

Country Assessment Report

Country/Region Name- Colombia:

Colombia is situated in northern South America; bordered by Panama, Ecuador, Peru, Venezuela and Brazil. It has a population of just under 50 million and GDP over 330 billion. Its current growth rate is 2.5%, stimulated by an export-oriented growth strategy.

Economic Structure and Activity:

Colombia has a free market economy and has multiple international free trade agreements including the US and EU. The service industry accounts for the majority of Colombia's GDP, contributing 57.73%. It is currently the fastest growing country for IT and Digital services in the Latin American region.

The industrial sector accounts for 26.67% with manufacturing focused on delivering textiles, chemical products, metallurgy, cement, cardboard containers, plastic resins and beverages. Colombia's initial economic growth was founded upon its abundance in resource commodities. It has significant amounts of nickel, gold, silver, platinum, and emeralds, as well as large petroleum and gas reserves. The economy's performance is heavily dependent on energy and mining exports, leaving Colombia vulnerable to the impacts related to fluctuations in global commodity prices dependency on mining and energy exports

The agricultural sector is extensive and diversified and accounts for 6.28% of GDP. The main exports are coffee, bananas, cut flowers, sugarcane, livestock, rice and corn.

(Statista 2018)

Generation and demand: (type, MW, TWh)

Installed capacity of the grid (in 2015):

- Hydro: 11,500 MW
- Wind: 19 MW
- Gas: 1,548 MW
- Coal: 1,339 MW
- Other thermal: 1,928 MW
- Cogeneration: 86 MW
- **TOTAL: 16,420 MW**

(Source: <http://informesanuales.xm.com.co/2015/SitePages/operacion/2-6-Capacidad-efectiva-neta.aspx>)

Electricity generation by source (in 2015):

- Large hydro (>20 MW): 42,464 GWh
- Large thermal plants (>20 MW): 20,631 GWh
- Minor plants (<20 MW): 2,927 GWh
- Cogeneration: 526 GWh
- **TOTAL: 66,548 GWh**

(Source: <http://informesanuales.xm.com.co/2015/SitePages/operacion/1-2-Variables-de-la-operacion-del-SIN.aspx>)

Electricity demand by consumer type (in 2015):

- Regulated market¹: 44,630 GWh
- Non-regulated market (large consumers): 21,187 GWh
- **TOTAL: 65,817 GWh**

(Source: <http://informesanuales.xm.com.co/2015/SitePages/operacion/1-2-Variables-de-la-operacion-del-SIN.aspx>)

Notes:

- (1) The regulated market includes residential consumers, and small businesses and industries.
- (2) The non-regulated market includes larger commerce and industries that consume an average of 0.1 MW (55 MWh per month) per facility.

Electrical Interconnection and import/export:

The national power grid of Colombia is interconnected with the grids of Ecuador and Venezuela, and currently plans an interconnection with Panama that should be operational by 2024.

In 2016, Colombia imported 378,000 MWh of electricity and Colombia exported 45,000 MWh.

(Source: <http://informesanuales.xm.com.co/2015/SitePages/operacion/1-2-Variables-de-la-operacion-del-SIN.aspx>)

Market Structure:

The generation and supply of electricity work under open market competition, while transmission and distribution remain as regulated monopolies. This electricity market structure 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 framework¹. Since their enactment, Colombia has had a liberalized energy market, which is characterized by an unbundled generation, transmission, distribution, and commercialization scheme in order to segregate the power sector activities and markets. An electricity spot market and the development of a long-term contract market for electricity sales are the core objectives of the new structure to introduce a more effective framework for competition and an independent regulatory system supervised by the CREG (Regulatory Commission for Energy and Gas), created

¹ The laws can be accessed on the website: <http://www.creg.gov.co/cxc/secciones/documentos/leyes.htm>
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by the Law 143. This Electricity Law specifically introduced rules regarding: (i) Power sector planning; (ii) power generation; (iii) transmission and distribution; (iv) grid operation; (v) grid access fees; (vi) regime for electricity sales; (vii) concessions and contracts; and (viii) environmental issues, among others.²

Access to electricity can be distinguished by the NIS (national interconnected system) and ZNI (non-connected zones). Figure 1 depicts these inequalities in connectedness. The majority of Colombia's RE potential is distributed across ZNI (*see market risks and challenges*), but sites remain remote, sometimes inaccessible and carry ecological/ethnic interest.

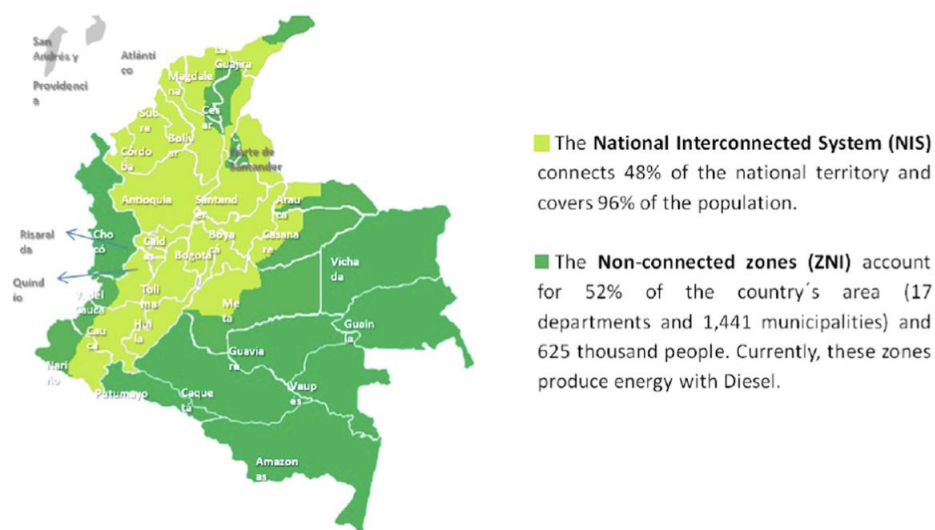


Fig 1. NIS and ZNI in Colombia

² http://www.creg.gov.co/cxc/english/mercado_mayorista/estructura.htm

Responsible Government Department: (include key contacts)

The Ministry of Mines and Energy is the leading institution in Colombia's energy sector. The Director of Electricity is [REDACTED] ([REDACTED]) and Head of Environmental and Social Issues is [REDACTED] ([REDACTED]).

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.

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.

XM Compañía de Expertos en Mercados S.A. E.S.P is a non-governmental agency acting as the market administrator, being in charge of the registration of contracts, the settlement and billing of all the transactions that take place in this market. XM is also responsible for grid operation and in charge of the National Dispatch Center.

The Superintendence of Domestic Public Services (SSPD) oversees and monitors the Colombian power market.

Existing/Planned Energy Legislation: (is there a CPO)

UPME has a "National Energy Plan" for 2015-2050³ that provides guidance for the future development of the energy and electricity sector to implement energy policies.

In 2014, the Law 1715 was enacted, which establishes the legal framework for the integration of non-conventional renewable energy to the Colombian energy system in order to further diversify the matrix and promote different renewable energy sources such as wind power, solar photovoltaic energy and geothermal energy. This law establishes the legal framework for the use of NCRE and creates tax incentives for the

³ http://www.upme.gov.co/Docs/PEN/PEN_IdearioEnergetico2050.pdf

investment in these kinds of projects. These include income tax deduction and VAT exemption on goods and services related to NCRE projects.

However, there are neither any renewable energy purchase obligations nor any REC schemes presently operational in Colombia or planned for the foreseeable future.

Environmental Legislation for RE:

The law 99 from 1993 provides the general requirements for issuing environmental licenses and permits for the construction and operation of power plants, and defines the role of the Environmental Ministry and the Regional Autonomous Corporations for the licensing process.

Article 49 of the law 99 of 1993 and article 3 of the decree 1220 of 2005 indicate that the execution of works, establishment of industries or the development of any activity that in accordance with the law or any applicable regulation could produce significant impact on natural resources or the environment or introduce considerable modifications to the landscape, require an environmental license.

As per Article 52 of law 99 and article 8 of decree 1220, projects with less than 100 MW do not fall under the responsibility of the Environmental Ministry but the Regional Autonomous Corporation.

Law 1715 of 2014 establishes investments incentives:

1. Incentive for the electricity production: reduction to the business profit tax payment for up to 50% of the investment value
2. VAT tax incentive: total exemption on equipment and machines
3. Import tax incentive: total exemption on equipment and machines no domestically produced
4. Financial incentives: accelerated depreciation (The certificates are issued by the ANLA (Autoridad Nacional de Licencias Ambientales)).

Electric Coverage Expansion Plan 2016-2020 (Plan Indicativo de Expansión de Cobertura de Energía Eléctrica PIEC 2016-2020, PIEC)

Law approving the "Paris 2015 Agreement". Presidential Law of the Republic 1844/2017.

Existing/Planned Certificate Systems: (purpose, extent)

The I-REC Standard is fully operative on a voluntary basis in the country. There is the Fundación ECSIM who act as local issuer of I-REC Certificates.

RE Market Potential:

Colombia's climatic conditions and geographical positioning bequeaths a wealth of RE resources. Hydropower represents Colombia's biggest share of electricity generation and investment of NCRE resources. Its contribution to total electricity generations can vary between 45% and 95% because of impacts related to the weather phenomena "El Niño" and "La Niña" Southern Oscillation (ENSO). Small hydro has shown to be

more reliable, with an existing installed capacity of 784.44 MW, distributed across 200 plants and other off grid generators. Total installed capacity could reach up to 25 GW.

Colombia is situated along the equator which makes PV investment highly lucrative. Solar irradiation levels are mostly consistent throughout the country and average 4.5 KWh/m²/day). Total wind energy potential could be converted into an installed capacity of up to 25 GW, with only one 19.5 MW plant currently in operation. Installable capacity for biomass could amount to 15 GW, with the majority sourced from the ZNI (zonas no interconectados) where most biomass is produced. Colombia also has access to geothermal energy, which has an estimated potential of 1-2 GW. Potential sites have been located at Volcanes Chiles, the National Park of Los Nevados and Paipa geothermal area in Boyacá.

In January 2020, UPME approved connection to more than 120 NCRE projects outside of the auction framework (Renewables Now). This could potentially result in up to 7,700 MW of new installed capacity.

Market risks and challenges:

Although, Law 1715 was passed in 2014, regulation for incentives and tax exemptions are still pending and have therefore not yet been applied. The law also lacks any prospective regulation for self-generation and sales of self-generated electricity.

The concentration of RE resources in Colombia's ZIN is problematic because it would be very difficult to deliver electricity generated to the national grid. Unless, ZNI are integrated into the NIS, these plants would only be able to deliver electricity locally (roughly 625,000 people) which limits the profitability of investment. Currently, ZNI inhabitants receive subsidised diesel engines to generate electricity. If these subsidies were switched to RE projects, it would help ZNI exploit their abundance in renewable reserves. The investment risk still remains high in ZNI whilst armed conflict continues. If the ongoing peace talks between the government and armed guerrillas are successful, the risk would be significantly reduced, allowing public and private sectors to conduct further research around RE potential and invest in them

Another key barrier to existing RE deployment has been the high capital cost associated with such technologies, particularly because they have to be imported. In addition to high investment costs, the cost of electricity generation is higher amongst some RE technologies than existing market prices e.g. some biomass project.

(Gómez-Navarro and Ribó-Pérez 2018)

Extent of Engagement with Government: (brief summary of any contact already made with the national government regarding certification in general and I-REC)

I-REC representatives have met authorities from the Ministry of Environment and the Ministry of Mining and Energy to introduce them about 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 organised in Feb 2018 by presenting at the event.

Expected response from Government:

Current Environmental Reporting in Energy:

Any other Relevant Information:

Although it is an important goal of the Colombian government to further promote and foster renewable energies, there are no REC schemes presently operational in Colombia or planned for the foreseeable future. Hence a renewable energy project in Colombia should be able to claim and issue I-RECs. On the other hand, even if a domestic REC scheme comes up in the future (although not yet perceived on the horizon), a renewable energy project in Colombia should still be able to claim either I-RECs or any future domestic Colombian RECs at any given point in time for any given MWh generated by the project. This is also in line with the relevant I-REC Code clause: "***An I-REC can exist sequentially from another energy attribute tracking methodology (e.g. the Guarantee of Origin in Europe) such that only one is active at a point in time***". Hence, under the present scenario, any renewable energy project from Colombia applying for I-REC Production Device Registration should be readily acceptable by the I-REC Standard for issuing I-RECs.

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