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Trends in Brazil

Facts from the *Renewables in Cities 2021 Global Status Report*

Key Renewable Energy Takeaways in 2020 from Brazil

- Brazil is Latin America's largest renewable energy market. The liberalisation of the country's electricity market has enabled local governments and other energy consumers to increasingly procure renewable power directly from local/nearby projects, mostly solar PV.
- Prosumerism, especially in the form of community-owned solar systems, has become an attractive option to deploy renewable energy generation capacity in Brazilian cities.
- Despite the predominant use of biofuels in transport, the e-mobility trend is also gaining ground in Brazil, including in its most populous city: **São Paulo**.

Brand new data shows

- 13 cities in Brazil had renewable energy targets and/or policies (from a global total of over 1,300 cities). This covers 51.6 million people, 28% of the urban population in Brazil.
- Brazilian cities are lagging behind on setting net-zero¹ targets. Notable exception is **Belo Horizonte** which a net-zero target in 2020; 5 other cities had net-zero targets under development.
- Brazilian cities are lagging behind in climate emergency declarations: **Recife** was the first and only Brazilian city to formally declare a climate emergency (2019)²; globally 1,852 cities had such a declaration.

Renewable Energy Developments in Brazilian Cities

City renewable energy commitments and policies

- **Cáceres Prefecture** and **Itu Municipality** achieved their 100% renewable targets (for municipal operations and city-wide respectively) by 2020.
- **Curitiba**, **Palmas** and **Recife** also have targets for 100% renewables but for later years (2030, 2022 and 2037, respectively).
- **Rio de Janeiro** aimed to procure only zero-emission buses by 2025 and had pledged to implement bans/restrictions on fossil fuel vehicles.

¹ Net-zero" emissions can be achieved, for example, by using natural sinks, such as reforestation land or adopting agricultural best practices, or through a technological solution, such as carbon capture and storage. Net-zero targets also are referred to commonly as "climate-neutral", "carbon-neutral" or "zero-emission" targets, although technically these are not the same. Carbon neutrality refers to net-zero emissions of only CO₂, whereas climate neutrality indicates a broader focus on net-zero emissions of all greenhouse gases. There is no agreed-upon definition, and implementation of these targets also varies broadly.

² Recife is the 16th most vulnerable city in the world to climate change. Drastic changes in the local weather have motivated the local government to make commitments towards a low-carbon future.

- **São Paulo** and **Volta Redonda** had policies supporting the uptake of renewables in transport:
 - In 2019, **São Paulo** granted an exemption from the Vehicle Property Tax to electric, hybrid and hydrogen vehicles registered in the city.
- In 2007, **São Paulo** was among Brazil's first cities to enforce a solar mandate (applicable to all new buildings), and by 2015 >110,000 m² of collector area had been installed across the city.
- **Paraíso do Tocantins** adopted a new solar mandate in 2020, and several other cities implemented other new policies supporting renewable power:
 - **Rio de Janeiro** passed a tax exemption for renewable power produced by distributed generation projects.
 - **Salvador** started offering property tax discounts for installing solar PV; the system must correspond to a minimum percentage consumed by the property.
- In 2019, in response to its climate emergency declaration, **Recife** committed under the City Climate Action Plan to becoming carbon neutral by 2050.
- **Fortaleza** launched its climate action plan in 2020.

Scaling up renewables in buildings and transport

- **Cities in Brazil are accelerating on-site generation of renewables:**
 - **Uberlândia** nearly tripled its solar PV capacity between mid-2019 and mid-2020, to nearly 50 MW, making it the nation's top city for solar PV.
 - Established in 2015, the **Palmas** Solar project, co-financed by the city and three private banks, provides tax incentives for the installation of solar panels, stimulating consumers to feed surplus generation to the grid, thus reducing their energy bills:
 - As of October 2020, the city had granted discounts totalling BRL 415,785 (around USD 103,000) and supported 3.8 MW of installed decentralised generation capacity.
 - **Palmas** also implemented the Parque Solar project: in 2018, the government-owned bank Caixa Econômica Federal provided financing to install solar panels on public schools, saving the municipality an estimated BRL 5,000 (USD 1,240) per month; Phase 2 involves building a 5 MW solar farm to power all municipal buildings with solar energy.
- **Biofuels in urban transport remain strong, due to national mandates:** Brazil is a top producer of ethanol and biodiesel; Urban transport systems benefit from high shares of renewables due to existing national-level biofuel blending mandates, which have been strengthened in recent years.
- **Despite the predominance of biofuels, electrification of urban transport is also gaining ground:** **São Paulo**, Brazil's most populous city, has joined the global e-mobility trend. Although these efforts rely by default on relatively high shares of renewables in the regional mix, examples exist of explicit links to renewable electricity:
 - In 2019, the municipal government integrated 15 electric buses into its fleet and set a requirement that these must be charged using solar power.
 - In 2020, **São Paulo's** metro announced plans to build new renewable energy generation capacity to meet its electricity demand.

Financing renewables in cities

- In Latin America, investment in renewable energy capacity has grown markedly, up 43% in 2019; Brazil dominated this investment (up 74% to USD 6.5 billion).
- The liberalisation of the electricity market in Brazil has made it possible for municipal governments and other large energy consumers to procure renewable electricity directly from local or nearby projects:
 - In 2020, the state government of Piauí opened bidding for a USD 32 million PPP to build eight solar PV plants of 5 MW each in six municipalities (**Caraúbas do Piauí, Miguel Alves, Piracuruca, Jose de Freitas, Cabeceiras do Piauí and Canto do Buriti**) as a way to meet the power demand of all state-owned buildings.
 - **São Paulo** initiated a PPP for a USD 32.6 million investment in solar PV to supply the city's health department.
 - **Curitiba** partnered with the local utility to jointly finance (a 5 MW solar-biomass project that will supply 43% of the municipal building's electricity needs.
 - In **São Paulo**, provides long-term, low-interest loans for small-scale renewable energy projects.

Citizen engagement to achieve energy and climate goals

- Some examples of prosumerism exist in Brazil: Community-owned solar systems sprung up after the National Energy Agency changed its regulations in 2015 to allow for shared distributed generation:
 - By 2019, at least eight community energy initiatives were operating in the country, including solar options for urban residents who do not own the buildings they live in.
 - In 2020, a community solar PV project was started in **Rio de Janeiro's** favela (slum) that will supply 30 families with electricity from a 26 kW-peak solar PV system; the system will be refinanced by 50% of the savings on the energy bills of its members.
- **Porto Alegre** was the birthplace of participatory budgeting. As the rest of the world continues to praise this Brazilian invention, the practice has fallen away in its birthplace. Porto Alegre recently suspended its participatory budgeting program³.

Brazil's Energy Profile:

<https://www.iea.org/countries/brazil>

Regional Trends: Latin America

- Trends include the integration of solar PV and solar thermal systems in public buildings; the creation of public-private partnerships to implement larger decarbonisation projects (such as investments in public transit infrastructure); and growing momentum for the electrification of public bus fleets, with e-buses operating in cities across 10 Latin American countries.

³ <https://www.wri.org/blog/2018/06/what-if-citizens-set-city-budgets-experiment-captivated-world-participatory-budgeting>

- Many cities in the region already have high shares of renewable electricity in their energy mixes due to: a large contribution of hydropower to national and regional grids; emerging national-level regulations for integrating distributed renewable energy generation, and the resulting growing penetration of wind and solar power; as well as the emergence of renewable energy auctions. Similarly, many urban transport systems in the region also benefit from high shares of renewables due to existing national-level biofuel blending mandates.

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All report materials, figures, case studies and the full data pack can be downloaded here: <http://ren21.net/rec2021press>