

PALMAS

BRAZIL

Land area
(km²)

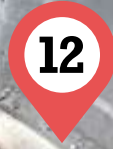


100.6

Population size
(2020)



306,000



Palmas City, the capital of the state of Tocantins in north-central Brazil, aims to generate 100% of its electricity from solar power by 2022 and to have 100% of its local electricity energy supply based on solar energy by 2035 (foregoing the use of hydropower from the regional grid). Hydroelectric dams located on the Tocantins River account for nearly 97% of the electricity consumed in the city, in addition to providing power elsewhere in the country. However, electricity bills in Palmas are among the highest in Brazil, and growing uncertainties about hydropower's stability and climate and environmental risks have heightened interest in exploring the local solar resource.

The Palmas Solar project, established in 2015, provides tax incentives for companies and households to install solar PV panels and to feed surplus generation to the electricity grid. The benefits include reducing the city's dependence on hydropower and non-renewable energy sources, improving air quality and reducing greenhouse gas emissions. The main drivers for reducing hydropower are rising energy bills and the environmental risks of this generation source.

At first, the project focused on solar PV installations only in new buildings, but it has since extended city-wide. Users are encouraged to install solar panels in exchange for a discount of up to 80% on two municipal taxes – the Property and Urban Land Tax and the Real Estate Transfer Tax – for a period of five years. The costs for private users are drastically reduced, as the solar power they generate is fed into the grid and discounted from their energy bills. The local utilities maintain the distribution infrastructure, for which users pay a minimal equipment cost.

For Palmas, the tax incentives did not affect public revenue because the project was launched right after a tax increase, foreseeing that a share of municipal revenue would be allocated to this project. Three private banks, Banco da Amazônia, Banco do Nordeste and Banco do Brasil, have helped finance any remaining costs. The programme has led to the creation of a solar PV market with more than 20 local enterprises selling and installing imported or locally manufactured solar panels. 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 under the Palmas Solar programme.

In parallel, Palmas implemented the Parque Solar project. During phase 1 of the 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, although funding is yet to be secured.





RAJKOT

INDIA



13

Rajkot, the fourth largest city in the western Indian state of Gujarat, has committed to reducing its greenhouse gas emissions 14% by 2022-23 (from 2015-16 levels). Energy consumption in residential buildings totalled 606 million kWh in 2015-16, accounting for around half of all electricity consumption and contributing 35% of greenhouse gas emissions from economy-wide activities in the city. Recent efforts have focused on reducing energy consumption and enhancing energy efficiency in residential buildings. The Capacity Building for Low Carbon and Climate Resilient City Development project (CapaCITIES) has helped maximise the use of renewables in the city, reducing the need to tap into the predominantly coal-based national grid.

The Krantiveer Khudiram Bose social housing complex (known as 11A) consists of five buildings with a total of 140 dwelling units. At full occupancy, common amenities (lifts, lights, pumps, etc.) consume 3,000 kWh of electricity per month. To encourage the adoption of solar PV, a 31.5 kW-peak grid-connected solar PV system is being installed on-site and will be operated and maintained by the contractor/developer for a period of 10 years. The system consists of 100 polycrystalline solar PV panels of 315 watt-peak capacity each, mounted on a frame at a 21-degree panel tilt. It will generate around 3,780 units of electricity per month (45,360 kWh per year) and has the potential to reduce 37 tonnes of CO₂-equivalent greenhouse gas emissions annually. Overall responsibility for the safety, security and periodic cleaning of the panels will lie with the township's Residential Welfare Association, which has been trained on panel maintenance.

Because of its efforts in low-carbon action and community engagement, Rajkot Smart City was selected as the national winner of WWF's Global One Planet City Challenge in 2020. Other noteworthy initiatives in Rajkot that support this award include: the installation of 9,629 kWh of grid-connected solar PV systems on residential buildings (with a further proposed 500 kWh on municipal buildings); retrofitting of 63,178 public street lights with light-emitting diodes (LEDs), resulting in annual energy savings of 11.5 million kWh; the implementation of Smart Ghar III, an affordable green home concept aimed at maintaining indoor thermal comfort with minimal climate impact; and plans to replace diesel buses with electric ones, along with the provision of solar PV charging.



Source: See endnote 124 in the *Urban Policy Landscape* chapter.