³²

Exploration and production

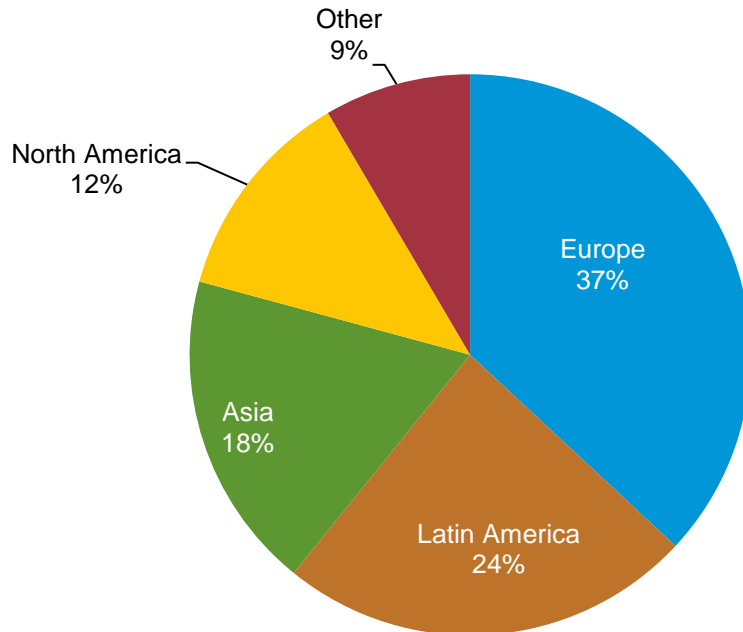
- Colombia produced 54 million short tons (MMst) of coal in 2020, and 9 MMst was consumed domestically. In 2020, coal production fell 42% amid the COVID-19 pandemic and a 91-day strike at a major mine in the north of the country.³³

Trade

- Most of the coal produced in Colombia is exported, making it the fourth-largest coal exporter in the world in 2020 after Australia, Indonesia, and Russia.³⁴

- Coal is the country's second-largest export commodity by value after oil and petroleum products. Colombia exported 75 MMst of coal in 2020, mainly to Europe and Latin America (Figure 5).³⁵

Figure 5. Colombia's coal exports by destination, 2020



Source: Chart by the U.S. Energy Information Administration, based on Global Trade Tracker

- In 2020, Colombia was the largest source of U.S. coal imports, accounting for 71% of total U.S. coal imports, or about 6.1 MMst.

Electricity

- In 2020, Colombia had 17 gigawatts (GW) of installed electricity generation capacity.³⁶
- Colombia generated 69 billion kilowatthours (kWh) and consumed 70 kWh in 2020. Generation mainly came from renewable resources, which accounted for 73% of total generation, nearly all of which was hydropower.³⁷
- Because Colombia predominately uses hydropower as its main source of power generation, droughts can significantly affect the generation mix. Droughts have led to significant demand increases for fossil fuels in periods of low rain. In 2020, thermal generation increased to account for the lower levels of hydroelectricity resulting from low water inputs during the year.³⁸
- The delayed Ituango hydroelectric dam project, known locally as Hidroituango, is expected by Empresas Públicas de Medellín E.S.P. (EPM) to have the first power-generating unit in service in 2022.³⁹ Once the number one unit of Hidroituango begins operation, it will generate the first 300 megawatts of energy for the national interconnected system. The entire project will have a

generation capacity of 2.4 GW in 2025, when it is operating with all eight units. The project will be the largest hydropower plant in Colombia.

- Colombia's non-hydropower renewables sector is not as extensive as its hydropower sector, but Colombia's Mining and Energy Planning Unit (UPME) expects non-hydropower renewables to grow through 2030 because of significant opportunities in solar and wind power.⁴⁰ Colombia has committed to reach 4 GW of renewable electricity generation capacity and to derive 74% of total electricity consumption from renewables by 2030.⁴¹
- Colombia currently does not have enough transmission infrastructure to develop non-hydropower renewables in rural areas where renewable power potential is highest. La Guajira holds the largest wind and solar power potential in the country, estimated at 3.5 GW of wind and 2.5 GW of solar. However, the area is isolated from the country's main power grid.⁴² According to the UPME, transmission and distribution infrastructure is a priority under the government's 2031 expansion plan, namely, increasing power supply and improving the ability to develop new clean power capacity in regions that have not been connected to the national grid.

Trade

- Colombia imports electricity from Ecuador to help meet demand. In 2020, Colombia imported 1.3 gigawatthours of electricity.⁴³ Colombia's and Ecuador's electrical grids are linked by dual 230-kilovolt power lines spanning 132 miles.
- Colombia maintains international electricity interconnections with neighboring countries Ecuador and Venezuela. Exports to Ecuador were 250 MWh in 2020.⁴⁴

Notes

- Data presented in the text are the most recent available as of March 31, 2022
- Data are EIA estimates unless otherwise noted.

Endnotes

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