

Santos, Brazil

City Information

Population: 434,742 (IBGE, 2017)

Area (km²): 271 km², of which 231.6 km² correspond to the continental area and 39.4 km² to the insular area (PGIRS, 2012).

Climate: Tropical, hot and humid climate, with an average annual temperature of 22°C. (PGIRS, 2012).

GDP/Capita \$ 11,096.78¹ (IBGE, 2015)

Main Economic Activities: Santos' economy is heavily based on port activity, harboring the largest port in Latin America, where more than a quarter of all national cargo harbor. Other sectors that influence the dynamics of the municipality's economy are tourism and services.

City website: <http://www.santos.sp.gov.br/>



Country Information

Population: 208,494,900 (IBGE, 2018)

Area (km²): 8,515,759.090 (IBGE, 2017)

Economy and GNI/Capita

Upper-middle-income: US\$ 8,580 PPP (2017 – World Bank)

Main Economic Activities

- Agriculture: mainly coffee, soybeans, wheat, rice, corn, sugarcane, cocoa, citrus, beef
- Industry: mainly automobile, petrochemicals, machinery, electronics, cement and construction, aircraft, textiles, food and beverages, mining, consumer durables, tourism.

Government Agencies responsible for guidance on waste legislation

Ministry of Environment: <http://www.mma.gov.br/cidades-sustentaveis/residuos-solidos>

Ministry of Cities: www.cidades.gov.br

¹ Equivalent to BRL 46,007.27, according to exchange rate from September 7 2018: 1 BRL = 0.241 US\$

MSW Sector Overview: City Level

Classification of MSW

Waste generated by households and small businesses, such as markets, bars and restaurants, have to be separated between residual waste and dry recyclables, according to the municipal law. For these generators, the collection is carried out by the municipality.

Large waste generators, such as hotels, hospitals, malls, with an amount of up to 120 kg or 200L per day, are responsible for contracting the collection, transportation and final disposal services from private providers.



<https://egov.santos.sp.gov.br/legis/document/?code=6198>

MSW Generation

The municipality of Santos generates approximately 174,859 tons per year of MSW (2017), including waste from households, small businesses and public cleaning services. The per capita generation of MSW is 402.21 kg/inhabitant/year.

Due to the fact that the municipality of Santos is a seaside town with an intense tourist flow during the months of December and January, due to summer months and school holidays. During these months, there are peaks of MSW generation, which correspond to about 20% of the total generated annually.

MSW Collection Coverage and Type

Municipalities in Brazil are responsible for planning and implementing the collection and management of MSW. Santos currently delegates the collection and disposal services to private sector operators. However, the Municipality directly handles some waste collection services. The Public Services Secretariat (SESERP) is responsible for the contracts management of waste services. Since 1998, when the first contract was signed, Terracom Company carries out the regular collection, separate collection and final disposal of the waste of Santos, covering 100% of the territory.

The waste collection services in Santos encompass the following activities:

1. Services contracted and/or done by the Municipality:

- Regular door-to-door collection of waste generated in households and small businesses. This collection is carried out six days a week.
- Door-to-door collection of dry recyclable waste generated in households and small businesses, known as "Recicla Santos" program. The collection is performed six days a week, once a week in each neighborhood. Large generators can also count on the service of separate collection since it was previously authorized by the municipality.
- On-demand collection service of bulky waste and construction and demolition (C&D) waste, limited to 1m³, called "Cata Treco".
- Beach cleaning service performed daily.

2. Services carried out by the private generators:

- Collection and final disposal of industrial waste, ports, roads and rail terminals. The private haulers have to be contracted by the generators.

Climate and Clean Air Coalition Municipal Solid Waste Initiative

<http://waste.ccacoalition.org/>

- Private service providers for healthcare waste.
- Materials drop-off sites located in commercial establishments for delivery of fluorescent lamps, medicines, paraffin, radiological films, tires, batteries and batteries, electronic waste, used cooking oil and bicycles. The municipality requires that establishments that sell these materials offer their own collection boxes and transport to the final destination.

The table below summarizes the stakeholder responsible for collection for different types of waste.

Type of waste	Municipal service	Private service providers
Residual waste	For households and small businesses	For large generators
Dry recyclables	"Recicla Santos" program for households and small businesses and for large generators that have been previously authorized	NA
Bulky waste	"Cata Treco" on-demand collection service	For large generators
C&D		For large generators
Healthcare waste	NA	For specific generators

Waste Composition

The main fraction of the waste in Santos is organic waste, including food waste and green waste, and corresponds to 36%. Dry recyclables are mainly composed of plastics, which account for about 27% of the total waste generated.

Tipo de Material	%
Plastics	11.19
Plastic film	15.47
Tetra Pak	1.29
Cardboard	2.97
Paper	13.27
Non-ferrous metals	0.80
Ferrous metals	1.43
Wood	1.65
Glass	1.04
Leather	2.30
Textile	1.74
Others	10.82
Organic waste	36.03

PRGIRS BS, 2018

Waste Management Practice

From the 174,859 tons of solid waste collected in 2017, approximately 170,193 tons (97.3%) were collected as residual waste and 4,666 tons (2.7%) as dry recyclables collected separately. The overall coverage of the collection service for municipal waste reaches a rate of 100%.

Below are described the city's waste management programs:

- Cata treco

The "Cata treco" service aims to collect bulky and C&D waste on demand, aiming to prevent the illegal dumping, especially in channels, mangroves and beaches. The service covers all neighborhoods of the insular area of the territory and collects waste such as furniture and home appliances, and C&D (maximum 1 m³).

According to the municipality, the service collected approximately 37,372 tons in 2017.

- Composta Santos

As part of the "Santos Sustentável" overarching project, the program "Composta Santos" targets composting and urban agriculture. The program was approved in 2017 to encourage the recycling of organic waste fraction from households and street markets, reducing the volume sent to the landfill and promoting urban agriculture using the compost produced.

The program was launched in June 2018 and is under implementation phase. It foresees a pilot composting facility for pruning and organic waste from street markets, with a processing capacity of up to 10 tons per day. In addition, the program has already delivered 40 vermicomposters to NGOs, schools and households that will be multipliers.

- "Recicla Santos"

The city's separate collection scheme began with the "Lixo Limpo" program in 1990, collecting dry recyclable waste throughout the beachfront region. In 1995, the coverage of separate collection was increased to 100% of the insular area, and the program was known as "Separate Collection". In 2016, with the enactment of Law 952/16, the socio-environmental program of separate collection "Recicla Santos" was set. The law establishes the obligation of the separation of the waste in two fractions, dry and wet, and the non-compliance causes application of fines. In addition, the large commercial generators are defined to be responsible for the collection and final disposal of their waste.

Currently two cooperatives of waste pickers are responsible for the segregation service. "Cooperativa de Materiais Recicláveis Santista" (Comares) operates in a public owned building under a contract of ten years that started in 2016. The NGO "Sem Fronteira" is also in charge of collecting dry recyclables from commercial generators in the downtown area; the generators request the service by online registration. In order to facilitate the transport and avoid pollutants emissions, this collection service is provided by modified bicycles called "recicletas".



Comares cooperative performing the segregation of dry



Sem Fronteira NGO collecting cardboard from a large

recyclables	generator.
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The program collected 4,666 tons of dry recyclable waste in 2017, which corresponds to 2.7% of the total waste generated and 6% of the dry fraction.

- “Recicla + Santos”
The "Recicla + Santos" program was created in 2017 as the result of a partnership between the municipality and the private sector. The program includes the provision of exchange stations, where the citizen delivers the dry recyclable waste in exchanges of credits to be utilized in the local commercial establishments. The waste is collected by specific recyclers for each type of material, which carry out the pressing and baling and send it to the corresponding industry.

The program received 87 tons of dry recyclable waste between 2017 and 2018.

- Environmental station
The "Environmental Station" project started in 2016 and aims to sensitize the population on environmental issues, in order to enable community involvement in the development of a culture of environmental co-responsibility. One of the themes addressed in the project is the generation of waste. For this purpose, activities are promoted to reflect on the importance of separate collection. The project contemplates awareness raising actions in schools, street markets and neighborhoods.

Final disposal

Currently, the waste generated in Santos and in seven other municipalities in the Metropolitan Region of Baixada Santista is disposed at Sítio das Neves Landfill, which activities began in 2010 and has an operating life until 2019. The landfill is located in the mainland area of the city, 30 km from the center of Santos, and is owned and operated by Terrestre Ambiental, a private company. In addition, the municipality has a transfer station, located in the area of the closed Controlled Landfill of Alemoa, 32 km from the operating landfill.

Financing of MSW

The expenses for public cleansing services, including solid waste management, was approximately R\$ 136 million in 2017. Additionally, in exchange for the provision of collection and final disposal services of waste, Santos has a waste tax for households and small businesses, which is paid through Urban Land and Building Tax and is proportional to the area of the property. In 2017, the revenue obtained from this tax was R\$ 45,011. An income was also obtained from selling the recyclable materials, R\$ 466,998, according to official source² of information from the municipality.

Waste Management Challenges

Currently, Santos faces four main challenge regarding waste generation and management:

- Due to the closure of the Sítio das Neves Sanitary Landfill and the unavailability of suitable sites for the construction of a new facility, the municipality faces the challenge of finding alternative areas for waste disposal. The municipality recognizes the importance of increasing the deviation of waste going to the landfill, with a specific focus on recycling of materials.
- Despite the advances observed after the Recicla Santos law, the recycling rates are still low compared to the total dry recyclable waste generated.

² <http://www.santos.sp.gov.br/?q=servico/loa-lei-orcamentaria-anual>

- The municipality also faces as a challenge on developing the Composta Santos project. The project will require awareness and active participation of the market sellers for the correct separation of waste.
- Another challenge faced by the municipality, as well as throughout the coastal region of the country and the world, is the fight against marine littering. According to international studies, 80% of the waste found in the seas and oceans have terrestrial origin. Among the main causes is the absence of waste management structures able to carry out treatment and correct destination, as well as the low awareness of the population about the impacts of littering both in the outlying residential areas and during leisure and recreation activities on the beach and coastal areas. Therefore, preventing marine pollution requires effective improvement in the management of urban sanitation in cities.

General description and overview of common practice

More than 3,352 of the 5,570 Brazilian municipalities still dispose their waste in dumpsites or controlled landfills (ABRELPE, 2017). From the waste collected, 18% goes to open dumps, 22.9% to controlled landfills and 59.1% ends up in sanitary landfills. Approximately 9% of the national territory still does not have regular services to collect their waste, although the household collection service in urban areas has reached almost 100% coverage.

The organic fraction generated in households corresponds to more than 50 percent of the total MSW generated in Brazil. When properly separated, organic waste can be transformed into fertilizer by means of the composting or biodigestion process, which can be carried out at various scales. Despite the existence of these alternatives, less than 2% of MSW is destined for composting (MMA, 2017).

In 2017, around 70% of Brazilian municipalities declared having some initiative related to separate collection (ABRELPE, 2017).

While the per capita waste generation in Brazil is 1.035 kg per day, the South and Southeast of the country present a per capita generation of 0.757 and 1.217, respectively.

Waste Generation (per capita/year)

377,775 kg/person/year (ABRELPE, 2017).

Waste Collection Coverage

Approximately 9% of the national territory still does not have regular services to collect their waste, although the household collection service in urban areas has reached almost 100% coverage.

MSW Disposal rate (tonnes/year)

According to ABRELPE (2017), 115,801 tons/day (59.1%) of what is collected are disposed in sanitary landfills and 80,249 tons/day (40.9%) are disposed in controlled dumps or open dumps.

Recycling rate

The recycling rates are: plastic 8.2%, paper and cardboard 52.3%, and aluminum 87.2% (ABRELPE, 2017).

Waste management of Organic fraction (composting, anaerobic digestion)

Around 2% of the organic fraction of urban in Brazil is recycled, with the main treatment being composting, as reported by the Ministry of the Environment.

Energy Recovery Rate

Energy recovery is still very low. Currently, 17 projects for the use of landfill gas for power generation are in operation in the country (ANEEL, 2017).

City Level

Aimed at improving waste management in general

The Municipal Solid Waste Master Plan (PGIRS) was launched in 2012 and is currently being reviewed. The PGIRS main goal is to be in line with the guidelines, strategies, goals, programs and actions defined in the National Solid Waste Law of August 2010. The main structural goals established by the PGIRS are:

<i>Goal</i>	<i>Status</i>
The promotion of the feasibility of reverse logistics flows for waste generated in the territory.	Achieved through the establishment of materials drop-off sites in commercial establishments for lamps, tires and packaging from automobile oil.
A broader discussion about the regionalization of solid waste management in the Metropolitan Region of Baixada Santista.	Achieved through the development of a regional solid waste master plan launched in 2018.
Increase the segregated collection.	Achieved with the law "Recicla Santos".
Implementation of two materials drop-off sites for dry recyclables.	Achieved partially by one material drop-off site of the program "Recicla + Santos".
Incorporation of cooperatives of waste pickers in the management of separate collection.	The municipality delegated the operation of the material recovery plant to Comares and Sem Fronteira cooperatives.
Evaluation of the adoption of new treatment and disposal systems for MSW.	The project "Composta Santos" will make it possible to divert the waste from the street markets to composting, reducing the volume of waste sent to the landfill.

Aimed at addressing climate change and reducing short-lived climate pollutants (SLCPs) through waste related activities

The Municipal Climate Change Plan was launched in 2016 and has solid waste management among its 12 thematic axes. According to the plan, one of the goals set for the reduction of the generation of greenhouse gases (GHGs) is the reduction of the MSW generation. In addition, the following measures are planned:

- Implementation and maintenance of programs for separate collection of solid waste in establishments with a high concentration or circulation of persons, as a condition for obtaining the pertinent legal authorizations;
- Discouraging the use of plastic or non-biodegradable bags, as well as excessive or unnecessary packaging, encouraging the use of products that are easy to recycle;
- Implementation of sorting and processing facilities, and promotion of organic waste composting;
- Encouragement at all levels of government to place waste recipients in public areas, suitable in size and types according to the waste generated locally.

Country Level

Aimed at improving waste management in general

The National Waste Law (12.305/2010) brings principles, objectives and instruments and sets forth guidelines for integrated solid waste management, generators' responsibilities and applicable economic instruments.

Some of its content that is important to highlight:

- An integrated municipal solid waste management must follow some steps: waste generation reduction, re-utilization, destination to treatment (recycling, composting, energy recovery) and final disposal;
- The sanitary landfills are considered the only environmentally-adequate final disposal for municipal solid waste;
- All states and municipalities must have an Integrated Solid Waste Plan, in order to be in compliance with the law and to have access to funds provided by the national government to solid waste management actions at the city level;
- Separate collection has to be part of the municipal solid waste management system and must prioritize the integration of waste pickers' cooperatives in the formal system.

Aimed at addressing climate change and reducing SLCPs through waste related activities

At the end of 2016, the Brazilian government made an official commitment through Nationally Determined Contributions to define mitigation measures to reduce the country's GHG emissions by 37% in 2025 below 2005 levels and by 43% in 2030. To this end, the country undertook to increase the participation of sustainable bioenergy in its energy matrix by 18% by 2030, restore and reforest 12 million hectares of forests, and also increase the participation of renewable energy in the composition of the energy matrix by 45% in 2030.

Although there is no specific legislation at National level that refers to GHG emissions reduction goals for solid waste and landfills, subnational governments such as municipalities are taking actions to improve their MSW management with social and environmental benefits. Another important aspect to consider is the possibility of the creation of a Brazilian carbon market, which could allow credit trading among the regulated sectors and set reduction targets. This trading scheme is being studied by Brazilian authorities and could reflect realities that are consolidated in other countries.

Legislation

City Level

Legislation governing MSW management

Complementary Law 1010/2018

<https://leismunicipais.com.br/a/sp/s/santos/lei-complementar/2018/101/1010/lei-complementar-n-1010-2018-altera-e-acrescenta-dispositivos-da-lei-n-3531-de-16-de-abril-de-1968-que-institui-o-codigo-de-posturas-do-municipio-de-santos-e-da-outras-providencias>

Complementary Law 952/2016

<https://egov.santos.sp.gov.br/legis/document/?code=6198>

Complementary Law 946/2016

<https://leismunicipais.com.br/a/sp/s/santos/lei-complementar/2016/95/946/lei-complementar-n-946-2016-institui-o-programa-ecobarreiras-e-da-outras-providencias?q=res%EDduos>

Law 3297/2016

<https://leismunicipais.com.br/a/sp/s/santos/lei-ordinaria/2016/330/3297/lei-ordinaria-n-3297-2016-institui-no-municipio-de-santos-o-programa-de-aproveitamento-de-madeira-de-podas-de-arvores-e-da-outras-providencias?q=res%EDduos>

Complementary law 779/2012

<http://www.apply.com.br/201210prefsan.htm>

Complementary law 2863/2012

<https://leismunicipais.com.br/a/sp/s/santos/lei-ordinaria/2012/287/2863/lei-ordinaria-n-2863-2012-dispoe-sobre-a-inclusao-de-estudos-basicos-sobre-tratamento-e-destinacao-do-lixo-no-curriculo-das-escolas-municipais?q=res%EDduo%20s%F3lido>

Complementary law 454/2002

<https://egov.santos.sp.gov.br/legis/document/?down=1394>

Complementary law 435/2001

<https://leismunicipais.com.br/a/sp/s/santos/lei-complementar/2001/44/435/lei-complementar-n-435-2001-altera-dispositivo-da-lei-complementar-n-322-de-29-de-dezembro-de-1998-que-dispoe-sobre-a-taxa-de-coleta-tratamento-e-destinacao-final-dos-residuos-solidos-dos-servicos-de-saude-rsss?q=res%EDduos>

Inspection activities/supervision and enforcement of legislation

The Progresso e Desenvolvimento de Santos S.A. (Prodesan) provides advice to the Municipal Department of Public Services and is responsible for managing and supervising the services performed by the contractors and the municipal team.

National Level

Legislation governing MSW management

Law 12305/2010 - National Waste Law

http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12305.htm

Decree # 7404

http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/Decreto/D7404.htm

National Policy on Climate Change (12.187/2009)

http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/lei/l12187.htm

Decree # 7390

http://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2010/Decreto/D7390.htm

2nd Brazilian GHG Annual Emissions Estimation report

http://www.mct.gov.br/upd_blob/0226/226591.pdf

Current Projects or Activities Aimed at Reducing SLCP Emissions

Two goals established by the PGIRS have been achieved or is being developed so far to reduce SLCP emissions:

- Increase in the volume of waste collected separately with the program "Recicla Santos".
- Deviation of organic waste from street markets to a composting facility and the distribution of 40 vermicomposters through the project "Composta Santos".

Additional Useful Information

In 2018, Santos won first place in the environment category in the ranking of smart cities in Brazil, especially due to the less polluting public transport fleet and social and environmental projects.