



SUSTAINABILITY

City of San Antonio, TX

2021 Inventory of Government Operations Greenhouse Gas Emissions



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Produced by the City of San Antonio’s Office of Sustainability (OS) with assistance from
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Key Findings and Trends

Figure 1 shows local government operations emissions. The largest contributor of emissions (**40.8%**) comes from Nelson Gardens, the City’s closed landfill, which is capped and capturing methane. However, this percentage is large because while a small number of emissions are released, methane has a global warming potential (GWP) 28x greater than CO₂. The Buildings and Facilities sector accounts for the next largest majority (**34%**) of total emissions. The next largest contributor is Vehicle Fleet (**17.6%**), followed by Street Lights and Traffic Signals (**7.6%**). Actions to reduce emissions from these sectors are a key part of San Antonio’s commitment to climate action.

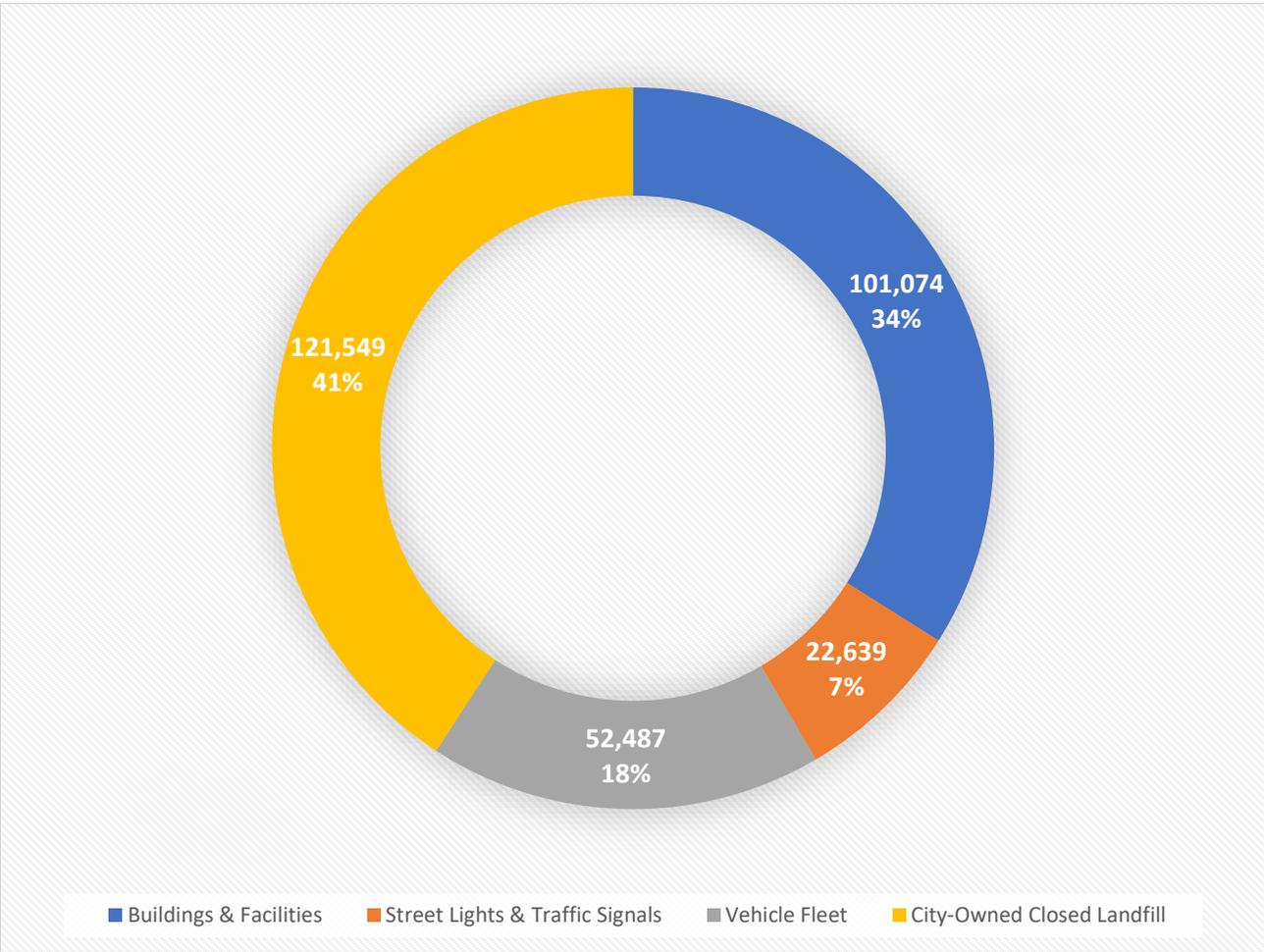


Figure 1: 2021 Government Operations Emissions by Sector (MT CO₂e)

Figure 2 shows total government operations emissions between 2013 and 2021. During this timeframe, emissions peaked in 2014 with total emissions of 571,041 MT CO₂e and fell by 37% to 272,675 MT CO₂e in 2019. The primary driver for the decrease occurred between 2016 and 2019 (-41%) as a result methodology changes where estimated emissions from several small, closed landfills that do not report to the EPA were removed due to lack of data and to bring up to par with best practices.

Total government operations emissions increased by 8.42% between 2019 and 2021 from 272,675 MT CO₂e to 297,749 MT CO₂e. While there was a 6.1% decrease in emissions from the municipal fleet, the primary driver of the increase was from the emissions generated by municipal buildings and facilities (+19%) and the City-owned closed landfill (+7.2%)

The City-owned Nelson Gardens Landfill closed in 1993 and continues to be the largest contributor to government operations. These emissions will continue to decrease over time; however, there may be periodic increases as decomposition rates fluctuate and are impacted by environmental conditions.

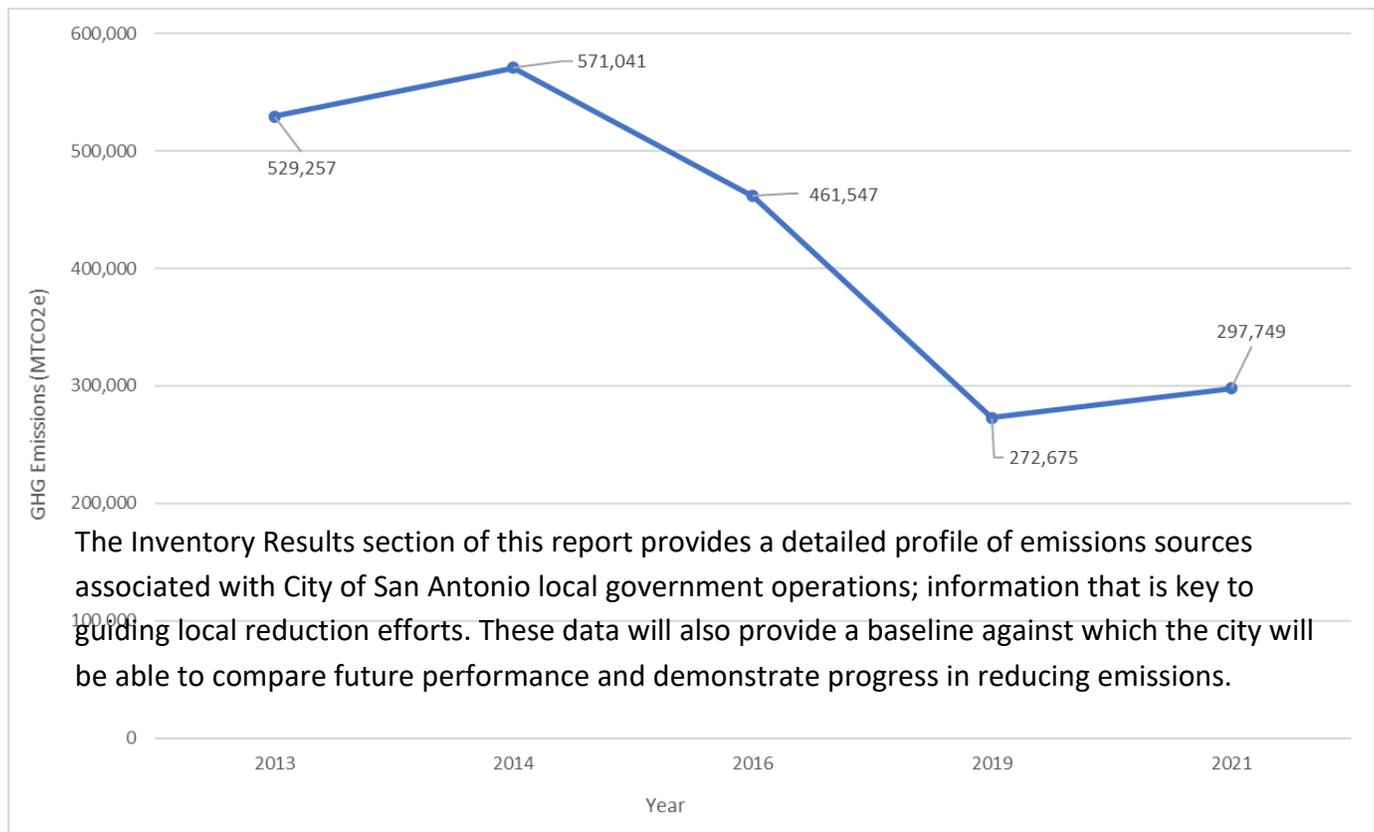


Figure 2: Total Government Operations Emissions Trends from 2013-2021 (MT CO₂e)

Inventory Methodology

Local Government Operations (LGO) Protocol

In 2010, ICLEI, the California Air Resources Board (CARB), and the California Climate Action Registry (CCAR) released Version 1.1 of the LGO Protocol¹. The LGO Protocol serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. The purpose of the LGO Protocol is to provide the principles, approach, methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory.

The following activities are included in the LGO inventory:

- Energy consumption from Buildings & Facilities
- Energy consumption from Streetlights and Traffic Signals
- Vehicle Fleet Fuel Usage
- Emissions from Closed Municipal Landfills

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. San Antonio's LGO greenhouse gas emissions inventory utilizes 2016 as its baseline year, for which the necessary data are available.

¹ ICLEI. 2010. Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions. Retrieved from https://ww2.arb.ca.gov/sites/default/files/classic/cc/protocols/lgo_protocol_v1_1_2010-05-03.pdf

Government Operations Emissions Inventory Results

Table 1: Local Government Operations Inventory

| Sector | Fuel or source | 2021 Usage | Usage unit | 2021 Emissions (MTCO _{2e}) |
|---|-----------------------------------|-------------|------------|--------------------------------------|
| Buildings & Facilities | Electricity | 219,267,202 | kWh | 91,502 |
| | Natural Gas | 963,429 | Therms | 5,124 |
| | Chilled Water | 12,733,897 | Ton-hr | 4,449 |
| Buildings & Facilities total | | | | 101,075 |
| Streetlights & Traffic Signals | Electricity | 54,251,684 | kWh | 22,639 |
| Streetlights & Traffic Signals total | | | | 22,639 |
| Vehicle Fleet | Gasoline | 32,712,757 | VMT | 23,586 |
| | Diesel | 9,472,918 | VMT | 28,709 |
| | Propane | 366,584 | VMT | 192 |
| Vehicle Fleet total | | | | 52,487 |
| Solid Waste | Municipally Owned Closed Landfill | 10,705,136 | Tons | 121,549 |
| Solid Waste total | | | | 121,549 |
| Total government emissions | | | | 297,750 |

Next Steps

Based on the results of this inventory, while progress is being made, additional work needs to be undertaken to accelerate the decarbonization of government operations. The Office of Sustainability will focus on reducing emissions through the following actions:

| | |
|---|---|
| SA CLIMATE READY GOAL: REDUCE BUILDING ENERGY CONSUMPTION | Buildings and Facilities |
| | <p>SA Climate Ready Strategy:</p> <ul style="list-style-type: none"> Achieve Zero Net Energy (ZNE) for all municipal buildings by 2040. <p>Pursue the procurement of on-site and off-site renewable energy to offset municipal buildings and facilities electricity consumption.</p> |
| SA CLIMATE READY GOAL: REDUCE TRANSPORTATION ENERGY CONSUMPTION | Fleet, Streetlights and Traffic Signals |
| | <p>SA Climate Ready Strategies:</p> <ul style="list-style-type: none"> Convert all streetlights to LEDs with daylight sensors by 2021 and implement the recommendations of the Urban Lighting Master Plan. Convert all fleet passenger vehicles and small trucks to more efficient options by 2025, with a priority on electrification. Reduce the GHG impact of employee commuting. <p>Replace remaining conventional streetlights with more efficient LED fixtures.</p> <p>Pursue the procurement of off-site renewable energy to offset streetlight and traffic signal electricity consumption.</p> <p>Implement Administrative Directive 1.4 – Municipal Facilities Energy Policy.</p> |
| | Explore the potential for quantifying and reporting emissions from employee commuting. |
| | |
| | |
| SA CLIMATE READY GOAL: ADVANCE THE CIRCULAR ECONOMY | Solid Waste |
| | <p>SA Climate Ready Strategy:</p> <ul style="list-style-type: none"> Strive to achieve zero waste for all municipal government operations by 2030 with a focus on overall reduction, product reuse, and circularity. <p>Undertake a supply chain analysis for municipal purchasing to quantify the carbon impact of procurement.</p> <p>Explore the potential for quantifying and reporting waste directly generated from government operations.</p> |
| | |

Appendix: Methodology Details

Energy

The following tables shows each activity, related data sources, and notes on data gaps.

Table 2: Energy Data Sources

| Activity | Data Source | Data Gaps/Assumptions |
|------------------------------------|-------------|-----------------------|
| Local Government Operations | | |
| Electricity consumption | CPS Energy | N/A |
| Natural gas consumption | CPS Energy | N/A |

Table 3: Emissions Factors for Electricity Consumption

| CPS | CO ₂ (lbs./MWh) | CH ₄ (lbs./GWh) | N ₂ O (lbs./GWh) |
|------------|----------------------------|----------------------------|-----------------------------|
| CPS / 2021 | 917 | 0.015 | 0.011 |

Transportation

Table 4: Transportation Data Sources

| Activity | Data Source | Data Gaps/Assumptions |
|------------------------------------|-------------|-----------------------|
| Local Government Operations | | |
| Government vehicle fleet | CoSA | N/A |

For vehicle transportation, it is necessary to apply average miles per gallon and emissions factors for CH₄ and N₂O to each vehicle type. The factors used are shown in Table 5.

Table 5: MPG and Emissions Factors by Vehicle Type

| Fuel | Vehicle type | MPG | CH ₄ g/mile | N ₂ O g/mile |
|----------|---------------|------|------------------------|-------------------------|
| Gasoline | Passenger car | 24.1 | 0.0183 | 0.0083 |
| Gasoline | Light truck | 17.6 | 0.0193 | 0.0148 |
| Gasoline | Heavy truck | 5.4 | 0.0785 | 0.0633 |
| Gasoline | Motorcycle | 24.1 | 0.0183 | 0.0083 |
| Diesel | Light truck | 17.6 | 0.001 | 0.0015 |
| Diesel | Heavy truck | 6.4 | 0.0051 | 0.0048 |
| Propane | Light Truck | 17.6 | 0.037 | 0.067 |

Solid Waste

Table 6: Solid Waste Data Sources

| Activity | Data Source | Data Gaps/Assumptions |
|------------------------------------|-------------|-----------------------|
| Local Government Operations | | |
| Waste in Place – Closed Landfill | EPA | N/A |

Inventory Calculations

The 2021 inventory was calculated following the US Community Protocol and ICLEI’s ClearPath software. As discussed in Inventory Methodology, the IPCC _5th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO₂e units. ClearPath’s inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO₂e emissions.