



RIO DE JANEIRO BRAZIL

MITIGATING METHANE AND BLACK CARBON FROM THE MUNICIPAL SOLID WASTE SECTOR

Rio de Janeiro is the second-largest city in Brazil and the third-largest metropolitan area in South America. The city faces a number of solid waste management challenges, including low collection rates in unplanned settlements, low recycling rates, and difficulty producing quality compost. In 2013, Rio joined the Climate and Clean Air Coalition (the Coalition) Municipal Solid Waste Initiative (Waste Initiative), partnering with the U.S. Environmental Protection Agency (EPA) to address these challenges and reduce short-lived climate pollutant (SLCP) emissions from the waste sector, particularly methane and black carbon.

CHALLENGES AND OBJECTIVES

There are two sides to Rio de Janeiro: the planned areas of the city and the unplanned settlements (also known as slums or favelas); the favelas contain nearly one-quarter of the city's population despite covering only 2% of the city's area. Although Rio's public sanitation company, Companhia Municipal de Limpeza Urbana (COMLURB), provides full waste collection services in the planned sections of the city, there are a number of high-density favelas that do not receive these services at the same level as in the formal neighborhoods. This is due in part to the difficulty of accessing these areas with traditional waste collection vehicles, as many of the favelas are in the forested hillsides surrounding the city. In addition, the city's waste collection routes have not been updated, and some are inefficient, resulting in excessive fuel consumption.

Rio's sizable street markets, produce markets, and tourism industry generate large volumes of organic waste, making up just over 50% of the city's total waste stream. Some of this organic waste is treated at the city's 200 ton-per-day (TPD) open windrow compost facility, but there are many opportunities to increase waste diversion rates, especially through source separation by large generators. In addition, recycling rates remain relatively low; as of 2012, only 1% of recyclable materials are collected, and formal recycling programs only cover one-third of the city. Despite formal paper, cardboard, plastics, metals, and glass recycling programs, these materials make up approximately 20% of the city's waste stream.

CITY FACTS

Population:
≈ 6.3 million
Waste Generation Rate:
≈ 1.6 kg/person/day
Waste Collection Rate:
≈ 100% in some areas,
lower in others

The **Climate and Clean Air Coalition Municipal Solid Waste Initiative** unites national and local governments, international organizations, and other partners to reduce emissions of short-lived climate pollutants, such as methane and black carbon, from the municipal solid waste sector.



After completing a detailed assessment of waste management practices in Rio, COMLURB and the EPA developed a work plan that identified five main priorities to improve waste management and reduce SLCP emissions:

1. Establish an SLCP baseline.
2. Reduce fuel consumption and associated particulate matter emissions (including black carbon) from the collection and transport of waste:
 - Optimize waste collection routes;
 - Test alternative fuel sources, such as biodiesel and sugar cane diesel, and full-electric collection trucks; and
 - Develop and adopt non-power train measures, such as compliance with Euro V standards, hybrid hydraulic collection trucks, eco-driving, and green tires.
3. Enhance landfill operations and energy recovery, particularly relating to landfill gas utilization and leachate management.
 - One project of interest is the existing 20,000 m³/hour landfill gas energy plant at the closed Gramacho landfill.
4. Divert organic materials from landfills, focusing primarily on large generators of organic waste (e.g., vegetable markets, restaurants, to generate energy and compost).
5. Increase paper and cardboard recycling rates through improved curbside collection and the construction of a material recovery facility in Caju Eco-Park.

ACHIEVEMENTS TO DATE

Through collaboration with the Waste Initiative, Rio has made substantial progress on Activities 3 and 4, landfill operations and organic waste diversion, respectively.

In September 2013, COMLURB and the EPA hosted a leachate management workshop to provide participants with training on strategies to (1) reduce the volume of leachate that has to be managed at landfills, (2) remove leachate from within the waste mass, and (3) treat and dispose of leachate in an environmentally responsible manner. Over 120 participants attended this workshop.

COMLURB's technicians continue to participate in many of the Coalition's workshops relating to both waste management and SLCP emissions reduction in general. The Waste Initiative project partners travelled to Rio in February 2015 to discuss organic waste diversion efforts thus far, and to visit the Caju composting plant to assess its operations. The team led a training session on composting basics and operations; and provided recommendations on how to reduce costs at the Caju facility, and on opportunities to maintain and expand the plant's capacity.

ABOUT THE COALITION

The Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (Coalition) is a voluntary global partnership of governments, intergovernmental organizations, business, scientific institutions and civil society committed to catalysing concrete, substantial action to reduce SLCPs (including methane, black carbon and many hydrofluorocarbons). The Coalition works through collaborative initiatives to raise awareness, mobilise resources, and lead transformative actions in key emitting sectors.



Landfill gas recovery and purification plant at the closed Gramacho landfill

Rio recently began construction of a 50 TPD biomethanization plant at the facility, which will be fueled with organic waste from large generators. The plant, expected to begin operating in August 2017, will produce biogas for future energy use and high quality compost.

In April 2015, the Waste Initiative project partners conducted an organic waste characterization study to determine how organic waste is generated, disposed of, and diverted from large organic waste generators (e.g., restaurants), and to assess opportunities to increase diversion of this waste. The team collected data from 49 different organic waste generators across a variety of sectors. Based on the study's findings, the Waste Initiative project team recommended the following actions: pursue opportunities to separate organic waste, coordinate the collection of organic waste by focusing on specific generator categories, encourage separation of cardboard and paper, standardize messaging about material recovery and make employee training mandatory, and encourage generators with on-site composting to incorporate food waste.

ONGOING ACTIVITIES

Moving forward, Rio is working on implementing the recommendations of the organic waste generator study as well as the other actions identified in the Waste Initiative work plan.

Rio is in the process of finalizing a contract for a 1,500 TPD material recovery facility in the Caju Eco-Park, to help improve recycling rates.

MORE INFORMATION

www.waste.ccacoalition.org
www.waste.ccacoalition.org/participant/rio-de-janeiro-brazil

@ ccac_secretariat@unep.org

@CCACoalition

facebook.com/ccacoalition