

BEST PRACTICES IN CITIES AND STATES



1

BIOGAS AND ELECTRICITY PRODUCTION AT COMLURB'S ECOPARK¹



Rio de Janeiro - Brazil



This is the first factsheet in the series Just and Inclusive Energy Transition: Best Practices in Cities and States developed by the Energy Research Office (EPE).



The main objective of this series is to **accelerate the process of a just and inclusive energy transition in states and cities** by disseminating structured information on sustainable energy infrastructure projects.



These projects have the potential **to inspire and promote the dissemination of best practices** among other state and local governments. This series also contributes to ensuring that best practices feed back into energy planning itself.



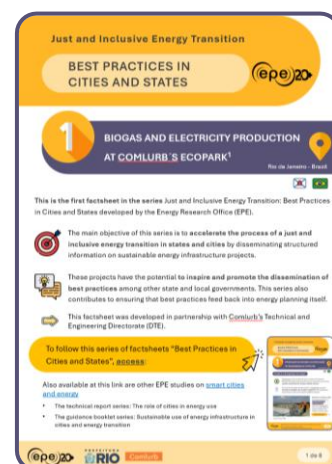
This factsheet was developed in partnership with Comlurb's Technical and Engineering Directorate (DTE).

To follow the “Best Practices in Cities and States” factsheet series, **access:**



Also available at this link are other EPE studies on [smart cities and energy](#)

- The technical report series: The role of cities in energy use
- The guidance booklet series: Sustainable use of energy infrastructure in cities and energy transition



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What is the Caju Ecopark?



The Caju Ecopark is part of Rio de Janeiro's Municipal Urban Cleaning Company (Comlurb) and promotes the **sustainable management of urban solid waste**.



Through low-carbon technologies, the Ecopark promotes the **biological treatment of organic waste through a circular economy** and inclusive energy transition approach.



Source: Comlurb, 2025.

Regional relevance

In operation since 2019, the **Biomethanization Pilot-Unit**, located in the Caju Ecopark, is the first 'dry' anaerobic digestion unit installed in Latin America.

[Learn more ¹](#)



Technological Routes that Add Value to Waste

Technological routes have been implemented at the Caju Ecopark, aimed at the reduction, reuse, treatment, and recovery of organic waste. Some routes are outlined below:



Food bank



Pilot unit of
Biomethanization
and Energy
Utilization of
Biogas



Pilot unit of
Accelerated Composting
with Gore® Cover-type
Membrane and
Composting Yard



Mechanical
Pruning
Processing Unit



Organic Compound
Processing Unit



*Anaerobic digestion is a biological process that occurs in the complete absence of oxygen (O₂), **resulting in the formation of biogas**, which is rich in methane (CH₄) and can be **converted into energy**.*



“Technological tropicalization”

The biomethanization unit

The project aimed **to technologically adapt (“tropicalize”)** an optimized anaerobic treatment process, widely disseminated in countries with modern systems of sustainable management of Municipal Solid Waste (MSW), mainly in Europe.

National technical capacity

This is a **Brazilian technology** developed through a partnership between the startup Methanum, the Federal University of Minas Gerais (UFMG), and Comlurb, implemented with non-reimbursable funding from the National Bank of Economic and Social Development (BNDES).



Business model: the role of BNDES

The Biomethanization Pilot Unit was implemented with funding from BNDES.

Investment in the plant was made through the 2010 FUNTEC/BNDES Technological Fund Call for Proposals — Non-Refundable Financial Collaboration Agreement — with total approved funding of R\$ 10.3 million.



Source: Comlurb, 2025.

The process in numbers



The Biomethanization Unit has an average capacity for treating organic waste of:

**4,500
tonnes/
year**



The waste is collected by Comlurb from schools of the municipal school system.

**80
schools**

The facility also receives segregated organic waste from supermarkets, hotels, and hospitals, in addition to green waste from the municipality's arboricultural management.



The biogas produced is converted into electricity, ensuring the plant's energy self-sufficiency and supplying the Ecopark's electric vehicle charging station, contributing to a net-zero process.

Using a 35 kW power generator

Destination of organic composts



The resulting organic compost is supplied as an input for urban agriculture programs and for the

City Hall initiatives, such as the “Hortas Cariocas” program, as well as the maintenance of parks and gardens carried out by Comlurb.



The material digested in Biomethanization is sent for post-treatment via **composting**,

improving the compost's quality for use in soil and agriculture.



Source: Comlurb, 2025.

Stakeholders



Source: Comlurb, 2025.

Actor/Organization	Responsibility
Rio de Janeiro City Sanitation Company (Comlurb)	Operation and Coordination
Methanum Waste and Energy and Federal University of Minas Gerais (UFMG)	Development and Implementation
National Bank of Economic and Social Development (BNDES)	Financing (Biomethanization)
City of Cologne (Germany), the German Federal Ministry for Economic Cooperation and Development, and Engagement Global	Funding (Food Bank, Gore Cover, Pruning Processing)
Municipal Department of Social Assistance (SMAS) and Municipal Department of Environment and Climate (SMAC) of Rio de Janeiro / Zona Sul Supermarkets S.A.	Support/Operation
C40 Cities; Global Methane Hub (GMH); Inter-American Development Bank (IDB); United Nations Environment Programme (UNEP)	Support/Operation

Regulatory Framework



Global Methane Pledge:

an initiative launched at COP26 (2021) that aims to reduce emissions of the potent greenhouse gas methane (CH₄) by at least 30% by 2030

National and Local Plans



Sustainable

Development and

Climate Action Plan of

the City of Rio de Janeiro: Municipal Decree No. 48.940, June 4, 2021.



National Solid

Waste Plan (Planares)

Federal Decree No. 11.043/2022, April 13, 2022



Municipal Plan

for Integrated Solid Waste Management

of the City of Rio de Janeiro: Decree No. 50.868, May 31, 2022



Rio Strategic

Plan 2025-2028: Rio

Decree No. 55.611, January 1, 2025



Jun
2021

Goal 1.2: Achieve 80% diversion of organic food waste generated by activities of large waste producers (supermarkets, restaurants, etc.) **recovery** facilities (composting and/or biodigestion);



Apr
2022

Goal 7: Increase the recycling of the organic fraction of municipal solid waste (MSW).

Example of Indicator: Percentage of total mass sent for biological treatment: Recover 13.5% of the organic fraction relative to the total mass of MSW by 2040;



May
2022

Highlights the Pilot Biomethanization Unit as a strategic tool to outline the planning of organic waste treatment and recovery at the Caju Ecopark.



Jan
2025

MI24 Goal: Position the municipality among the 5 Brazilian cities with the highest waste recovery rate by 2028.

Rio Mais Orgânico (More Organic Rio) -

Expansion of the processing, treatment, and valorization of organic waste, focusing on reducing methane emissions linked to the promotion of urban agriculture, food security, and energy generation.

Contribution to the SDGs (2030 Agenda)

Sustainable Development Goals (SDGs) of the United Nations (UN)

02 ZERO HUNGER 	Solidarity Food Banks at Caju Ecopark and Cidade de Deus: production of the organic compost “Fertilurb,” which supports “Hortas Cariocas,” Rio de Janeiro City Hall’s community garden program.
07 AFFORDABLE AND CLEAN ENERGY 	Biomethanization Unit: generation of clean and renewable electricity that ensures the energy self-sufficiency of the treatment process itself, in addition to providing power for the electric vehicle charging station at the Caju Ecopark.
11 SUSTAINABLE CITIES AND COMMUNITIES 	Recovery and valorization of the organic fraction of municipal solid waste.
12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	Diagnosis on food waste in Rio Strategies to reduce food waste in supermarkets through Food Banks.
13 CLIMATE ACTION 	Reduction of fugitive methane emissions from landfills Energy transition enabled by biogas Carbon sequestration through the use of organic compost.
15 LIFE ON LAND 	Production of organic compost to support urban agriculture and reforestation programs in partnership with the Municipal Department of Environment and Climate.

Video material: how the circular economy is implemented by Comlurb Rio (C40 Cities / Comlurb).



How has EPE addressed this topic?

The role of cities in energy use (2022): It is a [series of technical reports](#) prepared by EPE that provide context and delve into specific topics related to smart cities from an energy perspective.

Sustainable use of energy infrastructure in cities and energy transition (2024). Targeting local governments, this [series provides guidebooks](#) within the theme of cities and energy infrastructure. Review the content and access the following files:



Summary of
Guides



Local Guide 1



Local Guide 2



Local Guide 3



Energy
Transition
Local Guide

Ten-Year Energy Expansion Plan (PDE)



The **PDE** is a study prepared by EPE under the guidelines and support of MME. Its primary objective is to indicate the **needs and prospects for the expansion of the energy sector** over the study's horizon, from the government's perspective, with an integrated view of the various available energy sources. On pages 20 to 24 of the [PDE 2035 Biofuels Supply Notebook](#), you will **find information on biogas and biomethane**.

**Follow the upcoming
factsheets in the series**

Just and inclusive
energy transition:
**Best practices in
cities and states**

BEST PRACTICES IN CITIES AND STATES 1. BIOGAS AND ELECTRICITY PRODUCTION AT COMLURB'S ECOPARK.

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