

# **Colombia Renewable Energy Market, By Type (Hydroelectric Power, Wind Power, Bioenergy, Solar Energy, and Geothermal Energy) and End Use (Residential, Commercial, Industrial, and Others), By Region, Competition, Forecast and Opportunities, 2028**

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## **Abstracts**

The Colombia Renewable Energy Market, valued at USD 6.12 Billion in 2022, is poised for robust growth in the forecast period, with an anticipated Compound Annual Growth Rate (CAGR) of 3.50% through 2028. Renewable energy encompasses energy sources that are naturally replenished and sustainable over time, distinct from finite fossil fuels. It harnesses abundant resources like sunlight, wind, water, and organic matter, leveraging Earth's natural processes to produce usable power without depleting finite reserves or causing lasting environmental harm.

Solar energy captures sunlight via photovoltaic cells or solar thermal systems to generate electricity or heat. Wind energy harnesses kinetic energy from moving air through wind turbines, converting it into electrical power. Hydropower uses the gravitational force of flowing water to turn turbines and produce electricity. Biomass energy derives from organic materials like wood, crop residues, and waste, either burned or converted into biofuels for energy production. Geothermal energy taps Earth's internal heat, using underground steam or hot water to generate power. Renewable energy technologies offer multiple benefits, including reduced greenhouse gas emissions, improved air quality, and reduced dependence on fossil fuels. As technology advances and economies of scale improve, renewable energy plays a pivotal role in the global shift towards a more sustainable and resilient energy future.

## Key Market Drivers

### Colombia's Drive Towards Renewable Energy

Colombia has actively pursued the development of renewable energy sources, propelled by various factors that underpin its energy transition and sustainable development. These drivers reflect the country's rich natural resources, commitment to environmental stewardship, and economic diversification. Here are the primary drivers behind Colombia's renewable energy market:

- 1. Abundant Natural Resources:** Colombia boasts abundant natural resources that favor renewable energy generation. The country's rivers and water bodies offer substantial potential for hydroelectric power, while diverse regions feature solar and wind energy resources.
- 2. Government Policies and Incentives:** The Colombian government has instituted policies and incentives to foster renewable energy investment. These measures encompass tax incentives, subsidies, and regulatory frameworks that facilitate the development and integration of renewable energy projects into the national energy mix.
- 3. Climate Commitments:** Colombia is dedicated to reducing greenhouse gas emissions and mitigating climate change. Adopting renewable energy aids the nation in meeting international climate commitments while contributing to global climate change mitigation efforts.
- 4. Energy Security and Diversification:** Investment in renewable energy sources bolsters Colombia's energy security by diversifying its energy mix. This reduces dependence on fossil fuel imports, enhancing the country's energy resilience.
- 5. Local Economic Development:** Renewable energy projects drive job creation and stimulate local economic development. They demand skilled labor for construction, operation, and maintenance, thereby generating employment opportunities in both rural and urban areas.
- 6. Technological Advancements:** Ongoing advances in renewable energy technologies, such as improved solar panels, wind turbines, and energy storage solutions, enhance efficiency and cost-effectiveness. These advancements make renewable sources increasingly attractive for energy generation.

7. Private Sector Participation: The private sector actively engages in renewable energy projects, drawn by the sector's potential for long-term investment and growth.

8. International Collaboration: Colombia collaborates with international organizations and partners to access funding, technology transfer, and expertise for renewable energy projects. Such collaboration supports the country's efforts to accelerate its renewable energy development.

Overall, Colombia's pursuit of renewable energy is driven by a synergy of environmental consciousness, economic vitality, and social progress, aligning with the global trend towards cleaner and more sustainable energy systems.

### Supportive policies and Regulations are Likely to Propel the Market

Colombia has implemented a range of supportive policies and incentives to promote the development and integration of renewable energy sources into its energy mix. These policies aim to encourage investment, increase renewable energy capacity, and contribute to the country's sustainable development goals. Some of the key renewable energy supportive policies in Colombia include:

**Law 1715 of 2014:** This law establishes the legal framework for the promotion of renewable energies in Colombia. It defines renewable energy sources, establishes goals for their incorporation into the energy mix, and outlines mechanisms for incentivizing their development.

**Renewable Portfolio Standard (RPS):** Colombia's Ministry of Mines and Energy has set a mandatory RPS, requiring energy producers and distributors to gradually increase the share of renewable energy in their total energy output. The RPS sets specific targets for renewable energy capacity additions over time.

**Tax Incentives:** The Colombian government offers tax incentives for renewable energy projects, including exemptions from value-added tax (VAT) and customs duties on equipment and materials used in renewable energy generation.

**Power Purchase Agreements (PPAs):** Colombia allows power purchase agreements between renewable energy developers and consumers, enabling long-term contracts for the sale of renewable energy at predetermined prices. PPAs provide revenue certainty for renewable energy projects.

**Net Metering:** Net metering regulations allow consumers to generate their own renewable energy and feed excess electricity back into the grid, receiving credits on their electricity bills. This encourages the adoption of small-scale solar installations.

**Clean Energy Certificates (CELs):** The CEL program mandates energy generators and distributors to obtain a certain percentage of their energy from renewable sources. If they fall short, they must purchase CELs from renewable energy producers to meet their obligations.

**National Development Plan:** Colombia's National Development Plan includes provisions for promoting renewable energy and sustainable development. It sets targets for renewable energy capacity and outlines strategies for achieving them.

**Research and Innovation:** The government supports research, development, and innovation in renewable energy technologies through grants, funding, and collaboration with academic institutions and industry partners.

**Grid Integration:** Policies have been put in place to facilitate the integration of renewable energy into the national grid, ensuring a smooth transition and reliable operation of the energy system.

These policies create a conducive environment for renewable energy development in Colombia, attracting investment, stimulating job creation, reducing greenhouse gas emissions, and contributing to the country's energy security and sustainability goals.

## Key Market Challenges

While Colombia has made significant strides in promoting renewable energy, several challenges persist that can affect the widespread adoption and integration of these clean energy sources:

**Grid Integration and Stability:** Integrating variable renewable energy sources like solar and wind into the existing grid can pose challenges for grid stability and reliability. Balancing supply and demand while accommodating fluctuations in renewable energy generation requires robust grid infrastructure and advanced energy management systems.

**Intermittency and Reliability:** Solar and wind energy generation is dependent on weather

conditions, leading to intermittency in power production. Without effective energy storage solutions, this intermittency can affect grid stability and necessitate backup power sources.

**Financial and Investment Barriers:** While there are incentives and policies in place, renewable energy projects often require substantial upfront investment. Financing can be challenging to secure, particularly for smaller and less established players in the industry.

**Permitting and Regulatory Hurdles:** Complex and time-consuming permitting processes can delay the development of renewable energy projects. Regulatory uncertainties or inconsistencies can also discourage potential investors.

**Land Use and Environmental Concerns:** Large-scale renewable energy projects, such as hydroelectric dams, can have environmental and social impacts, including habitat disruption and displacement of communities. Balancing renewable energy development with environmental preservation and local livelihoods is a complex challenge.

**Technological Readiness and Skill Development:** The deployment of advanced renewable energy technologies may require a skilled workforce for installation, operation, and maintenance. Ensuring the availability of trained personnel can be a hurdle.

**Lack of Infrastructure in Remote Areas:** Some of Colombia's renewable energy potential is located in remote or difficult-to-access areas. Developing the necessary infrastructure, such as transmission lines and access roads, can be logistically challenging and costly.

**Energy Market Dynamics:** The energy market structure and pricing mechanisms can impact the competitiveness of renewable energy sources. Fluctuating electricity prices and market distortions may affect the economic viability of renewable projects.

**Public Awareness and Acceptance:** Raising public awareness about the benefits of renewable energy and addressing misconceptions can contribute to a more favorable environment for renewable energy development.

**Lack of Long-Term Planning:** Ensuring a consistent and long-term policy framework for renewable energy is crucial for investor confidence. Frequent changes in policies or regulatory uncertainties can hinder long-term planning and investment.

Addressing these challenges requires a holistic and coordinated approach involving government agencies, industry stakeholders, local communities, and international partners. Overcoming these obstacles will contribute to Colombia's transition toward a more sustainable and renewable energy future.

## Segmental Insights

### Solar Energy Insights

The Solar Energy segment established its dominance in the renewables energy market in 2022 and is projected to maintain its position throughout the forecast period. Colombia's proximity to the equator gives it ample sunlight throughout the year. Regions such as La Guajira, the Caribbean coast, and parts of the Andean region receive high solar irradiance levels, making them suitable for solar energy generation. Falling solar panel prices and advancements in technology have made solar energy more economically viable. As solar costs continue to decrease, it becomes increasingly competitive with conventional energy sources, fostering its adoption. Solar energy can contribute to diversifying Colombia's energy mix, reducing dependence on hydropower and fossil fuels. This diversification enhances energy security and resilience, especially during dry periods when hydropower generation may be constrained. The solar energy market in Colombia is gradually growing, with utility-scale solar projects, commercial installations, and residential solar becoming more common. Collaborative efforts between the public and private sectors can accelerate market growth.

### Residential Insights

The residential segment established its dominance in the renewable energy market in 2022 and is projected to maintain its position in the upcoming years. Increasing numbers of Colombian households are installing rooftop solar panels to generate their own electricity. This allows homeowners to reduce their reliance on the grid and potentially even sell excess energy back to the utility through net metering programs. One of the primary motivations for residential renewable energy adoption is cost savings. Solar panels, for instance, can significantly reduce electricity bills over their lifespan, providing a long-term financial benefit for homeowners. Renewable energy systems, such as rooftop solar, offer a degree of energy independence. Households can generate their own power, especially during daylight hours, reducing the need to purchase electricity from the grid. Government incentives, such as net metering policies and tax exemptions for renewable energy equipment, can encourage homeowners to

invest in renewable energy systems.

## Regional Insights

**Caribbean Region:** This region has the highest potential for solar and wind energy development in Colombia. The average solar radiation in the region is around 5.5 kWh/m<sup>2</sup>/day, which is well above the global average of 3.5 kWh/m<sup>2</sup>/day. The wind speed in the region is also favourable for wind energy development, with average wind speeds of around 7 m/s. The Colombian Caribbean region is home to about 55% of the existing renewable energy projects in the country. The Colombian government has identified the Caribbean Region as the priority region for renewable energy development. The government has also launched several initiatives to promote the development of renewable energy in the country, such as the National Development Plan 2018-2022 and the Energy Transition Law. The development of renewable energy in Colombia is expected to help the country meet its energy needs, reduce its dependence on fossil fuels, and mitigate climate change.

## Key Market Players

Celsia Colombia Saesp

DNV GL AS

Enel Green Power S.p.A.

EDP Renovaveis SA

Ventus Ingenier?a S.R.L

Ecopetrol S.A

Empresas Publicas de Medellin

ISAGEN S.A E.S.P

ABO Wind Renovables Colombia S.A.S.

## Report Scope:

*Colombia Renewable Energy Market, By Type (Hydroelectric Power, Wind Power, Bioenergy, Solar Energy, and Geoth...*



In this report, the Colombia Renewable Energy Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Colombia Renewable Energy Market, By Type:

Hydroelectric Power

Wind Power

Bioenergy

Solar Energy

Geothermal Energy

Colombia Renewable Energy Market, By End Use:

Residential

Commercial

Industrial

Others

Colombia Renewable Energy Market, By Region:

North Region

South Region

East Region

West Region

Central Region



## Competitive Landscape

**Company Profiles:** Detailed analysis of the major companies present in the Colombia Renewable Energy Market.

## Available Customizations:

Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

## Company Information

Detailed analysis and profiling of additional market players (up to five).

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