

Renewable Energy in Brazil

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With around 16.3% of energy consumption in 2019 coming from wind and solar sources, not including another 28.7% from hydropower plants, Brazil is already the number one nation in the adoption of renewables — at least in relative terms. When observing the absolute numbers, however, it becomes clear that there is still a lot of potential to explore and opportunities of investment to meet the production of other countries with similar territorial magnitudes: Brazil's renewable outputs stands only 30% that of China's and 34% of the US's, and is comparable to the production of Germany, a country devoted to clean energy but nearly 24 times smaller.

The installed capacity of solar and wind power plants in the country is already 3.2 GW and 17.3 GW. Adding pre-operational power plants that hold a grant from the government (known as Outorga), these numbers rise to 18.0 GW and 29.4 GW. Solar panels installed by households and companies still supplied by distribution concessionaires sum another 4.5 GW of installed capacity connected to the power grids.

These numbers illustrate the adoption of renewables in Brazilian's energy mix and its potential for further development, which was fostered by specific regulations applicable to renewables. Since 2002, the Brazilian government has specific incentives for "alternative sources", a concept that includes solar,

wind, and biomass with a maximum installed capacity of 300 MW and small hydro with a maximum installed capacity of 50 MW. Benefits consist of at least 50% discounts in the tariffs for the use of the distribution or the transmission network (known as "TUSD" and "TUST") both for the power generator and for the energy consumers contracting these sources.

The Provisional Measure No. 998, of September 1, 2020, that was recently approved by the Congress and should be sanctioned or vetoed by the President before March 1, 2021, encourages new investments in renewables in 2021, due to the transition period that was established. The government will continue to grant such TUSD and TUST discounts for renewable projects for a limit time: only for power plants requesting the Outorga within 12 months from the date the law is enacted and entering into operation within 48 months from the date the Outorga is issued. After granted, the projects remain entitled to the benefits until the end of the Outorga's validity (usually of 35 years). The law also outlined the creation of a new incentive for sources with low carbon emissions, although such a mechanism is yet to be detailed.

Other aspects of the country's power sector regulation also favor investments in renewables:

- The sector comprises a consolidated institutional framework of authorities with combined technical

Table 1. Prime energy consumption for the selected countries, considering equivalent output units.

Country		Oil	Natural gas	Coal	Nuclear	Hydro	Renewables	Total
China (9,596,961 km ²)	Absolute	27.91	11.06	81.67	3.11	11.32	6.63	141.7
	Relative	19.7%	7.8%	57.6%	2.2%	8.0%	4.7%	100.0%
United States (9,371,174 km ²)	Absolute	36.99	30.48	11.34	7.6	2.42	5.83	94.66
	Relative	39.1%	32.2%	12.0%	8.0%	2.6%	6.2%	100.0%
Germany (356,733 km ²)	Absolute	4.68	3.19	2.3	0.67	0.18	2.12	13.14
	Relative	35.6%	24.3%	17.5%	5.1%	1.4%	16.1%	100.0%
Brazil (8,510,295 km ²)	Absolute	4.73	1.29	0.66	0.14	3.56	2.02	12.4
	Relative	38.1%	10.4%	5.3%	1.1%	28.7%	16.3%	100.0%

Source: the authors, based on data from BP, Statistical Review of World Energy, 2020.

expertise and experience, including the Ministry of Mining and Energy (“MME”), the Electric Energy National Agency (“ANEEL”), the Energy Research Company (“EPE”), the National Grid Operator (“ONS”) and the Electricity Trade Chamber (“CCEE”), among others.

- The country has an open access regulation for connecting to the grid, with fixed tariffs per MWh established by the federal government and a continuous expansion of the transmission system. ANEEL is also discussing specific regulations to indemnify, under certain criteria, power plants affected by curtailments and constrained-off situations determined by the ONS.
- The legal system enables eminent domain and easements over the areas needed for the transmission lines between the power plant and the point of connection to the electric network, provided that regulations are observed.
- Several ongoing reforms tend to increase the demand for new power generation projects, including the gradual liberalization of the electricity trade market, the segregation of purchase of power and energy, the implementation of hourly energy spot prices, and loosen regulations for the energy supply to electric cars.
- There is a class of “special consumers” that may migrate to the free market under the strict condition of purchasing their energy supply from “special energy” sources only, which include solar, wind, biomass, and hydro with a maximum capacity 50 MW.
- While part of the market is still supplied by distribution companies, regulations allow these individuals and companies to produce their energy from clean sources and to inject it into the distribution grid in net metering schemes (known as “distributed generation”), and solar has been the preferred source.
- Further tariff incentives remain applicable to “self-generation” projects and entitle the exemption of certain sectoral charges included in the TUSD or TUST, and specific corporate structures are being created among developers, investors, and consumers for this purpose.
- There are still tax incentives for infrastructure projects and other benefits for renewable sources depending

on the characteristics and location of the power plant that should be assessed on a case-by-case basis.

New technologies should also foster investments in renewables in Brazil. Offshore wind power plants have started to gain traction in 2020, and around seven projects have already requested environmental licensing. Green hydrogen is also expected to advance major market opportunities. The Hydrogen Council estimates that Brazil can take the lead for green hydrogen, due to the fast expansion of renewables in the country. In addition, the Brazilian National Energy Policy Council defined the technology as strategic to the country, which means that more Research & Development (“R&D”) projects will be funded on the matter in the following years with resources from mandatory R&D investments of public services concessionaires.

All being said, renewables are an inexorable reality in Brazil’s present and future, with an increasing number of projects being developed every day and with even more potential for investment. Further developments are sure to come, due to the liberalization of the electricity trade and the entrance of new technologies.

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