



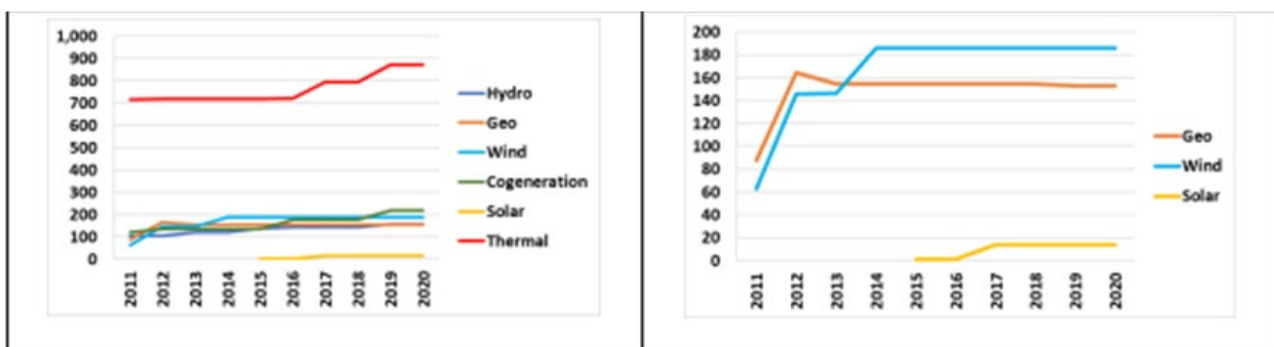
Nicaragua: Renewable energies SECTOR FICHE

1. Business opportunities

Nicaragua’s government has turned to renewable energy for a few key reasons. One is the country’s natural abundance of renewable resources. Nicaragua experiences powerful winds and large amounts of sunlight on a regular basis. The country is also home to 19 volcanoes—a reliable source of geothermic heat. The second reason is to become energy independent. Nicaragua itself does not produce oil. As a result, Nicaragua has historically relied on imports of fossil fuel resources. While the country still imports foreign oil, the increased production of renewable energy, like geothermal energy from Nicaragua’s volcanoes, has reduced that dependency.

Nicaragua offers a wide range of investment opportunities in the energy sector. Due to its richness in natural resources, the country has a potential of approximately 4,500 MW for energy generation from renewable sources distributed by geothermal, hydroelectric, wind, solar and biomass.

Nicaragua historical installed capacity¹



Under the country’s updated NDC², Nicaragua has set a goal for 65% of electricity generation to come from renewables by 2030, up from the previous target of 60%. In 2021, renewables accounted for 45% of Nicaragua’s generation mix, with biomass and wind being the biggest

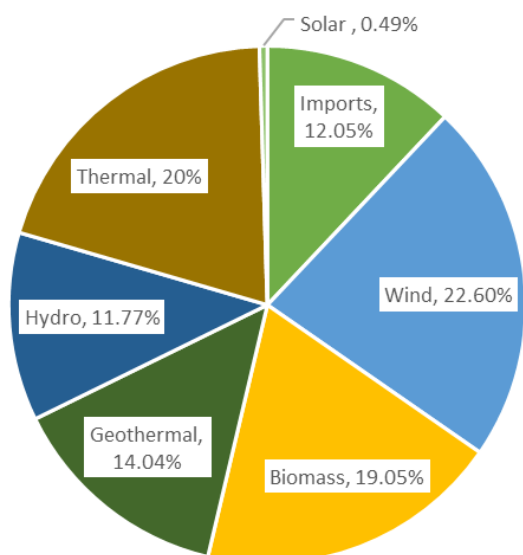
¹ https://trade.ec.europa.eu/access-to-markets/en/country-assets/euca_04_Renewable%20Energy%20sector%20in%20Central%20America.pdf

² https://unfccc.int/sites/default/files/NDC/2022-06/Contribuciones_Nacionales_Determinadas_Nicaragua.pdf

contributors, at 13% and 11%, respectively. Fossil-fuel-powered plants still play an important role in the country's power sector and Nicaragua says it will look to replace more emissions-intensive coal and diesel generation with natural gas.

According to data published by the National Electric Transmission Company (ENATREL)³ 80% of the energy produced between January and March 2023 came from renewable sources. Wind energy is the most important renewable energy source in Nicaragua, contributing to over 22% to the national generation total, followed by biomass, geothermal, hydroelectric, and thermal. Renewable energy generation capacity reached 887 MW in 2020 and is expected to reach 1,000 MW in 2025.

Nicaragua energy matrix, January-March 2023



In order to contribute to the analysis of the technical and economic feasibility of power generation projects based on renewable resources, the Ministry of Energy and Mines (MEM) developed an Indicative Electricity Generation Plan 2019-2027 followed by the 2018 Electric Generation Expansion Plan 2019-2033.⁴ These plans provide valuable information to operators and the State of Nicaragua under different country energy demand scenarios, driving the investments required for the development of power generation for the interconnected national grid.

According to the latter document, the country plans to add up to 1.106 MW of generation capacity before 2030, with 428 MW coming from hydroelectric, 300 MW from thermal, 173 MW from wind, 120 MW from solar and 85 MW from geothermal.

- Biomass: Nicaragua is characterized of having rich and diverse sources of biomass with high energy potential. Waste and byproducts of agricultural and forestry production are major sources of potential fuels. At this moment, such wastes are being used for this purpose by four sugar mills in Nicaragua. The Monterrosa and San Antonio sugar mills

³ <https://www.enatrel.gob.ni/matriz-de-generacion-2022/>

⁴ <https://www.mem.gob.ni/wp-content/uploads/2019/05/Plan-de-Expansion-de-la-Generacion-Elctrica-de-2019-2033.pdf>

supply to the National Grid an approximate of 30MW each, using as fuel bagasse (a byproduct of sugar production), and eucalyptus harvested specifically for the production of steam and energy generation. Montelimar is the smallest of the four mills, and has an installed capacity of 42.5MWh.

- Geothermal Potential: Geothermal energy represents the second largest source of energy available in Nicaragua. The privileged volcanic chain extends from the Gulf of Fonseca in a southeasterly direction until reaching the border with Costa Rica, with an extension of 380 kilometers and is part of the Pacific Ring of Fire, which includes several volcanic formations. Nicaragua's Geothermal Master Plan estimates that the geothermal potential amounts to 1,519 Megawatts (MW). Nicaragua has twelve areas of geothermal interest, located along the Pacific Volcanic Range: Cosiguina Volcano, Casita-San Cristóbal Volcano, Mombacho, Apoyo Caldera, Masaya Caldera, Managua-Chiltepe, Telica Volcano, San Jacinto-Tizate, El Hoyo-Monte Galán, Momotombo Volcano, Tipitapa and Isla de Ometepe. Currently, the country has under concession the Momotombo and San Jacinto - Tizate Geothermal Fields, located in the Department of Leon. The Momotombo Geothermal Field and Plant has an installed capacity of 77 MW, but currently generates between 20 - 25 MW; and is managed by the Momotombo Power Company (MPC) Private Consortium, through a Joint Venture Agreement with the Nicaraguan Electricity Company (ENEL), for a period of fifteen years (2014 - 2029). Meanwhile, the San Jacinto - Tizate Geothermal Field has an installed capacity of 77 MW and is managed by Polaris Energy Nicaragua S.A. (PENSA).
- Hydroelectric: Nicaragua has abundant large rivers in the central and the Caribbean region, which have not been used for power generation. Given the abundance of rivers, studies show a potential for hydroelectric power generation of 2,000 MW. In recent years Nicaragua increased its installed hydroelectric power capacity by an additional 53.2 MW, from 104.4 MW in 2006 to 157.42 MW by the end of 2020, according to the Nicaraguan Electricity Institute (INE). The increase in installed capacity has been the result of the entry into operation of small hydroelectric plants such as: El Diamante (5 MW), Hidropantasma (12.5 MW), San Martín (5.7 MW), La Mora (1.9 MW), Salto Grande-Siempre Viva (5.3 MW), La Florida (0.3 MW), El Sardinal (1.2 MW), Las Cañas (4.25 MW), Yakalwas (1.48 MW), through which energy is brought to the most remote rural areas of the country. The National Electricity Company (ENEL) leads hydroelectric generation in the country with a total of 117 MW, with four hydroelectric plants (Carlos Fonseca, Centro América and Larreynaga). In addition, ENEL is currently seeking financing for the construction of two other hydroelectric plants, with an installed capacity of 49.5 MW (El Barro 32.5 MW and La Sirena 17.0 MW). Also, within the framework of the National Program for Sustainable Electrification and Renewable Energy (PNESER), Nicaragua began the second stage of the "Master Plan for the Rio Grande de Matagalpa and Upper Coco River Basin", which consists of the execution of Prefeasibility Studies for the following hydroelectric projects: Copalar Bajo (150 MW), San Pedro del Norte (75 MW), El Carmen (101 MW), Boboké (97 MW), Mojolka (105 MW), Wanawas (81 MW), Paso Real (22 MW), Masapa (34 MW), Corriente Lira (33 MW) and Paraska (59 MW).
- Solar: according to ENEL, the country has four solar plants: La Trinidad Solar Plant in Diriamba (1.5 MW), Solaris in Puerto Sandino (12 MW), San Juan de Nicaragua (300 kW) and Corn Island with 2.5 (MW). Solar panels installed in homes and businesses for self-consumption would be close to 100 MW. In 2019, the Government of Nicaragua, through the Ministry of Energy and Mines, signed a Memorandum of Understanding with the Spanish capital company EPR Solar and Israeli investors for the construction of a solar plant

with a capacity of 100 MW, located between San Benito and Tipitapa. At the beginning of 2022, China Communications Construction Company Limited announced that it would invest US\$ 106.1 million in the El Hato solar project, in Terrabona, department of Matagalpa.

- Wind energy: With an average wind speed of 9 meters per second, Nicaragua’s wind energy potential is immense, and the country has been making significant strides in harnessing this renewable power source. One of the most notable examples of Nicaragua’s investment in wind energy is the Amayo Wind Farm, located in the southern region of Rivas. The farm, which began operations in 2009, consists of 19 wind turbines with a total installed capacity of 40 megawatts (MW). Another significant wind energy project in Nicaragua is the Eolo Wind Farm, located in the department of Rivas. The farm, which began operations in 2013, has an installed capacity of 44 MW and is capable of generating enough electricity to power approximately 100,000 homes. The MEM has completed feasibility studies for three new wind energy projects: Mirazul (55MW), Santiago (72MW) and Las Gutiérrez (38MW).

Nicaragua is also part of the Central American Electrical Interconnected System (SIEPAC), and its grid is connected to El Salvador, Guatemala, Panama, Costa Rica and Honduras by transmission lines.⁵ SIEPAC is a 230kV power grid from Guatemala to Panama, with a length of 1790km, and carrying capacity of the single-circuit line is 300 MW.

Central American Regional Electric Transmission System (SIEPAC)⁶



The Central America Operational Planning 2023-2024⁷ contemplates the entry between January 2023 and December 2024 of 27 projects for a total of 1,660.8 MW of new capacity in the countries of the region. Of the total, 25 projects for nearly 500 MW are renewable and are expected to be added to the system in the 2023-2024 period. The document includes four projects in Nicaragua,

⁵ For an analysis of SIEPAC see https://trade.ec.europa.eu/access-to-markets/en/country-assets/euca_04_Renewable%20Energy%20sector%20in%20Central%20America.pdf

⁶ <https://thedocs.worldbank.org/en/doc/441801573648542947-0280022019/original/MENAPANARABCONFRESChang.pdf>

⁷ https://www.enteoperador.org/archivos/download/Informe_Planeamiento_Operativo_2023-2024-Actualizacion_enero-2023.pdf

two of them in photovoltaic (75 MW total), one of biomass (30 MW) and one in natural gas (300 MW).

The Clean Energy Corridor of Central America (CECCA) initiative was launched in 2015 and aims to promote the accelerated deployment and cross-border trade of renewable power in Central America, in the context of the Regional Electricity Market (MER) and the SIEPAC. CECCA is built around key pillars of implementation: power system operations and regulatory frameworks for increasing Variable Renewable Energy (VRE) shares; country and regional power system planning with renewables; zoning and renewable resource assessment; and capacity building and information dissemination.

2. Regulatory framework

The structure of the electricity sector is made up of the following actors:

- Generation: According to data from the Nicaraguan Foundation for Economic and Social Development (FUNIDES), there are some 29 generators operating, mostly located in the Pacific region. It is estimated that around 82.8% of the installed capacity comes from private investment.
- Transmission: the National Electricity Company (ENATREL) is in charge of energy transmission, it does not participate in the purchase and sale of energy, and its role is limited to intermediation, for which it charges an Average Transmission Cost (CMT).
- Distribution: distribution is carried out through processes executed by the Ministry of Energy and Mines (MEM) and is operated almost exclusively by the private company DISNORTE-DISSUR.
- Regulation: mainly the Nicaraguan Energy Institute (INE), which supervises, monitors, and controls aspects related to the energy sector.

The country has taken steps to promote renewable energy production, such as creating a favorable legal and regulatory framework, and implementing incentive policies for renewable energy projects. Additionally, efforts are being made to improve the country's electrical infrastructure and increase energy efficiency in all sectors.

Nicaragua's power sector is unbundled, and distinct actors – both state and privately owned – participate in the generation and distribution sectors. At least 18 companies hold active generation contracts today for projects they own. However, the situation is not clear in this regard, given the lack of transparency regarding the real ownership of important assets in this country.

Renewable energy developers enjoy a range of tax breaks in Nicaragua, including exemptions on import duties, value-added taxes (VAT) and income taxes (IR). On September 8, 2020, the Nicaraguan National Assembly approved the proposed reform of Law 532⁸, a law for the promotion of electricity generation with renewable sources.

Since its approval in 2005, this law has undergone several reforms through which the tax incentives that were initially given to electricity generation projects in renewable sources have been extended. The 2020 reform goes hand in hand with a process of voluntary renegotiation of existing power purchase and sale contracts with companies that produce electricity

⁸ <http://digesto.asamblea.gob.ni/consultas/normas/shownorms.php?idnorm=NjYzOQ==>

("generators"). Tax incentives to aid the development of renewables projects have been extended until 2023.

This Law is not an amendment to the article on the period of application of incentives, but rather a temporary provision that only allows current generators to apply an extension of the period of exemption from Income Tax (IR), as long as they decide to negotiate a decrease in the purchase price of energy. Geothermal generators may apply for a 2-year extension, while generators of power from other sources may obtain up to 5 years.

On the other hand, the Reform law did permanently modify a provision referring to the price to pay per kWh band in commercialization outside of the contracts with the Distributor. Previously, the band included a minimum price and a maximum price, and from then on only the maximum limit was maintained at 6.5 cents per kWh.

The Law for the Exploration and Exploitation of Geothermal Resources (Law 443)⁹, one of the most modern in the region, provides an attractive policy of incentives and tax exemptions for the introduction of equipment and implementation of new projects in the sector.

⁹ <http://digesto.asamblea.gob.ni/consultas/normas/shownorms.php?idnorm=NjY3OA==>



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