

# COUNTRY ASSESSMENT REPORT COLOMBIA

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## 1.1 Country Assessment Report

<b>Country Name</b>	Colombia
<b>Introduction</b>	<p>Colombia (officially, República de Colombia) is situated in northern South America and shares land borders with Panama, Ecuador, Peru, Venezuela and Brazil. It has a population of more than 53 million and a GDP over USD 418.000 million (MINCIT, 2025).</p> <p>Colombia has a free-market economy and is part of more than a dozen trade agreements and cooperation organizations such as the OECD. It is also recognized as one of the most biodiverse countries in the world, hosting close to 10% of the planet’s biodiversity (Convention on Biological Diversity, 2020).</p> <p>From a production standpoint, the service sector accounts for the majority of Colombia’s GDP, contributing 66,7%. Some of the subsectors with greatest participation are wholesale and retail, automotive vehicle and motorcycle repair, public administration and defense, Real estate, and professional activities. The industrial sector accounts for 14,5% of the GDP, with greatest participation in mining and quarrying, chemical products, petroleum refining products and fuel blending activities, food and beverage products (DANE, 2024).</p> <p>Overall, the economy’s performance is heavily dependent on energy and mining exports. Its main export products include crude oil, coal, gold, refined oil, coffee, and flowers, to countries like USA, Panama, India, China and Mexico. Meanwhile, imports include refined oil, automobiles and aircraft, telephones, medicines, and corn, from countries like USA, China, Brazil, Mexico, and Germany (MINCIT, 2025).</p> <p>Colombia’s electricity generation is predominantly hydro-based, complemented by natural gas and coal thermal plants that provide reliability during dry periods, with utility-scale solar growing in recent years. In remote non-interconnected zones, diesel remains common but is increasingly hybridized with renewables.</p>

## 1.2 Electrical Generation and Demand

<b>Generation</b>	<b>Technology</b>	<b>Capacity (MW)</b>
	Wind	0
	Hydro	13.218
	Fossil/Thermal	6.080
	Biomass	200
	Solar	1.961
	<b>Total</b>	<b>21.460</b>
<b>Demand</b>	<b>Sector</b>	<b>Demand (GWh)</b>
	Residential <sup>1</sup>	56.540
	Commercial/Service/Public Sector	4.765
	Transport	574
	Industrial	11.214
	Primary Activities	8.527
	<b>Total<sup>2</sup></b>	<b>82.909</b>

**Generation:** As of December 2024, the Net Effective Capacity in the National Interconnected system (NIS) reached 21.460 MW, of which 15.391 are renewable and 6.069 non-renewable. During 2024, 71% of the electricity generation came from

<sup>1</sup> Regulated market used as proxy: includes households, small commercial users, and small public entities; excludes non-regulated large consumers.

<sup>2</sup> The difference with the sum of the categories is due to the generators' own consumptions.

renewable sources. Outside the NIS, non-interconnected zones add 335 MW of installed capacity (IPSE, 2025), predominantly from diesel (about 78%) with the remainder supplied by non-conventional renewables, mostly solar.

**Demand:** The country's electricity demand during 2024 was 82.909 GWh. Consumers can be classified as users of the regulated and non-regulated markets. The regulated market includes residential consumers and small businesses and industries. The non-regulated market includes larger commerce and industries that consume an average of 0.1 MW (55 MWh per month) per facility and choose to freely negotiate some components of the electricity rate.

### 1.3 Electrical Interconnection and Import/Export

Connected country	Capacity (MW)	Annual import from country (GWh)	Annual export to country (GWh)
Ecuador	485	503 <sup>3</sup>	729
<b>Additional information</b>	Colombia has the capacity to import and export energy with Ecuador. There are also electrical interconnection lines with Venezuela, although these are not currently operational. Additionally, there has been a project for an electrical interconnection between Colombia and Panama, which is still in the development phase and has been for quite some time.		

### 1.4 Market Structure

*Complete based on latest available data. This section should describe the structure of the national electricity market and any existing markets for environmental attribute products, including I-REC(E) or other certificate systems. Include key characteristics such as the types of electricity generation (e.g., hydro, wind, solar, thermal), market participants (generators, distributors, retailers), how electricity is traded or sold (e.g., wholesale, bilateral contracts, power pools), and the level of market liberalization. Reference any relevant statistics on renewable energy generation, installed capacity, and market share of different energy sources.*

The structure of the electricity market in Colombia includes the entities that are responsible for developing policies (Ministerio de Minas y Energía), planning (UPME), regulation (CREG), operation (XM), surveillance and control (Superintendencia de Servicios Públicos Domiciliarios), in addition to the participants in the market's production chain: companies in generation, transmission, distribution, and commercialization/retail.

The generation portfolio is hydro-dominated, complemented by thermal plants (gas and coal) that provide flexibility and security of supply, with a rising contribution from solar. Non-conventional renewables have expanded quickly since 2022, and several additional GW of solar and wind are expected over the next decade.

The regulatory framework is based on Laws 142 (Public Services Law) and 143 (Electricity Law) of 1994, which represent the last major reform of the power sector and establish its current regulatory framework. Since their enactment, Colombia has had a liberalized energy market, which is characterized by an unbundled generation, transmission, distribution, and commercialization scheme to segregate the power sector activities and markets (with some exceptions) (CREG, 2024).

Wholesale of electricity has two main mechanisms: (i) a centralized spot market ("*Bolsa de Energía*"), operated as a single-zone, hourly auction based on day-ahead offers and centralized economic dispatch; and (ii) bilateral contracts signed between generators and retailers, which are registered with the market operator. Additionally, Colombia's market includes the "*Cargo por Confiabilidad*", a reliability charge that remunerates generators committed to supplying firm energy during scarcity periods, ensuring long-term supply adequacy and investment signals for new capacity.

Regarding markets for environmental attribute products, The I-REC Standard is fully operative on a voluntary basis in the country, with Fundación ECSIM acting as local issuer. In addition, Ecogox, a voluntary renewable energy certificate platform from the market operator, XM, is also operational in the country.

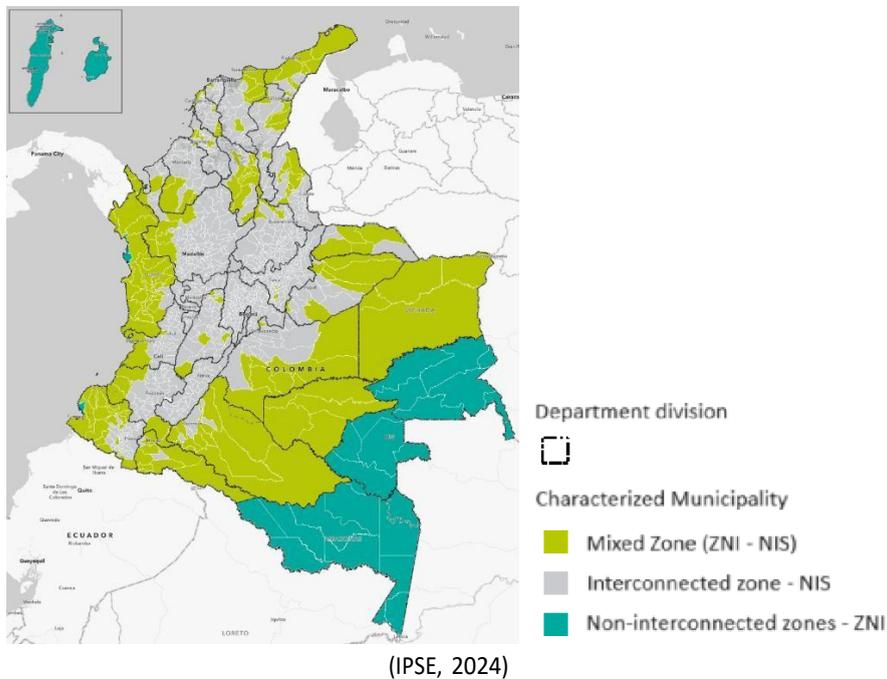
Access to electricity can be distinguished by the NIS (National Interconnected System) and ZNI (non-interconnected zones). Around 53% of the national territory is considered ZNI, although these areas have a very low population density and account for

<sup>3</sup> Average value for the 2020–2024 period

a small portion of the users. Energy in ZNI is mostly produced with Diesel (~80%), while the rest uses non-conventional sources of renewable energy (mostly PV solar installations) (IPSE, 2024).

Regulation in the country seeks to increase the hours of provision of electric energy service and encourages Non-Conventional Sources of Energy in the ZNI, seeking a reduction in rates and environmental impact (Superintendencia de Servicios Públicos Domiciliarios, 2024).

The following image shows the distribution of the ZNI and the NIS:



## 1.5 Responsible Government Department

The Ministry of Mines and Energy is the leading institution in Colombia’s energy sector. Its mission is to formulate and adopt policies aimed at the sustainable use of mining and energy resources.

The Regulatory Commission for Gas and Energy (CREG) is in charge of regulating the market for the efficient supply of energy. It defines tariff structures for consumers, transmission charges, and standards for the wholesale market, guaranteeing the quality and reliability of the service and economic efficiency. It also provides regulations that ensure the rights of consumers, the inclusion of environmental and socially sustainable principles, improved coverage and financial sustainability for participating entities.

The Unit for Mining and Energy Planning (UPME) is a unit of the Ministry of Mines and Energy and is responsible for the study of future energy requirements and supply situations, as well as drawing up the National Energy Plan and Expansion Plan.

XM operates the National Interconnected System (NIS), for which they perform the functions of National Dispatch Center (CND), Administrator of the Commercial Exchange System (ASIC) and Account Liquidator of charges for Use of the networks of the National Interconnected System (LAC). In addition, XM manages short-term International Electricity Transactions (TIE) with Ecuador.

The Superintendence of Domestic Public Services (SSPD) oversees and monitors the behavior of agents and sanctions the

violations of laws and rules.

The Ministry of Environment and Sustainable Development leads environmental policy and issues environmental norms and key guidelines.

ANLA (National Environmental Licensing Authority) evaluates, grants, and monitors environmental licenses and permits for projects under national competence, including large-scale energy facilities.

Energy attribute tracking systems operate in Colombia on a voluntary basis and are not subject to regulation by CREG. As a result, renewable energy transactions depend on market-based tracking platforms instead of mandatory compliance schemes.

## 1.6 Existing/Planned Legislation

The existing electric energy legislation includes that which regulates the main and complementary activities of the sector, the coverage of service provision, the scheme of subsidies and contributions, special funds, the rational and efficient use of energy, the Promotion, development, and use of non-conventional energy sources (FNCE), among other topics (MinMinas, 2024).

Laws 1715/2014 and 2099/2021 (known as the Energy Transition Law) seek to provide benefits and incentives for generation with Non-Conventional Renewable Energy Sources (FNCER), which include biomass, small hydro (<50 MW), wind, geothermal, solar and sea; and non-conventional energy sources (FNCE), which also include green and blue hydrogen. These incentives include a special deduction in the determination of income tax, accelerated asset depreciation (deducted for tax purposes), exclusion of relevant goods and services from Value Added Tax (VAT) and import tariffs exemptions. These same laws (and those that modify or regulate them) promote Distributed Energy Resources, encompassing demand response, electric vehicles, Distributed Generation, Electric Energy Storage Systems and Small and Large Scale Self-Generation, among others.

Thanks to these incentives allocated towards renewable and non-conventional energies, there is an augmented engagement of renewables within the country. Furthermore, I-REC holds the potential to enhance this momentum by furnishing an additional economic stimulus to these technologies.

In particular, the certification granted by UPME of tax incentives for Green and Blue Hydrogen that take energy from the grid, includes a requirement for a bilateral supply contract from FNCER and a Renewable Energy Certificate (REC) issued by a third party under recognized and verifiable international standards through a public registry consultation platform (section 5.3.7 of UPME Resolution 319/2022). This practice effectively acknowledges RECs as acceptable evidence for tax-incentive certification in hydrogen projects that draw electricity from the grid.

## 1.7 Environmental and Renewable Electricity Legislation

Law 2169/2021 (known as the Climate Action Law) defines goals on carbon neutrality, climate resilience and low-carbon development in the country. Currently, the goal is to reduce GHG by 51% by 2030 and achieve carbon neutrality in Colombia by 2050. Measures to reach the goal include energy efficiency, diversification of the national energy matrix and the transformation of the Non-Interconnected Zones (ZNI), through the dynamization of electrical generation and self-generation using Non-

Conventional Sources of Renewable Energy (FNCER), as well as increasing coverage for the provision of electrical energy service with reliable technologies with a lower emission factor.

Law 2099/2021 (energy transition law) expands the benefits and funds defined in Law 1715/2014 for FNCER, and includes these benefits for energy efficiency, green and blue hydrogen, and carbon capture.

In that same Law 2099/2021, the article 54 creates a “clean production label” for companies and industry in general. The purpose of this is to encourage the use of non-conventional sources of renewable energy (FNCER) in companies and industries, which will be assigned to all those who use only non-conventional sources of renewable energy as energy sources in production processes and invest in improving their energy efficiency. This article is still to be regulated, but in ECSIM’s opinion, its effective implementation should be supported by tracking mechanisms such as Renewable Energy Certificates (RECs).

Resolution MME 40715/2019, modified by Resolution MME 40060/2021 established a contracting obligation for retailers to buy a minimum portion of non-conventional renewables sources (FNCER). Ten percent (10%) of the annual energy purchases intended to serve end users (both regulated and non-regulated) should come from Non-Conventional Sources of Renewable Energy (FNCER), through long-term contracts. According to Resolution CREG 101008/2023, as of September 2022, only 13% of registered retailers reported compliance with the percentage of FNCER energy provided in the regulation, so other mechanisms are being established for this compliance, including FNCER auction calls.

## 1.8 Existing/Planned Certificate or Support Systems

The I-REC Standard is fully operative on a voluntary basis in the country. Fundación ECSIM acts as local issuer of I-REC Certificates in Colombia. In addition, Ecogox, a renewable energy certificate platform from the market operator, XM, is also operational.

Regarding reporting initiatives in Colombia, efforts have been made to implement standardized reports related to sustainability. One of them is the SDG Tracker initiative, a voluntary platform to measure the contributions of the private sector to the SDGs, containing indicators based on GRI standards.

Colombia’s Financial Superintendence issued External Circular 031 of 2021, which requires issuers of securities to disclose social, environmental, and climate-related information in their periodic reporting using international standards like TCFD and SASB. External Circular 015 of 2025 also sets out binding instructions for Colombian supervised financial institutions to identify, assess, and manage environmental and social risks (including climate-related risks) across governance, risk policies, credit origination, and monitoring.

The superintendence of corporations issued a circular (100-000010 del 21 de noviembre de 2023) in which it included a series of recommendations for companies to incorporate International Reporting Standards within the sustainability framework. According to the recommendations, the report must be carried out under International Standards that meet the criteria of understanding, reliability, recognition, and transparency. It is expected that over time these recommendations will become reporting obligations.

Colombia’s Mandatory Greenhouse Gas Emissions Report (ROE) is a national reporting system created by Law 2169 of 2021 as part of the environmental information system (SIAC). It is designed for organizations to report direct and indirect GHG emissions through a dedicated digital platform administered by the Ministry of Environment. As of late 2025, the Ministry launched a pilot phase (Nov–Dec 2025) to test functionality and gather feedback prior to full roll-out; formal mandatory operation will follow the Ministry’s implementing regulation.

## 1.9 Extent of Engagement with Government

In 2015, UPME (Colombia's energy planning institution) published the report "*Integración de las energías renovables no convencionales en Colombia*", which included a study on "Promoting market criteria for non-conventional renewable energies through the removal of barriers to their development." The report highlights that, among the main instruments used internationally for the direct and indirect promotion of renewable energies, are Renewable Energy Certificates (RECs).

I-REC representatives have met authorities from the Ministry of Environment and the Ministry of Mining and Energy to introduce them to the I-REC Standard. Both entities welcomed the operation of the I-REC Standard in the country on a voluntary basis. In addition, UPME supported the I-REC Workshop organized in Feb 2018 by presenting at the event.

In July 2024, representatives from ECSIM and Ecogox met with UPME to discuss topics related to the residual mix emission factor and its connection to UPME's current methodology for calculating the grid emission factor.

## 1.10 Expected Response from Government

The government is expected to be supportive of the voluntary, market-led implementation of renewable energy attribute tracking systems. Mandatory schemes are not envisaged, and any formalization would require further consultation with no stated timeline.

## 1.11 Proposed Restrictions

Facilities may be registered under other tracking systems; however, they must not receive more than one production attribute tracking certificate for any individual unit of electricity produced.

ECSIM monitors Energy Tracking Schemes and Carbon Offset Markets on an ongoing basis to ensure the integrity of certificate issuance. As part of this process, ECSIM reviews registered facilities and, when applicable, cross-checks issuance periods in other schemes. For facilities also registered with Ecogox, ECSIM verifies the relevant platform to confirm that the same production period has not been previously issued before approving any issuance request.

## 1.12 Any Other Relevant Information

### *RE Market Potential:*

Colombia is well-positioned to scale renewables. Solar has expanded rapidly while wind growth is expected as key transmission enablers in "La Guajira" region advance in licensing and construction. Public documents also mention geothermal prospects and

biomass/small-hydro opportunities, suggesting a diversified pipeline beyond solar (MinMinas, 2024).

*Historical support or development of renewables in the country/region:*

Policy instruments have included long-term contracting auctions in 2019 and 2021, which provided price and offtake visibility for new FNCER capacity. In parallel, the government has promoted renewable substitution in non-interconnected zones and consolidated financing vehicles, most recently creating FONENERGÍA, a public fund that helps bring electricity and gas to more people, improve the quality of these services, and support projects that make the energy system more reliable and sustainable.

*Demand-side market potential or strategic nature of market development:*

Corporate procurement of environmental attributes operates on a voluntary basis, enabling renewable consumption claims without sector-specific regulation. Notably, UPME’s incentive-certification rules for grid-sourced green hydrogen accept renewable attribute certificates from third parties under recognized standards, which could reinforce voluntary demand.

*Analysis of political disruptions or market risks:*

Recent decrees aimed at tariff stabilization and increased long-term contracting reflect price sensitivities and could reshape contractual strategies, indirectly affecting REC availability and pricing. These measures are not REC-specific but warrant monitoring.

*Analysis of regulatory risks, including linkages with carbon markets and support systems:*

Carbon-market linkages are material. The carbon tax permits “non-causation” via offsets but, after tax reforms, this relief may not exceed 50% of the liability. Transparency and registry integrity are being strengthened through the Mandatory Greenhouse Gas Emissions Report (ROE) and the reactivation and modernization of RENARE during 2024–2025, which could affect how offsets and other instruments (perhaps including RECs) are documented and disclosed.

<b>1.13 Author</b>			
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