City of Santa Fe

Municipal Greenhouse Gas Inventory

2022

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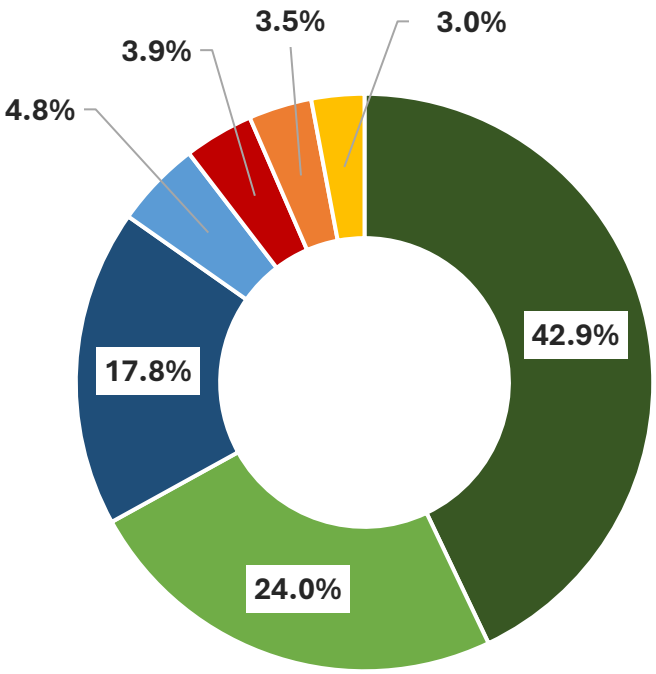
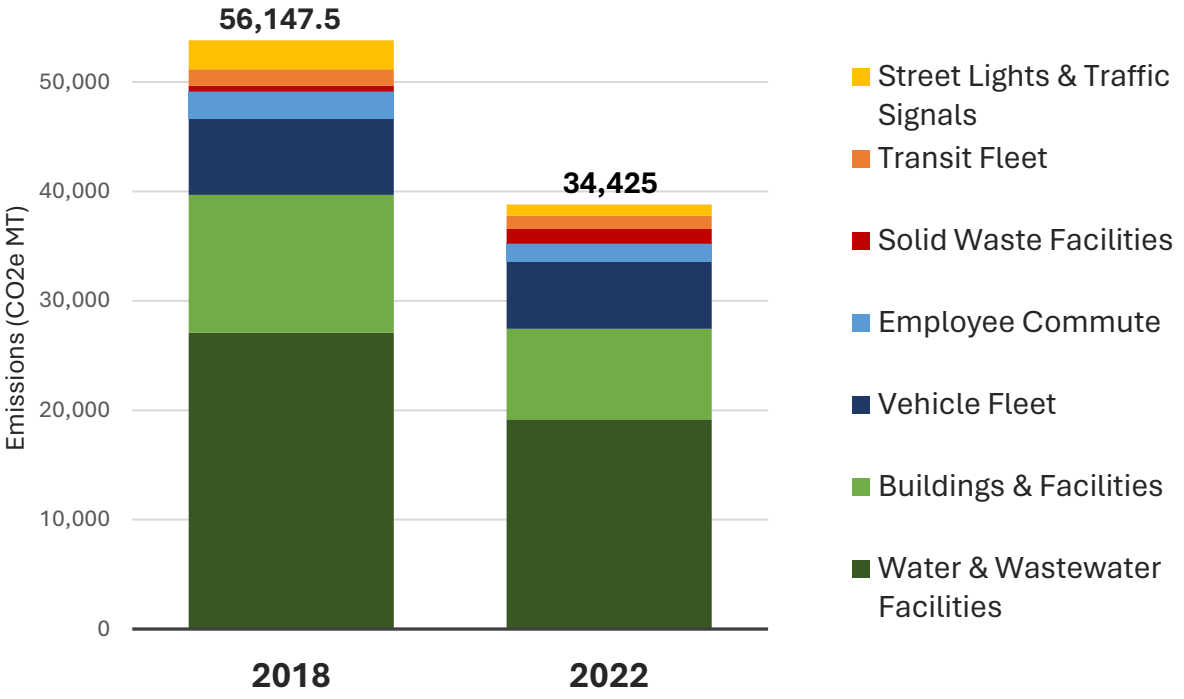
Thank you to everyone who contributed to this inventory!
Data was gathered from the following sources: City of Santa Fe: Environmental Services Division, Water & Wastewater Divisions, Finance Department, Public Works Department – Complete Streets, Transit, and Facilities Divisions; City of Santa Fe employees; Santa Fe Solid Waste Management Agency; Symmetry Energy Solutions, and PNM.

Cover photo: Peter Olsen

Municipal GHG Emissions

City of Santa Fe's municipal GHG inventory includes emissions from buildings, facilities, employee commutes, streetlights, traffic signals, water treatment & distribution, and city services.





Executive Summary

Climate change and pollution resulting from a fossil-fuel based society lead to numerous negative impacts around the world. Human activities are estimated to have caused approximately 1.0° C global average temperature increase since the preindustrial era (climate.gov). In Santa Fe, noteworthy impacts include wildfires, drought combined with unexpected flooding, climbing temperatures, poor air quality, dying vegetation and reduced biodiversity.

Greenhouse gas (GHG) inventories are critical for local government action to address climate change. This GHG inventory measures carbon dioxide, methane, and nitrous oxide and reports emissions in "carbon dioxide equivalent" ($CO2^e$). Sources of data include amount of stationary fuel combusted and electricity used in city buildings and services; vehicle miles driven by City fleet and transit vehicles; solid waste and recycling processed; and emissions from water and wastewater treatment processes. Complete, accurate data enables the City of Santa Fe to track its progress and understand priority climate actions to reduce GHG emissions in a quantifiable and transparent way.

The City of Santa Fe has a goal to reach carbon neutrality by 2040. To best understand progress made toward this goal, the City of Santa Fe conducts community-wide greenhouse gas inventories and municipal greenhouse gas inventories. Community Inventories are city-wide and include all people, vehicles, and buildings. Municipal Inventories are specific to city government buildings and functions. This report covers the municipal inventory.

Executive Summary

Since the Sustainable Santa Fe 25-Year Plan was created in 2018, the City has conducted municipal greenhouse gas inventories for 2018 and 2022. In 2018, municipal greenhouse gas emissions totaled 56,148 metric tons (MT) of carbon dioxide equivalent (CO_2e). In 2022, the carbon footprint of Santa Fe municipal facilities accounted for 34,425 MT CO_2e. This represents a **38.7% reduction in emissions** by the City in four years!

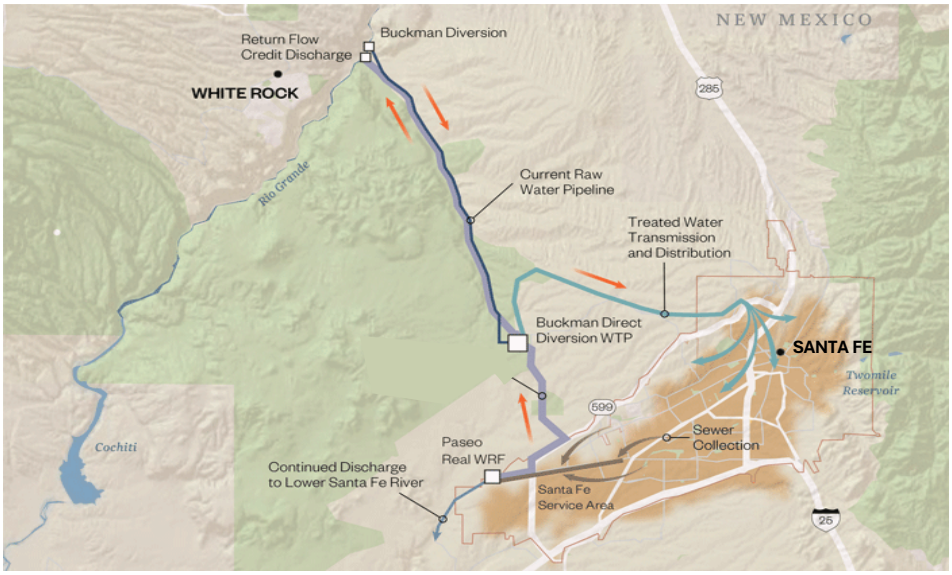
One metric ton is the equivalent of 2,564 miles driven by an average gasoline passenger vehicle

Reductions in municipal emissions are attributed to a variety of factors from reduced utility usage to large solar installations to implementation of new city policies, such as work from home schedules. City employees are also contributing as more people are opting to drive electric vehicles (EVs). This report provides explanations specific to each sector.

Sector	2018	2022	Net Change	% Change
Water & Wastewater Facilities	28,903	14,780	**-14,123**	-48.9%
Buildings & Facilities	13,109	8,277	**-4,832**	-36.9%
Street Lights & Traffic Signals	2,651	1,021	**-1,630**	-61.5%
Vehicle Fleet	6,976	6,118	**-858**	-12.3%
Employee Commute	2,481	1,668	**-813**	-32.8%
Transit Fleet	1,490	1,219	**-271**	-18.2%
Solid Waste Facilities	538	1,342	**804**	149.4%
Total	**56,148**	**34,425**	**-21,723**	**-38.7%**

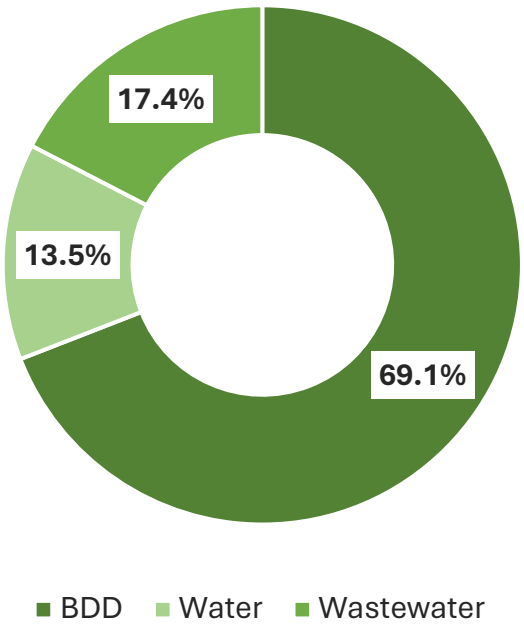
Comparing community-wide emissions with the municipal emissions demonstrates that municipal activities contribute only 3.3% of the total community-wide emissions. For more information on the community-wide greenhouse gas inventory, see https://sustainability.santafenm.gov/.

Executive Summary



Of the 34,425 total MT CO2e, the majority of municipal greenhouse gas emissions are from water and wastewater treatment and distribution (42.9%).

Of the 42.9%, the breakdown of water & wastewater emissions by source shows that Buckman Direct Diversion is the primary driver of emissions in this sector.



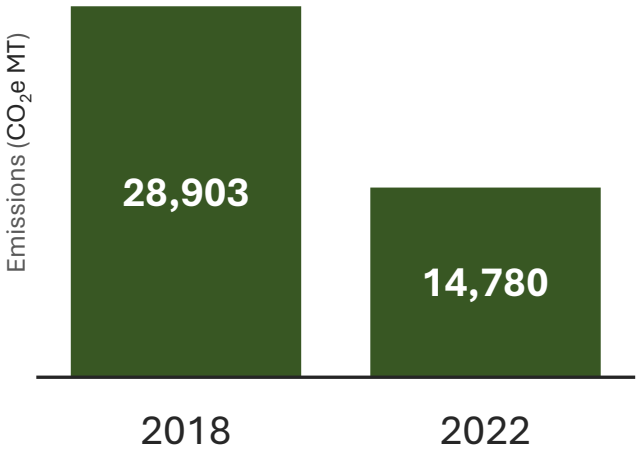
Water & Wastewater Treatment Facilities

42.9%
Of total emissions

14,780
MT CO_2e

-49%
Reduction since 2018

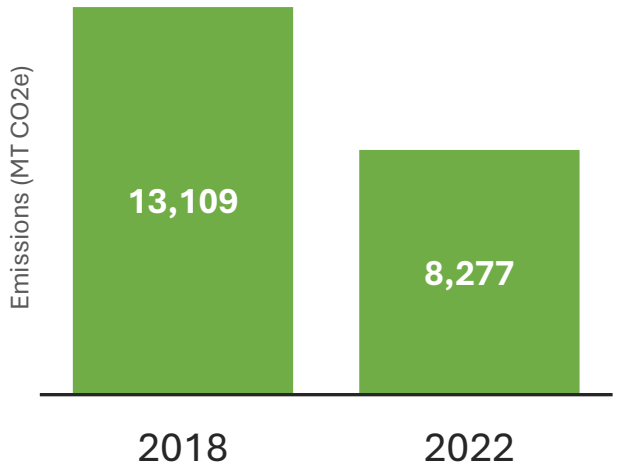
Factors:
- Electricity & Natural Gas
- Process N_20 Emissions
- Combustion of Digester Gas



Explanation:
Reductions in the water & wastewater facilities are a result of lower electricity usage (-31.8%) and lower gas production as part of the water treatment process. Starting in 2019, $9.3 million dollars were invested in Facility Improvement Measures recommended by an Investment Grade Audit (IGA) that resulted in reduced electricity, propane, and natural gas usage and increased renewable energy across strategic facilities. Water and wastewater facilities received 2.2 MW of solar to offset electric use.

Buildings & Facilities

Factors:
- Electricity
- Propane
- Natural Gas



24.0%
Of total emissions

8,277
MT CO_2e

-37%
Reduction since 2018

Explanation:
This sector experienced a 37% reduction in emissions since 2018. Starting in 2019, $6.1 million dollars were invested in Facility Improvement Measures recommended by an Investment Grade Audit (IGA) that resulted in reduced electricity, propane, and natural gas usage and increased renewable energy across strategic facilities. Buildings and facilities received 578 kW of solar to offset electric use.

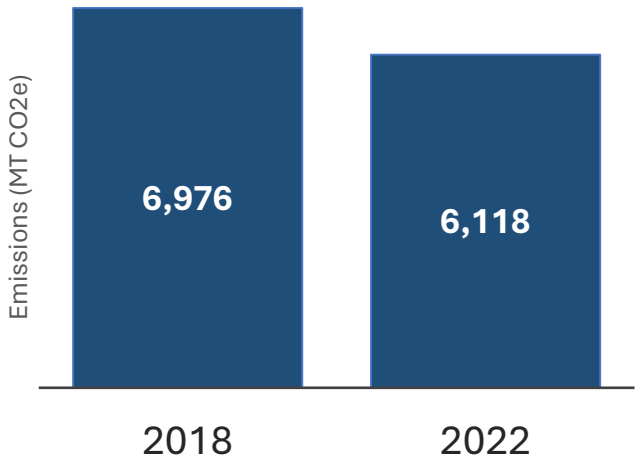
Vehicle Fleet

17.8%
Of total emissions

6,118
MT CO_2e

-12.3%
Reduction since 2018

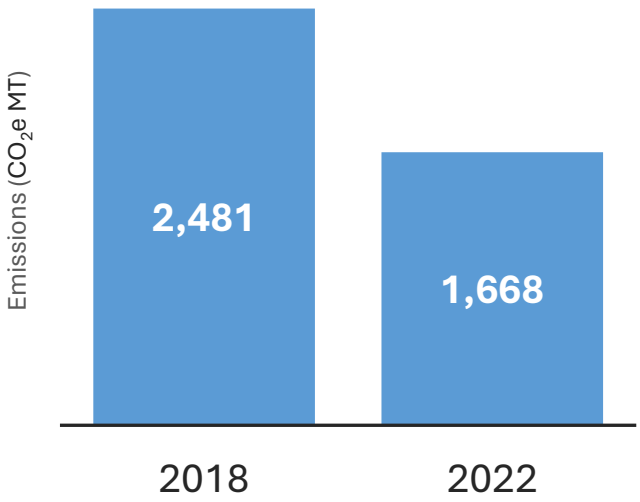
Factors:
- Fuel Type
- Vehicle Type
- On Road v. Off Road
- Vehicle Miles Traveled (VMT)



Explanation:
Since 2018, this sector has seen a 12.3% decrease in emissions as a result of less fuel being used, while delivering the same level of services. Vehicle fleet includes all vehicles at solid waste management facilities as well as Environmental Services residential and commercial collection vehicles.

Employee Commute

Factors:
- Fuel Type
- Vehicle Type
- VMT



4.8%
Of total emissions

1,668
MT CO_2e

-32.8%
Reduction since 2018

Explanation:
To capture this information, a survey was sent out in 2018 and 2022, asking employees about what type of vehicle do they drive, what type of fuel is used, commute duration, etc. The results are then extrapolated across the entire workforce to estimate the emissions from employee commutes. Since 2018, this sector has seen a 32.8% reduction that can be attributed to more employees driving hybrid or electric vehicles, choosing to walk or bike, and working hybrid home/office schedules. City of Santa Fe switched to a permanent hybrid work schedule for eligible positions post-2020, which directly lowers the carbon footprint of City employee commutes.

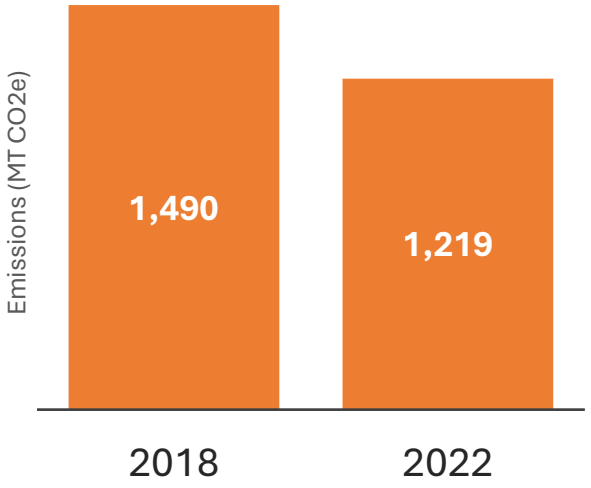
Transit Fleet

3.5%
Of total emissions

1,219
MT CO_2e

-18.2%
Reduction since 2018

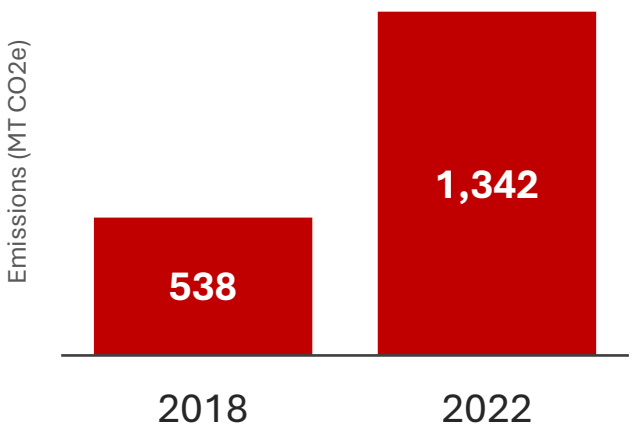
Factors:
- Fuel type
- Vehicle type
- Vehicle Miles Traveled (VMT)



Explanation:
The transit sector was highly impacted by the COVID-19 pandemic in 2020 – from reduced ridership and reduced driver availability –and City services have not recovered. This is seen in the 83% reduction in vehicle miles traveled (VMT) by Santa Fe Trails fixed routes and a 17% reduction in the VMT by ADA paratransit vans. Overall, this resulted in an 18.2% reduction in emissions by the transit fleet.

Solid Waste Facilities

Factors:
- Electricity & Propane
- Composted Green Waste & Biosolids
- Combustion of Landfill Gas



3.9%
Of total emissions

1,342
MT CO_2e

149.4%
Increase since 2018

Explanation:
Although pounds of waste per person per day in Santa Fe has decreased from 4.6lbs to 4.2lbs since 2018, the underlying functions of the Santa Fe Solid Waste Management Agency have changed very little since 2018, The main source of the emissions increase was the tonnage of biosolids composted, which rose from 165.2 tons to 1,071.2 tons*.

**Previously a portion of biosolids were used agriculturally, but disposal was switched to composting.*

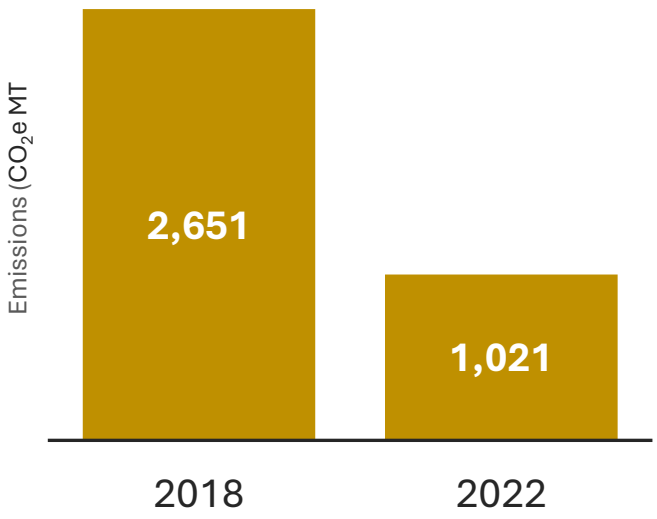
Street Lights & Traffic Signals

Factors:
- Electricity
- Luminaire Type

3.0%
Of total emissions

1,021
MT CO_2e

-61.5%
Reduction since 2018



Explanation:
This sector experienced a 61.5% reduction in emissions since 2018. In 2021, the City of Santa Fe began the process of converting 5,550 streetlights with older technology within the city to LEDs. LEDs reduce energy use by 60%, protect dark skies, and increase reliability.

Conclusion

The City of Santa Fe is proud of the progress it has made in reducing the greenhouse gas emissions from City facilities and services. Since 2018, the City has reduced its greenhouse gas emissions by 38.7% or 21,723 metric tons ($CO2^e$). The largest net reduction was in Water & Wastewater Facilities and in Buildings & Facilities. This reduction is primarily a result of municipal investments in renewable energy and energy efficiency improvements.

The City of Santa Fe will continue its work to be a leader in sustainability by reducing energy waste at its facilities, increasing utilization of renewable energy, reducing emissions from its fleet, and helping employees switch to electric vehicles for their commutes. In addition to its work to reduce its carbon footprint, the City of Santa Fe is mitigating greenhouse gas emissions and improving community resiliency through policies and programs described in the Sustainable Santa Fe 25-Year Plan. The City of Santa Fe will continue updating the municipal greenhouse gas inventory periodically to track its progress on leading by example in reaching a carbon neutrality goal.

For more information on City Sustainability efforts, please visit the Sustainability Dashboard at https://sustainability.santafenm.gov/.

Appendix

Fuel or Source	2018 Usage	2022 Usage	Usage Unit	2018 Emissions (MT CO_2e)	2022 Emissions (MT CO_2e)
Propane	9,824.8	3,162.9	Gallons	56.0	18.0
Electricity	14,378,301.0	8,458,472.0	kWh	8,135.3	3,465.3
Natural Gas	85,934.6	87,279.5	MMBtu	4,595.0	4,642.0
Bldgs & Facilities Total				**13,109.0**	**8,277.0**
Electricity	5,390,340.0	3,156,298.0	kWh	2,522.9	1,021.0
Streetlights Total				**2,651.0**	**1,021.0**
Fleet - Diesel	217,954.9	171,786.0	Gallons	2,231.9	1,758.0
Fleet - Gasoline	425,582.3	385,932.0	Gallons	3,748.6	3,388.5
ESD - CNG	18,071,102.6	17,960,592.9	scf	995.0	971.3
Fleet Total				**6,975.5**	**6,117.8**
Passenger vehicles, bus, and train commutes	4,565,999.0	4,277,197.0	VMT	2,481.0	1,668.0
Commute Total				**2,481.0**	**1,668.0**
Fixed Route CNG	14,200,570.0	14,757,925.0	scf	1,490.0	855.8
ADA Vans CNG		6,324,857.0	scf		362.8
Transit Total				**1,490.0**	**1,218.6**
Electricity	221,705.0	239,353.8	kWH	125.4	100.9
Propane	5,467.0	9,483.5	Gallons	31.2	53.6
Green Waste Composte	1,673.3	1,248.7	Tons	169.2	86.9
Landfill Gas Captured	16,415.0	26,360.5	cfd	47.6	25.3
Biosolids Composted	3,069.3	25,870.4	Tons	165.2	1,071.2
Solid Waste Total				**538.4**	**1,342.0**
Electricity	46,503,921.0	31,723,067.0	kWh	26,312.0	13,371.4
Digester Gas Flaring	222,090.0	24,000.0	scf/day	21.6	1.5
Natural Gas	15,632.0	16,712.8	MMBtu	835.9	888.7
N_20 Process Emissions	-	-		529.0	518.4
Water & Wastewater Total				**28,903.0**	**14,780.0**

Methodology

The Local Government Operations Protocol (Version 1.1) is designed to provide a standardized set of guidelines to assist local governments in quantifying and reporting GHG emissions associated with their government operations. It is designed to support the complete, transparent, and accurate reporting of a local government's GHG emissions.

Three greenhouse gases are included in this inventory: carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4)

The purpose of the Local Government Operations Protocol is to:

- Enable local governments to develop emissions inventories following internationally recognized GHG accounting and reporting principles defined below with attention to the unique context of local government operations;
- Advance the consistent, comparable and relevant quantification of emissions and appropriate, transparent, and policy-relevant reporting of emissions;
- Enable measurement towards climate goals;
- Promote understanding of the role of local government operations in combating climate change; and
- Help to create harmonization between GHG inventories developed and reported to multiple programs.

Source: ICLEI – Local Governments

Greenhouse Gas	Global Warming Potential
Carbon dioxide (CO_2)	1
Methane (CO_4)	28
Nitrous oxide (N_2O)	265

Source: IPCC, 2014

Methodology

Lastly, it is important to acknowledge that the fuel sources underlying the electric grid are changing. Thanks to the New Mexico Energy Transition Act, electricity is becoming a cleaner source of energy than ever before. In New Mexico, investor-owned utility (IOU) providers are committed to a statewide renewable energy standard of 50 percent by 2030. This means that electricity will increasingly be "cleaner" and produce fewer emissions when used.

Greenhouse Gas	2018 Electricity Factors	2022 Electricity Factors
CO_2 (lbs/MWh)	1,226	925
CH_4 (lbs/MWh)	174	86
N_2O (lbs/GWh)	25	7

In 2022, 51.3% of Santa Fe's electricity comes from carbon-free sources (PNM).