

Solar and wind power in Colombia: 2022 policy overview



SEI policy brief

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Key messages

- Colombia has world-class wind and solar energy potential and recent regulatory updates have enacted a robust framework of incentives. However, as of 2022, solar and wind have an operating installed capacity of just about 1.5% of the capacity mix.
- The next five years could see a sharp increase in solar and wind capacity. If the approved capacity effectively enters into operation, shares of solar and wind energy in Colombia's capacity mix will increase to nearly 40% by 2027.
- The expected large deployment of wind and solar resources in Colombia can be used to leverage creation of local employment, gender equality and benefits to local communities and Indigenous peoples. This will require strengthened policy frameworks to avoid negative effects on these areas.

This brief provides a snapshot of the renewables landscape for wind and solar in Colombia as of 2022¹. We discuss current legislation and financing intended to help move the country closer to its potential for renewable energy sources, as well as regulation regarding societal and environmental impacts. We also provide an overview of institutions and civil society stakeholders active in renewables.

Colombia's rich wind and solar energy potential is estimated at 30 GW and 32 GW, respectively, according to [SER Colombia](#), which is more than Colombia's current installed capacity of 18.8 GW. Of particular interest is La Guajira region, with world-class wind resources (average wind speeds of 9.8 m/s) and 18 GW of Colombia's wind power potential. However, this potential has remained to a large extent untapped: the country's operating installed capacity for solar in 2022 was 290 MW and for wind 18.4 MW representing 1.5% and 0.1% of the capacity mix, respectively.

Key policies and regulations

Energy policy in Colombia is defined by the [National Energy Plan \(PEN\) 2020–2050](#), which includes solar and wind in its different scenarios, including for both grid-connected and unconnected areas. Electricity planning is outlined by the 15-year [Generation and Transmission Expansion Plans](#), which are updated yearly.

Over a dozen public institutions are involved in renewable energy in Colombia.

The key actors include the [Ministry of Mines and Energy \(MME\)](#), the Planning Unit

¹ Throughout this text, when we refer to renewables, unless indicated otherwise, we mean renewable energy sources other than large-scale hydropower. Renewables other than large-scale hydropower are referred to in Colombia as non-conventional renewable energy sources.

for Mines and Energy (UPME), the Energy and Gas Regulation Commission (CREG), and the transmission system operator (XM). The corresponding environmental licensing authorities are also key: the National Authority (ANLA) for projects greater than 100 MW and Regional Authorities (CARs) for projects less than 100 MW. The technical entity in charge of supporting policy formulation and implementation in the mining and energy sectors is UPME, as indicated in several [planning documents](#), such as the National Energy Plan, the Generation and Transmission Expansion Plan, and the Indicative Plan for the Expansion of Electricity Coverage.

The 2020–2034 Generation and Transmission Expansion Plan considers 2034 scenarios ranging from 3700 to 4578 MW of wind power and 1963 to 4662 MW of solar power. The 2019–2023 Electric Coverage Expansion Plan estimates that the investments needed to achieve universal access to electricity in Colombia include COP 3.2 trillion (about USD 665 million) in solar home systems. The possibility of a 100% renewable [energy roadmap](#) for Colombia has been proposed by civil society and academic actors.

While the legal framework for renewable electricity in Colombia is nearly 30 years old, provided by the 1994 Electricity Law (Law 143) and Public Utilities Law (Law 142), the first legislation to include specific regulation and incentives for renewables was Law 1715 of 2014, updated by the Energy Transition Law (Law 2099 of 2021). The latest incentives include (1) income tax deduction of 50% of investment value for up to 50% of taxable income for up to 5 years (extended to 15 years by Law 1955 of 2019 and ratified by Law 2099 of 2021); (2) VAT exemption for renewable energy equipment and services (regulated by UPME Resolution 203 of 2020); (3) import duty exemption for renewable energy equipment not produced locally (Law 2099 of 2021); and (4) accelerated depreciation of up to 20% per year for renewable energy investments (increased to 33.33% by Law 2099 of 2021). Resolution 40284 of 2022 sets the competitive rules for development of offshore wind power.

The CREG Resolution 075 of 2021 regulates access to transmission for renewable energy projects by establishing a "one-stop shop" approach and a capacity reserve guarantee of USD 10 per kW. Small-scale self-generators (installed capacity ≤ 1 MW) and distributed generators (installed capacity ≤ 100 kW) have simplified procedures and access to net metering, as regulated by CREG Resolution 030 of 2018.

The renewable energy target established by Law 1955 of 2019 and subsequent MME Resolution 40060 of 2021 mandates 10% renewable electricity supply (excluding large hydropower) from 2023. The MME Resolution 40590 of 2019 allows the implementation of long-term power purchase agreements (PPAs) and the introduction of renewable energy auctions. The national oil and gas company, Ecopetrol, has included in its [long-term strategy](#) the target of 400–450 MW of self-generation by 2040 from renewable energy sources, including solar, wind and geothermal.

Competitive auctions for renewable energy generation long-term contracts are regulated by MME Resolution 40590 of 2019. Four power auctions² have been held as of 2022. One in 2019 resulted in no awards; see Table 1 for details.

According to the latest available [report](#) by UPME, at the end of 2022, construction was under way for 12 wind projects totalling 2072 MW and 6 solar projects totalling 908 MW. UPME also approved requests for 9984 MW of solar and 2734 MW of wind power capacity to start operating between 2022 and 2027. If these [approved](#) projects enter into operation, solar and wind could represent 38% of the installed capacity by 2027.

Table 1. Auctions and awarded capacities

Year	Auction	Awarded (MW)	
		Solar	Wind
2021	CLPE 03-2021	796	-
2019	CLPE 02-2019	296	1077
2019	OEF 2022-2023	238	1160

² For an analysis on auctions in Colombia, see the IRENA report [Renewable Energy Auctions in Colombia: Context, Design and Results](#).

Financing

After more than a decade with no investment in wind power, according to [Bloomberg](#), Colombia reached record high numbers in renewable energy investment in 2021. Of a total of USD 952 million, 71% went to wind and 29% to solar.

Domestic public finance for renewable energy comes from several sources. The Fund for Non-Conventional Energy and Efficient Energy Management (FENOGE) was created by [Law 1715 of 2014](#), regulated by [Decree 1543 of 2017](#) and [MME Resolution 40104 of 2021](#) and in operation since 2018. A fee of COP 0.4 per kWh finances FENOGE, levied on the wholesale electricity market by [FONENERGÍA](#), an energy solutions fund (previously FAZNI), created by [Law 2099 of 2021](#) and further regulated by [Decree 1580 of 2022](#). FENOGE is also financed through investments from national and multilateral banks, donations and public or private funds. FONENERGÍA replaces several previous funds active in renewable energy, such as [FAZNI](#) and [FAER](#), and its objectives include expansion of energy coverage and quality of service.

The General Royalties System (SGR), established by [Legislative Act 05 of 2011](#) and regulated by [Law 2056 of 2020](#), finances renewable energy projects. As per [Law 2036 of 2020](#), the SGR can also fund the equity participation of subnational entities and Indigenous territories in renewable energy projects. The IPSE energy access fund implements rural electrification projects, including renewable energy. The Financial Institution for Development (FINDETER) finances infrastructure for sustainable development, including renewables, through the programme [Reactiva Colombia](#).

International development finance institutions also have been engaged in renewable energy in Colombia. For example, in 2017, the Inter-American Development Bank provided USD 91 million for energy access and renewables to the Todos Somos PAZcífico Fund (FTSP) and a credit line of USD 45 million for clean energy projects to the Colombian national development bank Bancoldex in 2021. In 2022, German investment bank KfW signed a EUR 200 million [loan agreement](#) to support and accelerate Colombia's transition to renewable energy sources.

Environmental, socioeconomic and equity aspects

[Law 1715 of 2014](#) mandates the harmonization of environmental requirements (as introduced by [Law 99 of 1993](#) and regulated by [Decree 2041 of 2014](#)), the development of environmental impact assessment (EIA) procedures for renewable energy projects, and the establishment of a rapid assessment cycle for renewable energy projects. The EIA procedures for solar and onshore wind projects are regulated by [Resolution 1670 of 2017](#) and [Resolution 1312 of 2016](#), respectively.

Public consultation and benefit sharing are salient topics for renewable energy deployment in Colombia, with recent developments in the past several years. Free Prior Informed Consent (FPIC) is integrated into Colombian legislation through [Law 21 of 1991](#), with procedural steps outlined in Presidential Directive [No. 08 of 2020](#). The consultation process has been developed mainly via legal precedent through more than a dozen Constitutional Court rulings, such as [T-129 of 2011](#), [SU-123 of 2018](#), [T-426 of 2014](#) and [C-369 of 2019](#).

Several mechanisms for benefit sharing of renewables have been identified in Colombia. An “electric transfer”, established by [Law 1955 of 2019](#) and regulated by [Decree 1302 of 2022](#), requires solar and wind projects over 10 MW to transfer 1% of gross energy sales to the “project area of influence”, as defined in the EIA, with 60% to Indigenous or Afro-Colombian communities if present and the rest to municipalities. This rate will increase to 2% when renewables' installed capacity (other than large hydropower) exceeds 20% of the total, which according to UPME's projections cited above may happen within this decade.

The “works for taxes” mechanism, regulated by [Decree 1915 of 2017](#), allows companies to pay up to 50% income tax in the form of development projects in conflict and high-

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poverty areas (as defined per [Law 2155 of 2021](#)). Examples of this mechanism include solar power solutions and water access projects for Wayuu communities in La Guajira, where most of the country's wind energy potential is concentrated.

[Decree 2099 of 2016](#) mandates all projects requiring EIA and using surface water or groundwater for any project activity, including construction, to allocate no less than 1% of the total investment to the relevant water authority for water management.

While not established by law, companies may establish community funds to meet other compensation obligations deriving from consultation processes resulting in prevention, mitigation and compensation measures for environmental, social, cultural and economic impacts (e.g. [T-704 of 2016](#)). Also, these funds may include voluntary agreements such as sharing revenues from carbon markets and shares of annual revenues from electricity sold.

In Latin America and the Caribbean, decarbonization has the potential to increase employment in the renewable energy sector by an additional [100 000](#) full-time equivalent jobs by 2030. In Colombia, [jobs in the solar power sector](#) increased to 2381 in 2021 from just 360 in 2020. No countrywide projections for renewable energy employment were identified, but the potential is high. In La Guajira region alone, the 16 wind parks that should be in place by 2023–2024 are expected to create about [11 000 jobs](#). As per [Law 2099 of 2021](#), the generation, distribution and commercialization of renewable energy projects should prioritize hiring local residents, for both qualified and unqualified positions. There are no enforcement mechanisms.

While no official data are available on gender distribution of employees in this field, project-level reports suggest most renewable energy employees are men. For example, La Loma solar park (187 MW) has [employed 15%](#) women (out of 762 employees), while women made up [around 38%](#) of employees at the San Fernando solar park (61 MW).

Colombia has vibrant civil society organizations that are actively engaged in wind and solar power. Examples of non-governmental organizations include Foro Nacional Ambiental, a coalition of research institutions and think tanks; INDEPAZ, a human rights organization leading [instrumental work](#) on Indigenous rights and free, prior and informed consent for wind power in La Guajira; Tierra Grata, a grassroots energy access organization; and [CENSAT Agua Viva](#), an environmental justice organization working on community power.

Research and capacity building groups include the research group in Energy, Environment and Development (EADE) from the University Jorge Tadeo Lozano, the interinstitutional alliance “Energética 2030” led by the National University of Colombia (UNAL), the Transnational Centre for Just Transitions in Energy, Climate and Sustainability (TRAJECTS), the research group [EnerEIA](#) from the University EIA, the Innovation and Research Centre for the Fair Development of the Mining–Energy sector of Colombia (CIPAME), and the Energy Transition students’ research group from the University of Magdalena ([STE UniMagdalena](#)).

Prospects

The current administration, led by President Gustavo Petro and inaugurated in August 2022, included in its election agenda continued support for the development of the renewables sector; it promised increased [energy democratization](#) by prioritizing [mixed ownership models](#) of the energy value chain that ensure a greater participation and control from society. Then-candidate Petro also emphasized the concept of “[energy communities](#)” through a new solar programme, *Estallido de Energía Solar*, now under development, as well as the need for the mining industry to support the domestic production of wind turbines. The energy transition roadmap announced by the MME and to be launched in May 2023 is expected to provide details on these and other initiatives.
