Solar, wind power and energy communities in Colombia: 2025 policy overview

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Key Messages

- **In Colombia, installed solar and wind capacity represented around 9% of the total electricity matrix in 2024, a significant increase from the 1.5% recorded in 2022. This growth corresponds to the expansion of installed solar capacity.**
- **Over the next five years, there could be a sharp increase in solar and wind capacity. Between 2023 and 2033, 13.5 GW of solar projects and 2.8 GW of wind projects have been approved by the Mining and Energy Planning Unit (UPME).**
- **The National Development Plan 2022–2026 promotes the concept of energy communities as a key pillar for energy democratization, aiming to establish 20 000 by 2026.**
- **Investment in renewable energy in Colombia fell by nearly 70% between 2022 and 2023 due to changes in tax incentives, high capital costs, and pressure to reduce electricity prices, among other factors. Achieving the goals of the National Energy Plan (PEN) 2022–2052 for solar and wind capacity requires unlocking up to USD 92.4 billion.**
- **The expansion of wind and solar projects in Colombia faces justice and equity challenges which require concrete strategies to ensure meaningful participation and tangible benefits for local communities. The Just Energy Transition Roadmap outlines strategies to address these challenges.**

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This document provides an overview of wind and solar energy in Colombia[1] at the beginning of 2025.[2] It begins by exploring the current state of solar and wind energy in the country, as well as growth prospects. It then presents the institutional framework, key policies, and regulatory environment. The following sections offer an overview of the financing context, as well as environmental, socioeconomic, and equity-related aspects. The document concludes with a commentary on future outlooks.

1 This document updates, expands upon, and supersedes the publication Solar and wind power in Colombia: 2022 policy overview 2022.

2 Throughout this text, when we refer to renewable energy, unless otherwise specified, we mean renewable energy sources other than large-scale hydropower, which in Colombia are referred to as Non-Conventional Renewable Energy Sources.

Image: Wuimpalaa water supply system in the municipality of Maicao, La Guajira © Eduar Monsalve / SEI

Current state of solar and wind energy in Colombia and growth prospects

Colombia has significant solar and wind energy potential. Estimates included in government roadmaps indicate onshore and offshore wind energy potential of 35 GW and 50 GW respectively. The estimated technical-economic potential for solar energy is approximately 8000 GW for projects larger than 50 MW, and 7.4 GW for projects smaller than 5 MW. These figures far exceed Colombia's current installed capacity of 21.4 GW.

La Guajira is key to the development of wind energy in Colombia due to its world-class resources: unidirectional winds, an average wind speed of 9.8 m/s, and capacity factors close to 65%, representing between 18 and 21 GW of Colombia's wind potential. In contrast, solar energy potential is distributed across the entire country.

By the end of 2024, solar energy capacity reached 1928 MW, accounting for 9% of the total installed capacity. In contrast, no wind projects were recorded in the system's net effective capacity.[3] However, it is important to note that 31.9 MW of wind projects and 80.4 MW of solar projects were in the testing phase. To date, nearly 1.3 GW of wind energy projects have been discarded at various stages of development, including projects under construction.[4] In some cases, wind project developers have chosen to auction off equipment related to cancelled wind farms.

According to UPME, as of December 2024, 32 solar projects were under construction, totaling 5022 MW, along with 9 wind projects totaling 1571 MW. Additionally, UPME has approved around 18.7 GW of capacity, of which 13.5 GW correspond to solar projects and 2.8 GW to wind projects, with expected commissioning dates between 2023 and 2033.

Institutional framework

More than a dozen public institutions have jurisdiction over the renewable energy sector in Colombia. The key actors are the Ministry of Mines and Energy (MME), the Mining and Energy Planning Unit (UPME), the Energy and Gas Regulatory Commission (CREG) and the transmission system operator (XM). Environmental licensing authorities also play an important role, including the National Environmental Licensing Authority (ANLA) and the Regional Autonomous Corporations (CARs). For offshore wind energy, the Maritime Authority (DIMAR) and the National Hydrocarbons Agency (ANH) coordinate the planning and allocation of maritime areas.

3 The Net Effective Capacity (CEN) is the maximum amount of power that a generation unit or plant can supply under normal operating conditions to the National Interconnected System (SIN) at the point of connection or commercial boundary.

4 Windpeshi (205 MW), Tumawind (208 MW), and Chemesky (99 MW), led by Enel Colombia, have been indefinitely suspended. Celsia is evaluating alternatives for the Acacia (80 MW) and Camelias (250 MW) projects. EDP Renewables has decided to cancel the remaining investments in the Alpha (212 MW) and Beta (280 MW) projects.

Main policies and legislative framework

The legal framework for renewable electricity in Colombia dates back nearly 30 years, established by the Electricity Law (Law 143) and the Public Services Law (Law 142), both enacted in 1994. The first legislation to include specific regulations and incentives for renewable energy was Law 1715 of 2014, later updated by the Energy Transition Law (Law 2099 of 2021). The incentives include: (1) income tax deduction of 50% of the total investment value, applicable to up to 50% of taxable income over a period of up to 15 years (Art. 11); (2) VAT exemption for equipment and services (regulated by UPME Resolution 319 of 2022); (3) exemption from import duties for renewable energy equipment not produced locally (Art. 13); and (4) accelerated depreciation of up to 33.33% annually for investments in renewable energy (Art. 11).

Several planning documents govern Colombia's electricity sector, including the National Energy Plan, the Generation and Transmission Expansion Plan, and the Indicative Plan for the Expansion of Electricity Coverage. The current government's goal is to reach 6 GW of installed renewable energy capacity by 2026.

The National Energy Plan (PEN) 2022–2052 defines Colombia's energy policy and includes five different scenarios that consider solar and wind energy, both for grid-connected and off-grid areas. As of March 2025, the updated PEN 2024–2054 is under development. Unlike the PEN, which focuses on identifying technological options for energy production and consumption and their future impact, the scenarios presented in the Just Energy Transition Roadmap, launched in 2024, propose development pathways to assess and implement the most viable short- and medium-term options across different sectors. It remains to be determined how the energy scenarios proposed by the Just Transition Roadmap will be integrated into the updated PEN.

Between 2023 and 2030, the Just Energy Transition (TEJ) scenario, the central bet of the current government's strategy, projects reaching a total installed capacity of 15.2 GW in solar energy, 2.95 GW in onshore wind, and 3 GW in distributed generation. Offshore wind capacity is expected to be incorporated with 7 GW between 2030 and 2040. By 2050, solar capacity would reach 25 GW, onshore and offshore wind 7 GW and 8.4 GW respectively, while distributed generation capacity would reach 12 GW.

Meanwhile, UPME's Indicative Generation and Transmission Expansion Plans, which are updated annually, define electricity planning over a 15-year horizon. The 2023–2037 Generation and Transmission Expansion Plan outlines scenarios for 2037 ranging from 5.6 to 8.1 GW of wind energy and from 7.4 to 11.4 GW of solar energy.

The renewable energy target established by Law 1955 of 2019, and later by MME Resolution 40060 of 2021, mandates a 10% share of electricity supply from renewable sources (excluding large hydropower plants) starting in 2023. Resolution 40590 of 2019 from the MME allowed the implementation of long-term power purchase agreements and the introduction of renewable energy auctions. However, in 2023, the Council of State annulled Decree 570 of 2018, which had enabled these renewable energy auctions. The long-term contracts awarded to date will not be revoked.

MME Resolution 40284 of 2022 (modified by MME Resolution 40368 of 2024) defines the competitive process for granting Temporary Occupation Permits (POTs) over maritime areas for offshore wind energy projects as part of the first Offshore Wind Colombia Round, which aims to allocate maritime areas for the installation of between 1 and 3 GW. POT assignments are expected in the first quarter of 2026. These permits will be valid for eight years, after which the holder may apply for a 30-year maritime concession, with the possibility of extension.

CREG Resolution 075 of 2021 regulates grid access for renewable energy projects through a "one-stop shop" approach. Self-generation activities are classified according to installed capacity: small-scale (less than 1 MW), large-scale (between 1 and 5 MW), and distributed generation (≤1 MW), and are regulated by Resolution 174 of 2021. Ecopetrol, the country's oil and gas company, is also the main self-generator. By the end of 2024, its renewable energy capacity is expected to exceed 500 MW, with targets of 900 MW for self-generation by 2025 and 1 GW by 2030.

The 2022–2026 National Development Plan (PND) introduces the concept of energy communities as a key pillar for energy democratization (see Box 1).

BOX 1: ENERGY COMMUNITIES

The 2022–2026 National Development Plan (PND) defines energy communities as organized communities formed through an agreement among natural and/or legal persons, either public or private, who cooperate through a contract or associative arrangement to carry out activities related to the generation, commercialization and/or efficient use of energy through renewable energy sources, renewable fuels, and distributed energy resources. The government's goal is to establish 20 000 energy communities by 2026.

The rules for the establishment and operation of energy communities were regulated by MME Decree 2236 of 2023. Other relevant regulations include MME Resolution 40137 of 2024, which sets the criteria for targeting and allocating public resources to energy communities. This resolution also creates two entities: the Energy Communities Focalization Committee, responsible for determining whether applicant communities meet the required criteria; and the Administrative Committee for Energy Communities, in charge of defining the allocation of resources. Meanwhile, MME Resolution 40136 of 2024 establishes the Single Registry of Energy Communities (RUCE), and UPME Resolution 501 of 2024 sets maximum limits on capacity and dispersion for collective self-generators and collective distributed generators within energy communities. CREG Resolution 101 072 of 2025 enables the creation of energy communities by allowing groups of users to collectively generate, consume and sell renewable energy. Academia has also contributed by developing guidelines for the development of energy communities in Colombia.

Complementing the energy communities approach is the "Energy Municipalities and Territories" initiative, which is part of the government's Just Energy Transition (TEJ) policy. It targets Departments, Municipalities and Districts interested in developing 1 MW agrivoltaics farms and 130 kW energy fields, with the goal of reducing electricity bills for local governments and freeing up public resources.

Financing

In 2022, Colombia ranked as the third country in Latin America with the highest investment in renewable energy (USD 1.2 billion), following Chile (USD 1.6 billion) and Brazil (USD 24.7 billion). However, in 2023, clean energy investment in Colombia was approximately USD 410.2 million, representing a decline of nearly 70% compared to 2022. Factors contributing to this decrease include changes in tax incentives and fiscal regimes, the high cost of capital compared to other countries in the region, and pressure to ensure lower electricity prices, among others.[5] According to estimates from the World Economic Forum, achieving the PEN targets of up to 38.6 GW of wind and 30.9 GW of solar installed capacity by 2052 would require around USD 92.4 billion in investment.

The Electricity Coverage Expansion Plan 2019–2023 estimates that the investments required to achieve universal access to electricity in Colombia amount to COP 13.96 trillion (approximately USD 3.4 billion). This includes investments in renewables of around USD 2.2 billion (COP 6.84 trillion in individual solar systems and COP 1.93 trillion for isolated solutions with microgrids/energy communities).

Public financing at the national level for renewable energy comes from various sources. The Fund for Non-Conventional Energy and Efficient Energy Management (FENOGE) was created by Law 1715 of 2014, regulated through Decree 1543 of 2017 and Resolution MME 40104 of 2021, and has been in operation since 2018. FENOGE is funded through a COP 0.4 tariff per kWh dispatched in the Wholesale Energy Market, as well as investments from national and multilateral banks, donations, and public or private funds.

The Single Fund for Energy Solutions (FONENERGÍA), created by Law 2099 of 2021 and regulated by Decree 1580 of 2022, replaces the funds FAER, FAZNI, PRONE, and FECFGN. The revenues from these funds, which now make up FONENERGÍA, are governed by Laws 1753 of 2015 and 401 of 1997. Tariffs transferred to FONENERGÍA correspond to COP 2.10 and COP 1.90 per transported kWh for FAER and PRONE, respectively, and COP 1.90 per transported kWh for FAZNI. Other sources of financing, such as contributions from the Nation and international cooperation, may also provide resources. Its objectives include expanding energy coverage and improving the service quality.

The General Royalties System (SGR), established by Constitutional Act 05 of 2011 and regulated by Law 2056 of 2020, finances renewable energy projects. According to Law 2036 of 2020, the SGR can also fund equity participation by subnational entities and Indigenous territories in renewable energy projects.

IPSE's fund for energy access implements rural electrification projects, including initiatives based on renewable energy. The Territorial Development Bank (FINDETER) finances infrastructure for sustainable development, including renewable energy, through the "Reactiva Colombia" program with COP 300 billion (approximately USD 73 million), and specific financing for the "Energy Municipalities and Territories"

5 For more details, see the World Economic Forum report "Mobilizing Clean Energy Investment in Colombia: Community Solutions to Help Accelerate Financing," developed in collaboration with the Ministry of Mines and Energy, the Ministry of Finance and Public Credit of Colombia, Ecopetrol, and Marsh.

strategy reaching COP 1.7 trillion (approximately USD 412 million). The MME and Asobancaria are working on a financing line aimed at solar systems for small retailers ("tenderos y tenderas"), low-income households, and energy communities.

In 2023, Colombia accessed USD 70 million in concessional financing from the Climate Investment Fund's (CIF) Renewable Energy Integration (REI) program. These funds are expected to mobilize at least an additional USD 280 million from multilateral and national development banks, as well as from the public and private sectors. In 2024, Colombia announced a Socio-Ecological Transition Portfolio aimed at attracting USD 40 million in investments, of which USD 14.5 million would be allocated to the expansion of renewable energy and low-carbon reindustrialization.

The "Works for Taxes" mechanism, regulated by Decree 1915 of 2017, allows companies to pay up to 50% of their income tax through development projects in conflict-affected and high-poverty areas (as defined by Law 2155 of 2021). For 2024, the quota to use this mechanism was increased to COP 1 trillion (approximately USD 242 million), compared to COP 800 billion in 2023 (approximately USD 194 million) and COP 500 billion in 2022 (approximately USD 121 million). This mechanism has been used to finance solar energy solutions and satellite internet, as well as support the energy communities strategy.

The national government considers a variety of instruments to finance energy communities, including the General Budget of the Nation, FENOGE, the SGR, and Works for Taxes, among others. Other current financing alternatives include loans, financial leasing, power purchase agreements, and crowdfunding. Organizations have developed tools to support the financial and economic structuring of energy communities in Colombia.

Environmental, socioeconomic, and equity aspects

Law 1715 of 2014 mandates the harmonization of environmental requirements (introduced by Law 99 of 1993 and regulated by Decree 2041 of 2014), the development of environmental impact assessments (EIAs), and the establishment of an expedited evaluation cycle for renewable energy projects. EIA procedures for solar and onshore wind projects are regulated by Resolution 1670 of 2017 and

Resolution 1312 of 2016, respectively. According to ruling C-280 of 2024, EIAs must include an analysis of climate change impacts starting in August 2025.

Decree 0852 of 2024 assigns ANLA the responsibility of licensing projects larger than 50 MW, while the CARs are in charge of licensing projects with capacities between 10 MW and 50 MW. Projects smaller than 10 MW do not require an environmental license, and Decree 2462 of 2018 exempts renewable energy projects from submitting an Environmental Alternatives Diagnosis (DAA). Decree 1275 of 2024 grants Indigenous authorities' powers over territorial environmental planning.

Free, Prior and Informed Consent (FPIC) is incorporated into Colombian legislation through Law 21 of 1991, with procedures established in Presidential Directives No. 08 of 2020, 10 of 2013, and 01 of 2010. Additionally, more than a dozen rulings by the Constitutional Court, such as T-129 of 2011, SU-123 of 2018, T-426 of 2014, and C-369 of 2019, have further developed the consultation process. Exercising their autonomy, Indigenous communities have addressed regulatory gaps in the consultation process by generating Autonomous Consultation and Consent Protocols. Likewise, civil society has developed guidelines for engagement between companies and Indigenous communities.

In Colombia, the mandatory distribution of benefits from renewable energy projects is primarily carried out through transfers from the electricity sector ("transferencias del sector eléctrico"). These are financial resources that must be delivered by electricity-generating companies to the municipalities and communities where power plants are located. The amount corresponds to 1% of the gross energy sales from plants exceeding 10 MW. However, for operating plants located in areas with higher average wind speeds (>4 m/s at 10 m height) and higher average annual radiation (>5 kWh/m²/day), Law 2294 of 2023 establishes that these transfers will gradually increase from 1% to 6% for new plants, and to 4% for operating plants. Transfers will be 100% to municipalities and districts, except in the presence of ethnic communities, in which case municipalities will receive 40% and communities 60%. According to current regulations, these funds must be allocated to the execution and/or co-financing of infrastructure projects, public services, basic sanitation, and/or drinking water projects defined by the recipient communities,[6] as well as to investment projects outlined in the municipal development plan for beneficiary municipalities.

The "voluntary" distribution of benefits often overlaps with corporate social responsibility (CSR) initiatives and is generally achieved through bilateral agreements between the company and the community, within the framework of local consultations and FPIC processes. During FPIC, the project's impacts are also discussed, and management measures are proposed and agreed upon to prevent, correct, mitigate, or ultimately compensate for such impacts. Compensation measures are actions aimed at redressing and making restitution for negative impacts or effects on the biotic, abiotic, or socioeconomic.[7] In practice, voluntary benefits and compensations often overlap, creating ambiguity in their distinction. They are frequently reflected in the allocation of an additional percentage of annual sales, specific amounts per megawatt or wind turbine installed, and/or a percentage of carbon market revenues, among others.

The government estimates that by 2050, the solar and wind energy sectors will have approximately 200 000 and 25 000 direct employees, respectively. According to Law 2099 of 2021, the generation, distribution and commercialization of renewable energy projects must prioritize the hiring of local residents for both skilled and unskilled positions. Department-level regulations also establish minimum quotas for local labor hiring, although no enforcement mechanisms were identified.

6 Decrees 1540 and 1539 of 2024 regulate governance with ethnic participation for transfers allocated to Indigenous communities and to Black, Afrocolombian, Raizal, and Palenquero communities, respectively.

7 While the biotic component has defined technical and procedural guidelines set out in the Biotic Component Compensation Manual, adopted through Resolution 256 of 2018, the management of actions aimed at addressing impacts on the abiotic and socioeconomic components lacks specific regulation

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In Colombia, there are no official data available on the gender distribution of employees in the renewable energy sector. Studies indicate the exclusion of women, with their roles often limited to food provision and caregiving for those working directly in operations. The MME has developed guidelines to promote, strengthen and coordinate initiatives that incorporate a gender perspective from both labor and community dimensions.

Reflection and perspectives

There is strong optimism around the creation of energy communities, driven by their potential to decentralize energy access and strengthen local participation, although their viability depends on clear rules and adequate funding sources. On the other hand, solar energy has grown rapidly in the country, becoming the fastest expanding renewable sources. This accelerated pace raises questions about its effective integration into the energy system and its long-term sustainability. In contrast, wind energy faces a more challenging outlook, with difficulties in meeting proposed targets, requiring clear strategies to overcome technical, social and investment barriers. In this context, the future of renewable energy will depend on how these challenges are managed and on the country's ability to balance economic viability, system stability and equity in the distribution of benefits.