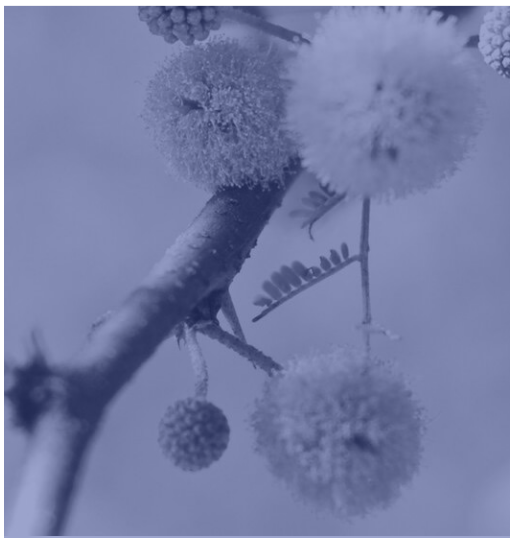
City of San Antonio

2014 Greenhouse Gas Emissions Inventory, March 2016



San Antonio launched its SA Tomorrow planning effort to guide the City toward smart, sustainable growth as it prepares for a million more people by 2040.

A sustainable San Antonio has a thriving economy, a healthy environment, and an inclusive and fair community.

The SA Tomorrow Sustainability Plan is a roadmap for enhancing the community's quality of life and overall resilience while balancing the impact of our expected growth with existing economic, environmental, and social resources.

Our Objective

One of the Sustainability Plan's primary goals is to reduce greenhouse gas (GHG) emissions from all sources in the city by 50 percent in 2040. To understand current greenhouse gas emissions levels, and their sectors and sources, the City has completed a GHG emissions inventory that assesses sources within government operations and throughout the community. This GHG emissions inventory measures and reports 2014 GHG emissions by the sector (Buildings, Transportation) and source (electricity, gasoline) they represent in government operations or the community.

Why Greenhouse Gas Emissions Matter

Greenhouse gases are essential to life on Earth and having the natural amount helps regulate the Earth's temperature. Human activities, like how we get around and the buildings we live and work in, have increased the level of greenhouse gases (GHGs) in our atmosphere and have led to disruptions in the Earth's climate. While scientists focus on six GHGs that result from various human activities, the most significant GHG is carbon dioxide (CO2). Humans produce more CO2 than any other GHG and when counting emissions of all GHGs, scientists use what is called the CO2 equivalent (CO2e). Each GHG has its own degree to which it contributes to the warming of our atmosphere and in order to compare apples to apples, we must convert the emissions of each GHG based on how they compare to CO2. For example methane, which is another GHG that is produced as trash breaks down in landfills, has 22 times more warming power than CO2. Therefore when looking at the emissions of methane, 1 ton of methane would be reported as 22 tons of CO2e.

The increase in GHGs in the atmosphere leads to an increase in the number and the intensity of extreme weather events, the degradation of our air quality, and limits the amount of available drinking water in Texas. Extreme weather events, like torrential rains contribute to flooding and destroy homes and infrastructure. An increase in temperatures results in an increase in "bad" ozone which is the primary ingredient in smog, which contributes to poor air quality and impacts the health of San Antonians, specifically the young and those with existing asthma or other respiratory issues. Finally, one of the projected impacts of a changing climate for Texas is an extended drought, which could negatively impact our drinking water supply. Therefore, it is essential that a city like San Antonio takes action to both understand and reduce its contribution to increasing GHG emissions into the air.

San Antonio Government Operations GHG Emissions

The delivery of government services to San Antonio residents, workers, and visitors resulted in the emission of approximately 583,000 metric tons of CO2e in 2014, which is equivalent to the emissions offset by 14,957,077 new seedling trees growing for 10 years. **Table 1** provides a breakdown of the GHG emissions by sector for San Antonio's government operations.

Table 1

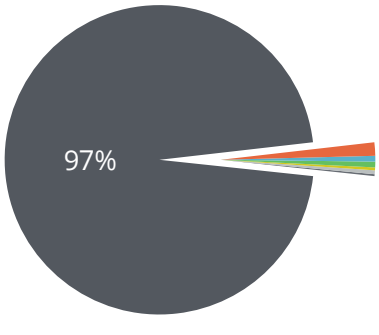
Sectors	Total GHG Emissions (metric tons of carbon dioxide equivalent)
Closed Landfills	231,103
Building and Facilities	102,158
Water Supply	98,441
Wastewater Treatment	61,388
Vehicle Fleet	55,574
Streetlights and Traffic Signals	34,662
Electricity Generation (provided as an information point only, not included in total)	16,351,643.86
Total	**583,326**

San Antonio Government Operations GHG Emissions

The Government Operations GHG Emissions Inventory assesses the emissions associated with all of the buildings and equipment the City owns as well as the various treatment and operational processes, with one exception. The City of San Antonio owns and operates a municipal utility that generates and distributes electricity to San Antonio and to surrounding communities.

The GHG emissions that result from electricity generation are nearly as much as the entire San Antonio community profile, with more than 16 million metric tons of CO2 emitted in 2014. Including these GHG emissions in the government operations inventory total would completely overshadow all other sources and would not provide a useful assessment of GHG emissions from government operations, as seen in **Figure A.**

Figure A



Therefore, GHG emissions from electricity generation are reported as an information item only and not included in the government operation total provided in this Inventory.

Due to the fact that methane is a more potent GHG than carbon dioxide, the emissions from the closed landfill represent the largest individual sector at 40%. Energy used to cool and power buildings, pump and treat water and wastewater, and power streetlights and traffic signals together comprise 50% of all sector emissions. The last 10% is captured by the municipal vehicle fleet.

Similarly, electricity and methane comprise the vast majority of source emissions at a combined 85% with gasoline and diesel representing another 9%.

Details of the GHG emissions for San Antonio's government operations by sector and source are shown in **Figures B and C.**

Figure B

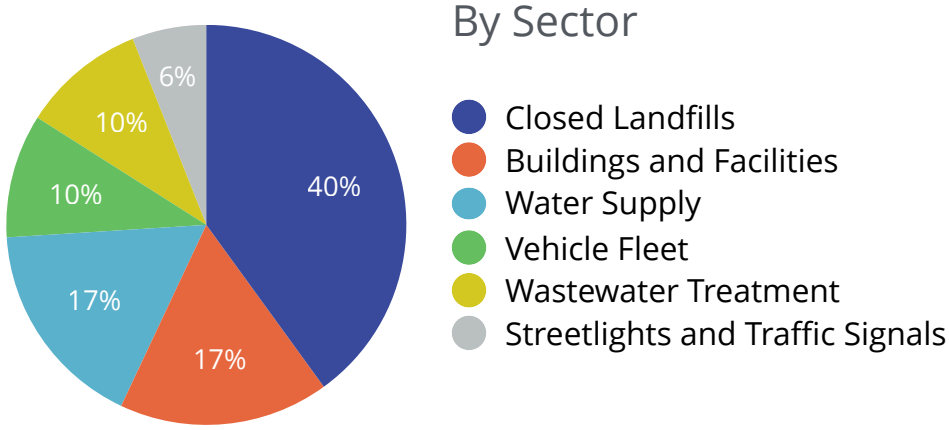
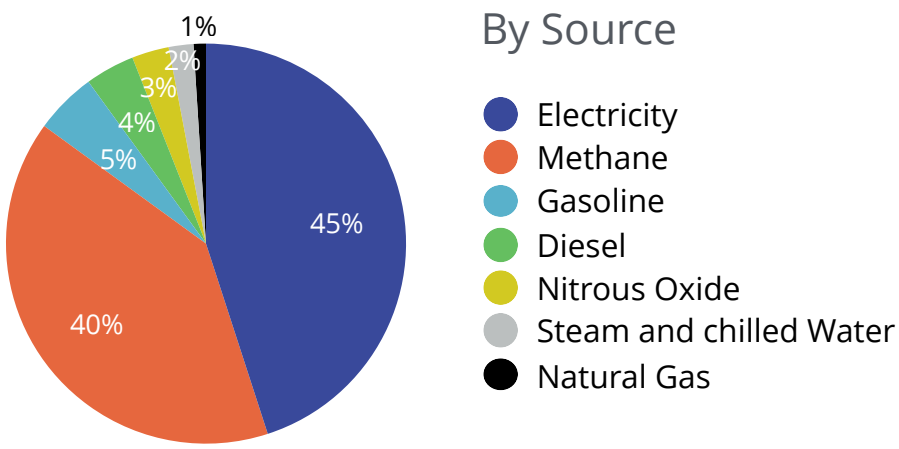


Figure C



San Antonio Community GHG Emissions

Activities by residents, visitors, and workers in San Antonio resulted in the emission of more than 16,498,864 metric tons of CO2e in 2014, which is equivalent to the emissions offset by 423,047,795 new seedling trees growing for 10 years. A breakdown of these emissions by sector is shown in **Table 2.**

Table 2

Sectors	Total GHG Emissions (metric tons of carbon dioxide equivalent)
Buildings	9,801,806
Transportation	5,882,395
Solid Waste Management	584,834
Water Supply and Wastewater Treatment	159,829
Total	**16,498,864**

San Antonio Community GHG Emissions

Emissions are reported by both the sector (Buildings, Transportation) and source (electricity, gasoline) they represent. Slightly more than half of community emissions are a result of energy used to cool, light, and power the homes, offices, and industrial facilities throughout San Antonio. The second highest sector, at more than a third of all community emissions is transportation, which includes fuel used to power cars, trucks, and buses.

When looking at the sources of emissions, the fuel used to generate electricity within the city accounted for half of all GHG emissions. Gasoline was responsible for almost a third of all GHG emissions. Diesel fuel for transportation, natural gas for building space heating and hot water, and methane from solid waste disposal and wastewater treatment each accounted for less than 10% of GHG emissions, respectively.

Details of the GHG emissions for the San Antonio community by sector and source are shown in **Figures D and E.**

Figure D

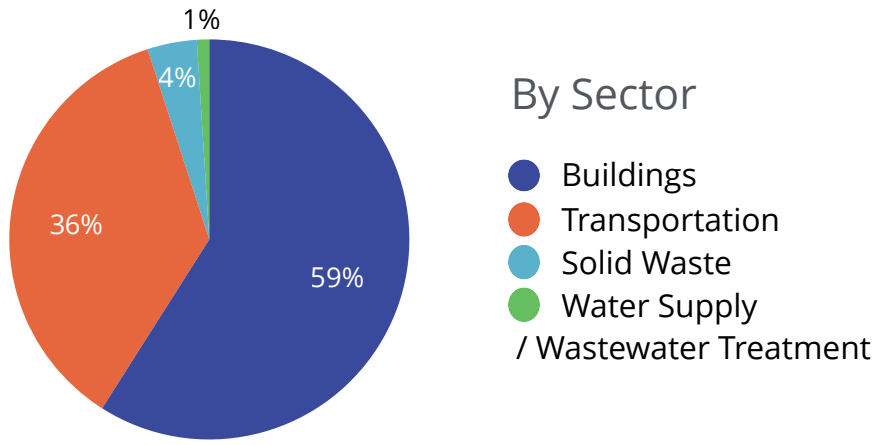
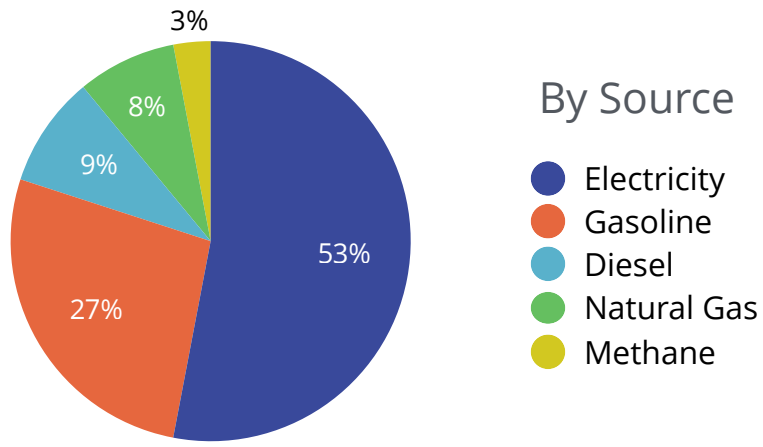


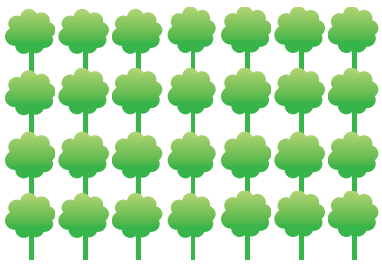
Figure E



Government Operations

Emissions offset by 14,957,077 new seedling trees growing for 10 years = 583,326 metric tons of CO2e

Community



Emissions offset by 423,047,795 new seedling trees growing for 10 years = 16,498,864 metric tons of CO2e

What is emission offset?

According to Terrapass (www.terrapass.com), "carbon offsets let you help build projects in communities across the country that reduce greenhouse gas (GHG) emissions beyond what you can achieve through individual action. Carbon offsets are purchased to fund these projects and diminish the impact of your own GHG emissions, even though the projects are located elsewhere."
Source: http://www.terrapass.com/climate-change/carbon-offsets-explained/

San Antonio GHG Forecast

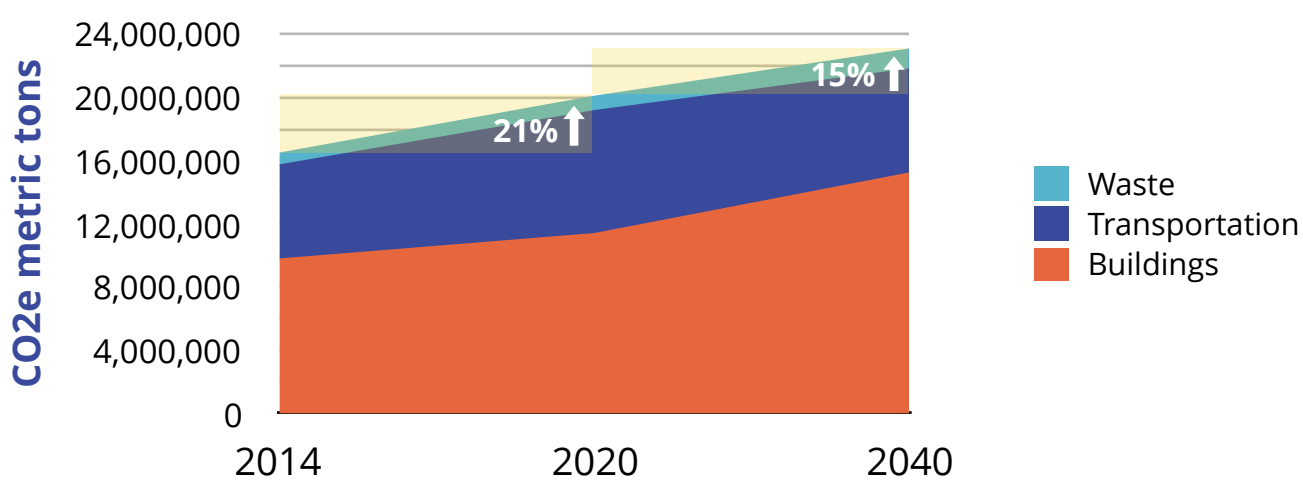
As part of the development of the GHG Emissions Inventory, a forecast of emissions was prepared. For San Antonio, a forecast of emissions under a Business As Usual (BAU) scenario was developed for both the long-term target year of 2040 and an interim year, 2020, to inform the identification of an emissions reduction target. The City of San Antonio has identified a 50% reduction target for 2040. The BAU scenario used the following assumptions:

- Population increases by 1,000,000 by 2040
- Energy use per person remains constant
- Waste generation per person remains constant
- Vehicle fuel efficiency improves per compliance with federal requirements
- Ten percent more renewable energy is added to the electricity supply per compliance with the federal Clean Power Plan mandates

The results of this BAU scenario show GHG emissions rising approximately 21% in 2020 and then rising approximately another 15% in 2040. The BAU scenario suggests that in 2040 the Buildings sector will continue to be the largest contributor to GHG emissions, but Transportation's contribution to total emissions will increase the by more than 7%, the most of any sector analyzed. **Figure F** below shows the forecasts and the breakdown of how each sector is expected to contribute to this growth.

Figure F

San Antonio GHG Forecasts, 2020 and 2040



Conclusion

Based on the GHG data, to reach a 50% reduction of 2014 emission levels by 2040, San Antonio will need to focus heavily on reducing overall electricity and gasoline consumption, which make up 80% of the community GHG emissions. Reducing demand for electricity by installing energy efficient lighting and appliances in buildings and switching to more renewable energy supplies, such as wind and solar, will help ensure emissions per person stay at or below the current level of 12 tons CO2e per person.

Additionally, to reduce the amount of gasoline that is burned by cars, there needs to be a targeted effort to create more opportunities for San Antonians to walk, ride bikes, and take public transit to their destinations. The SA Tomorrow Sustainability Plan has identified a number of strategies that can help reduce emissions from electricity and gasoline consumption, among other areas.