SANTA FE COUNTY

Greenhouse Gas Emissions Inventory

Baseline 2005
and Years
2017 & 2018

SANTA FE COUNTY

Contents

Executive Summary

All emissions are reported in metric tons of carbon dioxide equivalent (MT CO_2e). The analysis covers carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and the groups of high Global Warming Potential (GWP) gases, including hydrofluorocarbons (HFCs).

Santa Fe County is committed to reducing greenhouse gas emissions.

In 2017, the Santa Fe County Board of County Commissioners adopted a Resolution 2017-68 affirming its commitment to the Paris Agreement and signed onto "We Are Still In." To further its goals, the County contracted Adelante Consulting to develop greenhouse gas (GHG) emissions inventories for calendar years 2005, 2017 and 2018, quantifying emissions from the County's municipal operations only. The inventories include emissions from the following primary sources: stationary energy, transportation, solid waste, and water and wastewater management. Both Scope 1 and 2 emissions are reported.

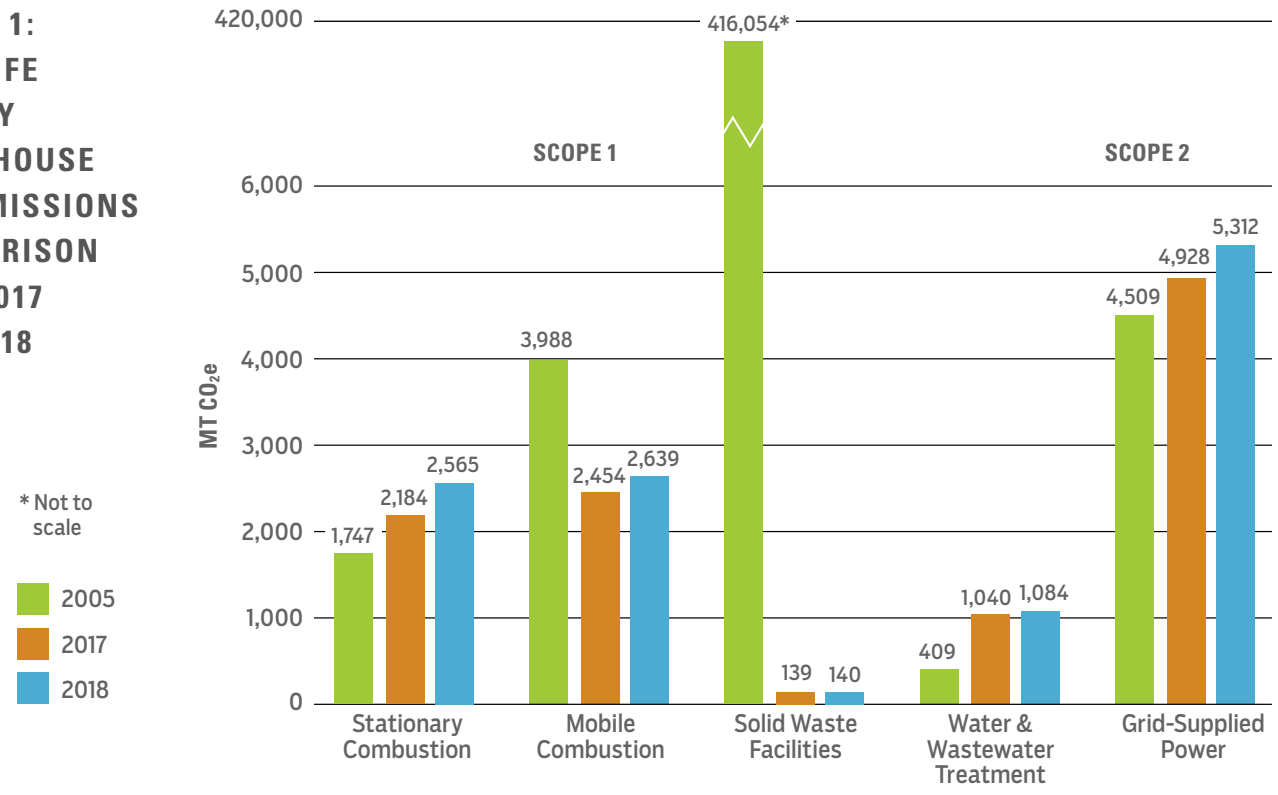
The 2005 inventory serves as a baseline, while data from 2017 and 2018 show trends over time. All GHG emissions sources, as could be determined from available data, from 2005, 2017 and 2018 are included. The data available for 2018 is the most complete of the data sets. Total emissions for County government operations in 2005 were calculated at 426,707 MT CO_2e. By contrast, 2017 GHG emissions totaled 10,745 MT CO_2e, and 2018 GHG emissions were 11,741 MT CO_2e. The dramatic reduction in GHG emissions from 2005 to 2017 was due primarily to a reduction in emissions from solid waste operations caused by the installation of the landfill gas collection system and flare.

Key highlights:

- Total GHG emissions showed a 97.2% decrease from 2005 to 2018; over 99% of this reduction is directly related to the development of a gas collection system at the Caja Del Rio landfill.

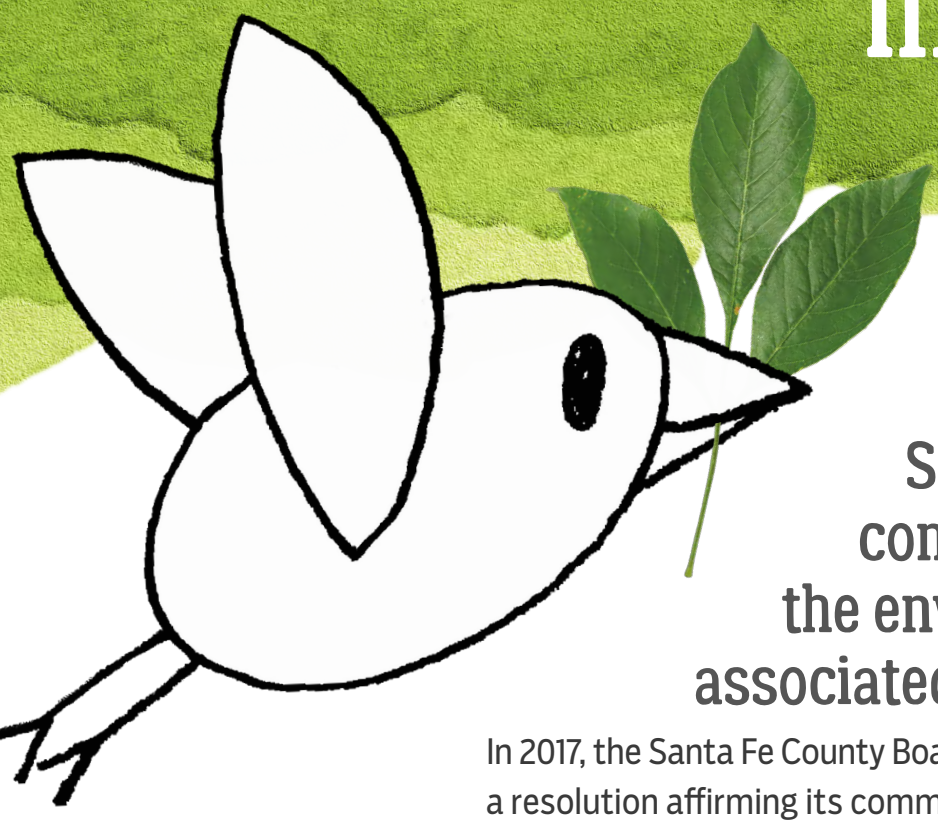
- Scope 1 emissions are calculated at 6,429 MT CO_2e for 2018, a 98% decrease from 2005 to 2018.
- Scope 2 emissions are calculated at 5,312 MT CO_2e for 2018, an 18% increase from 2005 to 2018. This increase is directly related to an 83% increase in County staff between 2005 and 2018, which necessitated an increase in the County's building footprint. However, the County was able to reduce per capita emissions over this time period, most likely by virtue of its solarization program.
- County buildings and facilities accounted for more than half of all GHG emissions in 2017 and 2018.

FIGURE 1: SANTA FE COUNTY GREENHOUSE GAS EMISSIONS COMPARISON 2005, 2017 AND 2018



These inventories set the foundation to make informed decisions on how to reduce the GHG emissions of County operations, and are the first step toward preparing a County-wide comprehensive action plan to further reduce emissions and increase resilience in the face of climate change.

Introduction



Santa Fe County has a commitment to analyze the environmental impacts associated with its operations.

In 2017, the Santa Fe County Board of County Commissioners adopted a resolution affirming its commitment to the Paris Agreement and signed onto "We Are Still In." The Paris Agreement contains more than a dozen key elements, and two are particularly germane to Santa Fe County's commitment:

1. A commitment to net zero greenhouse gas (GHG) emissions by mid-century.[1]

2. A commitment to assess progress every five years, and to accelerate reduction strategies if not on track to meet the mid-century goal.[2]

1 Paris Agreement to the United Nations Framework Convention on Climate Change, Articles 4 and 5, Dec. 12, 2015, T.I.A.S. No. 16-1104.

2 Ibid, Articles 4 and 7.

Santa Fe County has embraced the following seven climate action strategies, enumerated on the "We Are Still In" website[3]:

- Adopt policies to reduce carbon footprint of new and/or existing buildings;
- Increase energy efficiency of local government operations, such as buildings, street lighting, and water or wastewater plants;
- Promote practices that reduce the carbon footprint of food procurement and consumption and prevent food waste;
- Purchase renewable power or build on-site renewable electricity to run local government needs;
- Quantify, track and publicly report the County's climate action through CDP or carbon Climate Registry;
- Set a goal for emissions reduction equal to or greater than the US goal under the Paris Climate Agreement (26-28% reduction from 2005 levels by 2025);
- Use strategies that build resilience to threats of climate change into zoning, capital improvement, comprehensive planning, and hazard mitigation documents.

Through the adoption of climate action strategies and actions to quantify and reduce greenhouse gas emissions, the County will realize numerous benefits.

Through the adoption of climate action strategies and actions to quantify and reduce greenhouse gas emissions, the County will realize numerous benefits related to:

- Improving risk management and increasing resiliency by allowing decision makers to better identify and manage the impacts of climate change.
- Addressing inefficiencies related to resource inputs and waste resulting in improved County services and cost savings.
- Increasing performance of buildings through energy efficiency and integrated design methodology.
- Allowing the County to better prepare for future state and federal GHG emission regulations.
- Using outreach and education to recruit public and stakeholder participation concerning the impact of GHG emissions and the benefits of GHG reduction initiatives.

3 https://www.wearestillin.com/organization/santa-fe-county-nm

The adoption of climate action strategies such as regional air quality improvements and expanded public transportation can help improve public health outcomes.

- Improving public health outcomes through regional air quality improvements and expanded public transportation.
- Creating secure and meaningful jobs in the green economy.

In order to further its goals, the County sought support to develop greenhouse gas emissions inventories for calendar years (CY) 2005, 2017 and 2018, quantifying emissions from the County's municipal operations generated from the following primary sources: stationary energy, transportation, solid waste, and water and wastewater management. The 2005 inventory serves as a baseline, while data from 2017 and 2018 show trends over time.

Appropriate and relevant portions of the Local Government Operations Protocol guidelines (LGOP)[4] were utilized to quantify direct emissions (Scope 1) and indirect emissions (Scope 2) within the boundary of County government operations. The County is a member of Local Governments for Sustainability (ICLEI), therefore ICLEI's software, ClearPath, was utilized to display and document inventory data by sector and to calculate GHG emissions.

The completion of the County GHG emissions inventories is intended to allow County emissions to be recorded and compared across time, identify emissions trends, and support the establishment of County emissions reduction goals and planning for 2025 through 2050 and the adoption of high-impact emission reduction strategies.

4 Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories, Version 1.1. May 2010, https://ww2.arb.ca.gov/local-government-operations-protocol-greenhouse- gas-assessments.

Inventory Boundaries

The inventories that were developed for this report include only GHG emissions generated by County government operations; they do not include emissions generated by County residents. Inventory boundaries reflect the approach used to consolidate GHG emissions, defining the operations, departments and activities which fall within the scope of emissions resulting from County operations. Following LGOP guidelines, a financial control approach was utilized encompassing not only County-owned properties, vehicles, and activities, but also entities where the County has a financial stake in the emissions of partner organizations. Based on guidance from County staff, a percentage of emissions from the Santa Fe Solid Waste Management Agency (SWMA), which operates the Caja Del Rio landfill pursuant to a Joint Powers Authority (JPA) agreement between the County and City of Santa Fe, and from the Buckman Direct Diversion water treatment facility, which also was formed under a JPA agreement between the County and City, are included within the County's inventory boundary. In addition, a portion of emissions from the North Central Regional Transportation District (NCRTD) was included.

The LGOP was designed to provide a standardized set of guidelines to assist local governments in quantifying and reporting GHG emissions associated with their government operations. The Protocol was developed in partnership by the California Air Resources Board (ARB), California Climate Action Registry (CCAR), and ICLEI, in collaboration with The Climate Registry and dozens of stakeholders.

Through this Protocol, the partners sought to enable local governments to measure and report GHG emissions associated with government operations in a harmonized fashion. The Protocol facilitates the standardized and rigorous accounting of GHG emissions, which can help track emissions reduction progress over time and in comparison to GHG reduction targets.

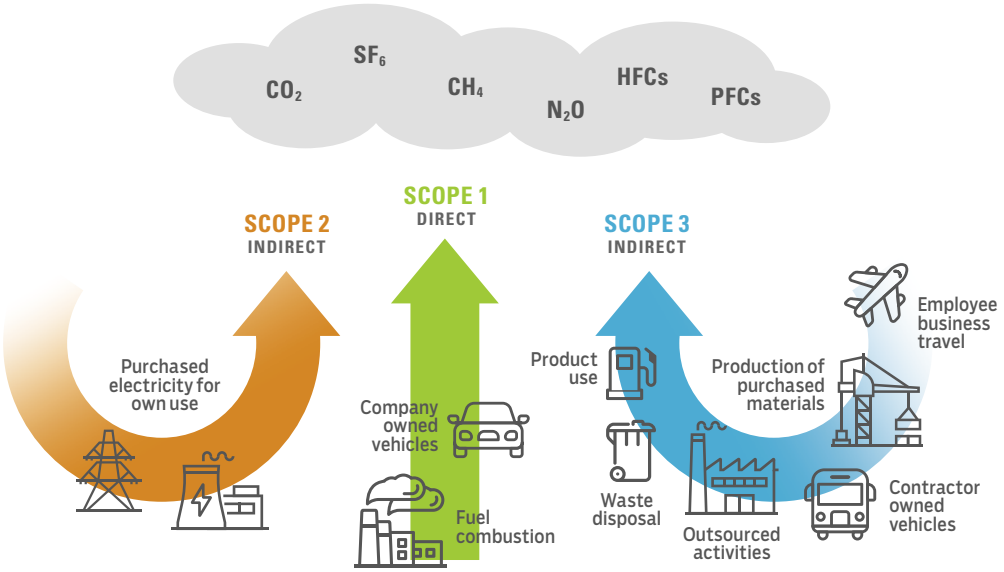
The Protocol provides the principles, approach, methodology, and procedures needed to develop a local government operations GHG emissions inventory. It is designed to support the complete, transparent, and accurate reporting of a local government's GHG emissions. The Protocol guides participants through emissions calculation methodologies and reporting guidance applicable to all U.S. local governments.[5]

Three scopes of emissions are defined in the LGOP. Scope 1 encompasses all direct emissions, including those from the combustion of fossil fuels such as gasoline, natural gas and propane; Scope 2 encompasses indirect emissions from the consumption of purchased grid-supplied energy (electricity); and Scope 3 emissions encompasses other emissions indirectly related to the operations of County government like emissions from business travel and employee commutes, emissions related to supply chain requisition of goods and services, and emissions from contracted services.

With the exception of the County fleet and the NCRTD, all sectors within the inventory report both Scope 1 and Scope 2 emissions. Figure 2, below, illustrates the sources of GHG emissions commonly included in Scopes 1, 2 and 3.

FIGURE 2: GREENHOUSE GAS EMISSIONS SCOPES

Source: Local Government Operations Protocol, Version 1.1, Page 23



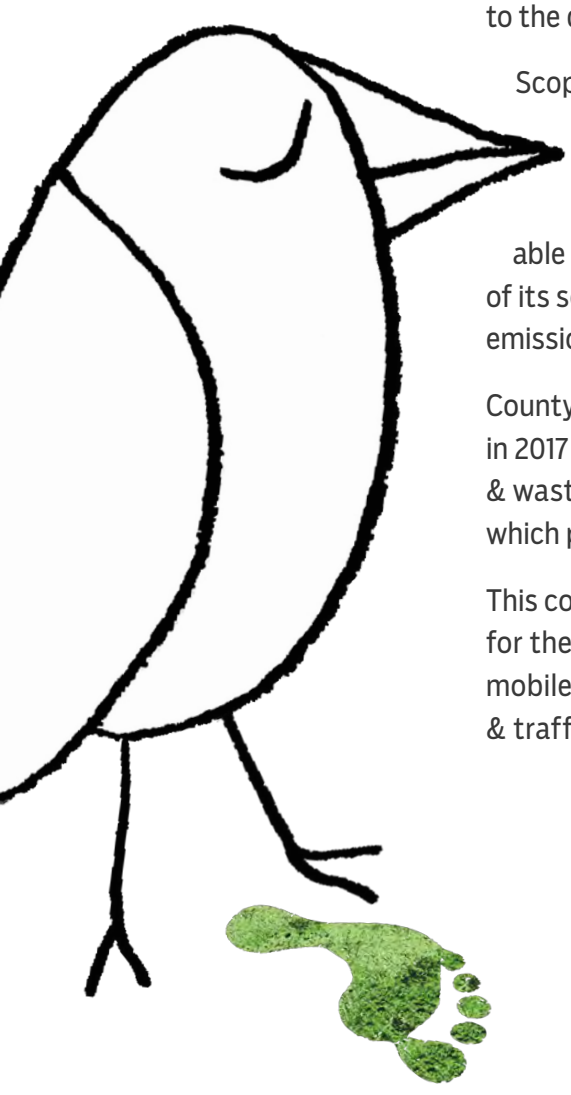
Scope 3 emissions are not addressed in this report because of a lack of necessary data. As the County builds upon this initial inventory effort, the County may wish to add Scope 3 inventory detail capturing emissions from a variety of other sources such as employee commutes, business travel, and supply chain analyses.

5 Ibid, pg. 11.

Inventory Results

Overall County operation emissions show a 97% drop from 426,707 MT CO_2e in 2005 to 11,741 MT CO_2e in 2018.

Scope 1 emissions are calculated at 6,429 MT CO_2e for 2018, a 98% decrease from 2005 to 2018 (Table 1). Over 99% of this reduction in emissions is directly related to the development of a gas collection system at the Caja Del Rio landfill.



Scope 2 emissions are calculated at 5,312 MT CO_2e for 2018, an 18% increase from 2005 to 2018 (Table 1). This increase is directly related to an 83% increase in County staff between 2005 and 2018, which necessitated an increase in the County's building footprint. However, the County was able to reduce per capita emissions over this time period, most likely by virtue of its solarization program. See Figure 1 for a summary of Scope 1 and Scope 2 emissions across each inventory year.

County buildings and facilities accounted for more than half of all GHG emissions in 2017 and 2018. The next highest emissions are from mobile combustion, water & wastewater treatment, solid waste, and finally street lights & traffic signals, which produced the lowest amount of emissions (Figures 4 and 5).

This contrasts to inventory year 2005, when solid waste operations accounted for the bulk of GHG emissions (Figure 3), followed by buildings & facilities, mobile combustion, water & wastewater treatment, and finally, street lights & traffic signals.

TABLE 1: GREENHOUSE GAS EMISSIONS SUMMARY FOR YEARS 2005, 2017 AND 2018 (MT CO_2E)

Scope & Sector	2005	2017	2018	% Change 2005-2018	% Change 2017-2018
SCOPE 1 TOTALS	**422,198**	**6,255**	**6,429**	**-98%**	**3%**
Buildings & Facilities	1,747	2,184	2,565	47%	17%
Solid Waste	416,054	139	140	-100%	1%
Water & Wastewater Treatment	409	1,040	1,084	165%	4%
Mobile Combustion	3,988	2,454	2,639	-34%	8%
SCOPE 2 TOTALS	**4,509**	**4,928**	**5,312**	**18%**	**8%**
Buildings & Facilities	2,905	3,638	3,862	33%	6%
Street Lights & Traffic Signals	44	81	83	89%	2%
Solid Waste	85	63	65	-24%	3%
Water & Wastewater Treatment	1,475	1,146	1,302	-12%	14%
TOTALS, SCOPES 1 & 2	**426,707**	**10,745**	**11,741**	**-97%**	**9%**

FIGURE 1: SANTA FE COUNTY GREENHOUSE GAS EMISSIONS COMPARISON 2005, 2017 AND 2018

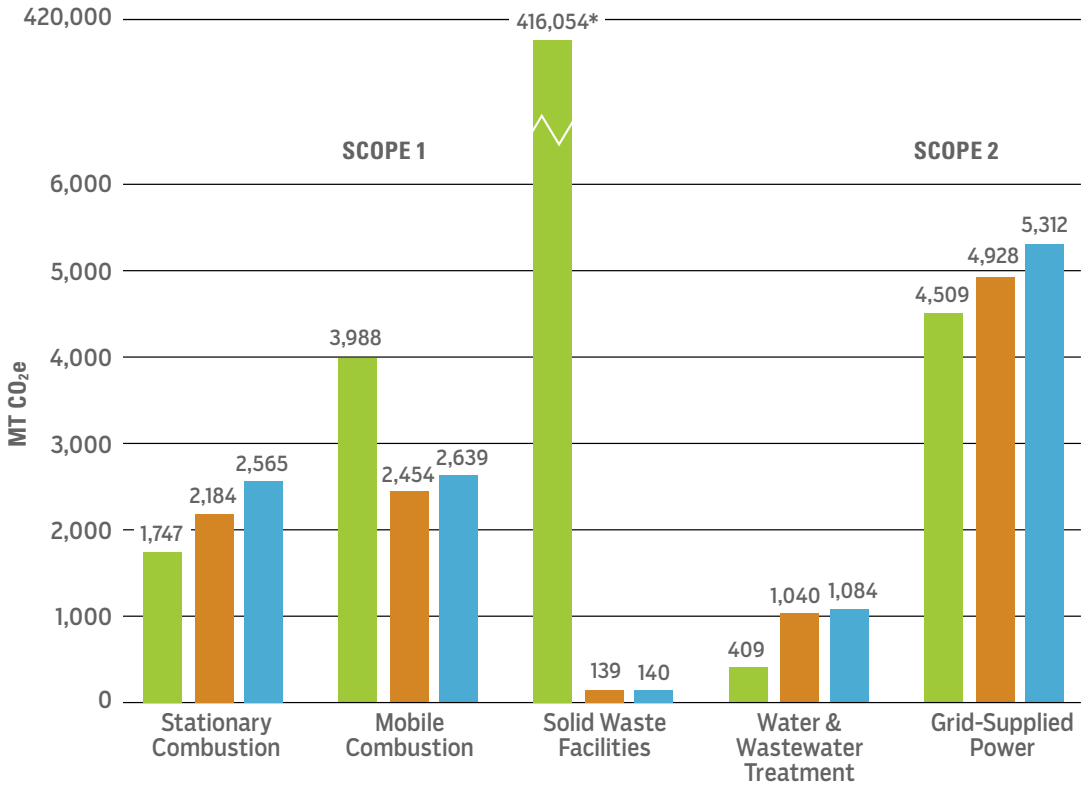


FIGURE 3:

2005

SCOPE 1 AND SCOPE 2 GREENHOUSE GAS EMISSIONS BY SECTOR (MT CO_2E)

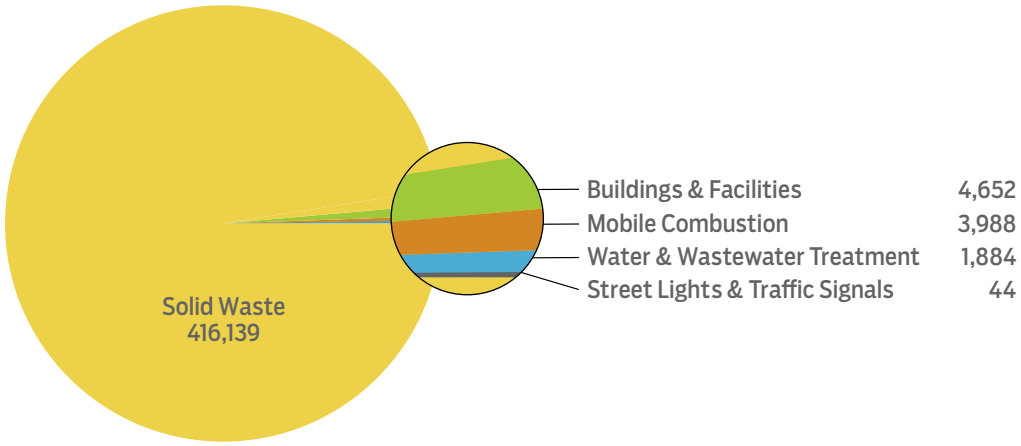


FIGURE 4:

2017

SCOPE 1 AND SCOPE 2 GREENHOUSE GAS EMISSIONS BY SECTOR (MT CO_2E)

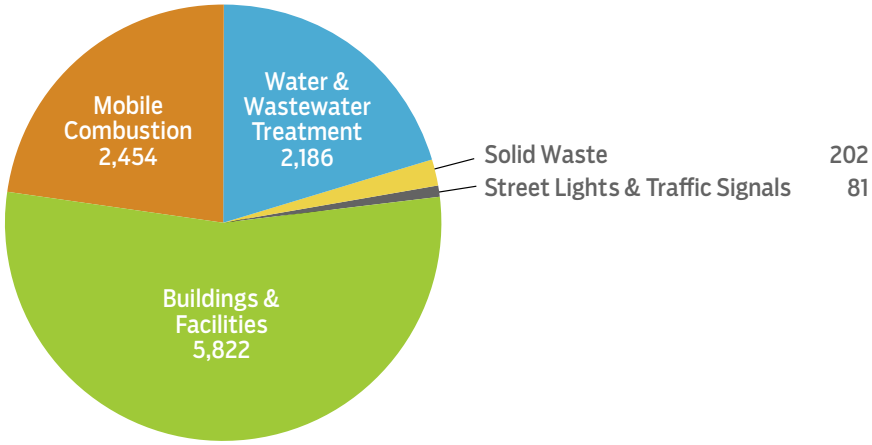
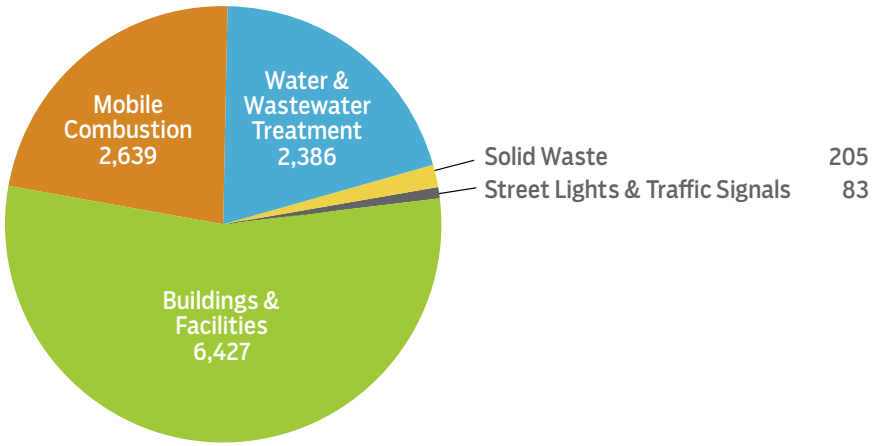


FIGURE 5:

2018

SCOPE 1 AND SCOPE 2 GREENHOUSE GAS EMISSIONS BY SECTOR (MT CO_2E)



Factors for the changes in emissions include:

Facilities represent a significant source of emissions. Buildings that have not been updated for energy efficiency provide opportunities for reducing emissions considerably.

SOLID WASTE

Responsible for the largest portion of reductions, emissions from solid waste decreased with the installation of a landfill gas capture system at Caja Del Rio. This system captures the emissions from the landfill and destroys the resulting gas by flaring with a 99% destruction rate. In addition, there has been a concerted effort to improve recycling and increase diversion of garbage from the landfill.

STATIONARY COMBUSTION

Scope 1 emissions from buildings and facilities increased by 47% from 2005 to 2018. This is likely due to the near doubling of County employees, from 563.5 full-time equivalent employees (FTE) in 2005, according to the County's budget for fiscal year 2005, to 1,032 FTEs in 2018, according to the County's Comprehensive Audited Financial Report for fiscal year 2018.

The number of the County's FTEs increased from 999 in 2017 to 1,032 in 2018, a 3.3% increase, while Scope 1 emissions increased by 17%. The increase in emissions resulted from a 17% increase in natural gas and propane use from 2017 to 2018. In 2018, the Heating Degree Days (HDDs) increased by approximately 9% from the 2017 HDDs, which required an increase of heating fuel usage of approximately 9% in 2018 in order to provide the same level of comfort as in 2017. Scope 1 emission increases between 2017 and 2018 are assumed to be the result of increases in FTEs, HDD changes and suboptimal building energy efficiency. Facilities represent a significant source of emissions, therefore, buildings that have not been updated for energy efficiency provide opportunities for reducing emissions considerably.

In addition to the expanded heating fuel use and increases in FTEs between 2017 and 2018, these data are partially influenced by the inclusion of propane use for road maintenance in the Buildings and Facilities calculation. Road maintenance propane usage increased 25% from 2,258 to 2,824 gallons from 2017 to 2018, contributing nearly 16 MT CO_2e. Overall, road maintenance comprises 5-6% of total propane use over the 2017-2018 period.

MOBILE COMBUSTION

Although in 2018 there were nearly twice the number of vehicles in the County fleet from 2005 levels, vehicle fuel emissions decreased. The decrease is likely partially due to strategic fleet vehicle replacement which increased the average fuel efficiency of the fleet. Additionally, departments have implemented fleet management policies such as idle reduction mandates to reduce fuel use.

However, data regarding the County's fleet was limited, which limits the reliability of any conclusions. For example, out of approximately 700 vehicles in the County's fleet in 2018, only 289 have fuel use data (42% of fleet), and 260 have no data (37%). 204 have CO_2e reports (29%), and fuel use in some cases, but CO_2e reports cannot be entered into ClearPath. Instead, ClearPath requires vehicle miles traveled (VMT), type of fuel used, vehicle information (heavy or light duty, year of model), and then calculates the CO_2e from that information. Additionally, the CO_2e reports are by driver rather than vehicle, further limiting their utility in calculating GHG emissions from the fleet and in reaching conclusions about fleet management. CO_2e reports were modified to support limited modeling within ClearPath.

Therefore, while the decrease is likely due in part to improvements in vehicle fuel efficiency (MPG) and in fleet management practices, the data is insufficient to support definitive conclusions.

The installation of solar panels at County facilities helped offset electricity emissions from other sources.

ELECTRICITY

Electricity emissions in buildings increased 6.2% from 2017 to 2018, largely due to greater use due to growth in the number of County FTEs and the corresponding increase in necessary building square footage in which to house them. In addition, the number of Cooling Degree Days (CDDs) increased in 2018; however, cooling accounts for only approximately 14% of electricity use. It is expected that the total impact from increased CDDs is fairly minor[6].

The installation of solar panels at 10-15% of County facilities, lighting upgrades to LED lights, and building systems improvements and occupant engagement, along with increasing amounts of renewably produced electricity in the electrical utility grid, helped to counter the effect of increased emissions due to increased CDDs and FTEs.

6 "Use of Energy Explained: Energy use in commercial buildings," U.S. Energy Information Administration, accessed August 24, 2020, https://www.eia.gov/energyexplained/use-of-energy/commercial-buildings.php

Data Sources and Methods

Inventory data related to building energy, building operations, transportation, solid waste, and water and wastewater management

was compiled based on records provided by the County, the City of Santa Fe, and the New Mexico Environment Department; interviews with County departments and partner organizations; utility record data hosted online by utility providers and the County; and payment receipts available through the County Sunshine Public Information Portal (Sunshine Portal). The inventory for CY 2018 is supported by the most complete set of quantitative data and therefore is the most accurate; the CY 2017 data was almost as complete as that for CY 2018. CY 2005 data was lacking in many respects and therefore is more speculative and less reliable.

Where records were incomplete or missing, a range of estimation methods were employed following ICLEI's LGOP estimation procedures. Additional County reports and documents were used to confirm facility locations and conditions and to append utility cost data to corresponding facilities. An overview of inventory data sources and methods by sector is outlined below.

BUILDING ENERGY/BUILDING OPERATIONS

A list of County-owned properties provided by the County was used as the foundation of the buildings and facilities inventory. Properties with no related emissions, such as open space areas and trails were excluded, and each remaining facility was given a unique Asset Identification Number (AID) to track facilities, as names or addresses sometimes changed across time. For the existing facilities, this AID corresponds to the identifier used by the County.

The 2014/2015 Santa Fe County Facilities Condition Assessment Report was utilized to confirm facility construction dates, utilities present, and any energy savings present where applicable; however, the report did not include information about all County facilities.

The majority of CY 2017 and 2018 facility records for electricity and natural gas were complete as provided by the County. For facilities with incomplete records, data was estimated based on information from a range of other sources.

The majority of CY 2017 and 2018 facility records for electricity and natural gas were complete as provided by the County. This information was added directly into ClearPath. Additional utility records were obtained from NM Gas Company and PNM utility portals if present. For facilities with partial 2018 use where only half of the year was enumerated, the presented total was doubled to estimate total year use.

For facilities with no data, financial records were obtained from the Sunshine Portal. These data provided the years of interest, specific vendors, and amount paid, and were delineated based on the Chart of Accounts available on the portal. Virtually all propane data was compiled in this manner.

Propane payments to Kings Butane for the year 2017, as an example, were downloaded from the Sunshine Portal. The government management and budgetary accounting numbers (GMBA numbers), assigned by the County Finance Department, were matched to six groups of eligible facilities using this vendor. Five of these were fire stations (e.g., Stanley Fire) and the propane costs were assigned to the facility using size of the facility versus size of expenditure to determine to which facility to assign the incurred expense. A standard price per unit of $2.00/gallon was assumed, and usage was calculated in this manner. There are shortcomings to this method, but the ease and accuracy of capturing all billing for propane vastly improved previous attempts to quantify this particular data set.

For facilities that could not be matched to a corresponding account number (some GMBA groupings were too large to be useful, such as Fire Operations), usage data was estimated using a reference facility of similar use and age and adjusted for building size. For facilities where CY 2018 data was present and CY 2017 data was missing, LGOP Alternative Activity Guideline Equations 6.8 and 6.13[7] were utilized to estimate missing values using CY 2018 as the proxy year. This data was then normalized for heating and cooling days as specified in the Protocol. Where LGOP estimates were used, this is noted in the specific ClearPath record.

CY 2005 utility data was not provided due to inaccessibility and financial records were also not present on the Sunshine Portal. Facilities constructed after 2005 were excluded from the CY 2005 inventory.

7 Local Governmental Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories, Version 1.1. May 2010, Page 36.

2018 usage values were reduced by 9% to account for reduced use in 2005. The 9% value reflects changes in energy intensity between 2005 and 2018, as outlined by the Energy Information Administration[8].

Usage data for the Valle Vista, Santa Cruz and Jacobo Housing Complexes was estimated using 2018 per unit average consumption values provided by the Santa Fe County Housing Authority. LGOP Alternative Activity Guideline Equations 6.8 and 6.13 were utilized to estimate CY 2017 usage.

See Tables 2 and 3 in the Appendix for a summary of fuel usage by sector and costs across each inventory year.

Inventory data for this report was compiled and organized by sector: building energy, building operations, transportation, solid waste, and water and wastewater management.

TRANSPORTATION

A list of County-owned vehicles was used as the foundation for the transportation inventory; however, the list was not comprehensive. For vehicles with GPS enabled, County monthly carbon emission summary reports were compiled and individual vehicles were grouped by department and entered into ClearPath. For vehicles where mileage data was not available, fuel economy was estimated based on vehicle model and year using EPA fuel economy standards[9]. For these records NO_2 and CH_4 values were not identified, and CO_2 was used as a stand-in for CO_2e, resulting in marginally reduced emissions values. Emissions were calculated outside of ClearPath and vehicles were grouped by department. In many instances, vehicle weight and fuel type were estimated.

Vehicle records for SWMA were obtained during meetings with SWMA officials. Because 42% of total waste is estimated to originate within the County, 42% of emissions were recorded as County emissions.

NCRTD transit fleet data was not provided. Vehicle miles traveled and fuel use were estimated from 2018 NCRTD Budget Documents and 2014 vehicle lists outlined in the 2014 NCRTD Transit Service Plan Update, which was used because it contained the most complete information available about NCRTD vehicles. Miles per gallon for identified vehicles were compiled from EPA combined fuel ratings[10]. Gross receipts tax collected in the County provided approximately 12% of NCRTD's budgets in CY 2017 and 2018; therefore, 12% of total fuel use, VMT, and passenger boardings were attributed to the County in the inventories for 2017 and 2018.

8 "AEO2020 Data," U.S. Energy Information Administration, accessed August 24, 2020, https://www.eia.gov/outlooks/aeo/consumption/sub-topic-03.php
9 "Fuel Economy Guide," U.S. Environmental Protection Agency, accessed August 24, 2020, https://www.fueleconomy.gov/feg/printGuides.shtml
10 Ibid.

SOLID WASTE

58% of total waste processed by SWMA is expected to have originated from outside the County. As a result, only 42% of total solid waste emissions were recorded within the County inventory for this report.

Based on guidance from partners at the City of Santa Fe, 42% of total waste processed by SWMA is expected to have originated from within the County. As a result, 42% of total solid waste emissions were recorded within the County inventory. CY 2017 and CY 2018 landfill gas flare, fleet and facility data was obtained during meetings with SWMA agency officials. Facility utility records were obtained from SWMA, the County and the City of Santa Fe. CY 2005 and CY 2017 facility records were incomplete and were estimated using waste placement totals reported to the EPA. It is assumed that facility use and corresponding emissions respond to total waste placement occurring at SWMA. As a result, waste placement totals were used as an indicator of facility use. SWMA waste placement in CY 2017 was 1.5% lower than CY 2018; therefore, CY 2018 facility utility records were reduced by 1.5% for CY 2017. In CY 2005, SWMA waste placement values were 18.7% greater than CY 2018, so CY 2018 facility utility records were increased by 18.7% for CY 2005.

In 2005 SWMA did not have a landfill gas collection system. Waste placement tonnage was derived from historic EPA landfill reporting. Waste in Place is a cumulative number based on the landfill opening in 1997. The reported value of all waste landfilled through 2005 is 1,331,912 MT. CH_4 data was estimated using a landfill emissions tool that the California Air Resources Board developed[11]. The spreadsheet-based tool implements a mathematically exact first-order decay model of the 2006 IPCC guidelines. This tool is designed to estimate the fugitive emissions of a landfill that does not have a landfill gas collection system. The file and data used are available for download from the ClearPath inventory record created for the County. In 2005, 50% of waste tonnage is presumed to have originated from within the County with the other 50% coming from the City of Santa Fe; as a result, 50% of landfill gas emissions for CY 2005 were included in the County's emissions inventory.

Solid waste processed at the seven County-owned Solid Waste Convenience Centers was transferred to SWMA and related emissions are included within the SWMA Solid Waste inventory. Facility-specific emissions are included within the Buildings and Facilities sector, while emissions related to the transport of solid waste are included within the Transportation sector.

Information about waste generated by County employees directly from County operations was not available.

11 https://ww2.arb.ca.gov/resources/documents/landfill-methane-emissions-tool

WATER

Utility data from the Buckman Direct Diversion (BDD) and associated water lift stations were obtained from the City of Santa Fe, and 30% of total emissions were recorded in these inventories, which corresponds to the percentage of BDD water utilized by County water utility customers. 2005 data was not available, so City of Santa Fe water use was used as an indicator of facility use and emissions.

Per City of Santa Fe and US Census Bureau reporting, water usage decreased by 8.13% from 2005 to 2018. Therefore, 2005 water use and lift station use was assumed to be 8.13% greater than 2018 values.

WASTEWATER

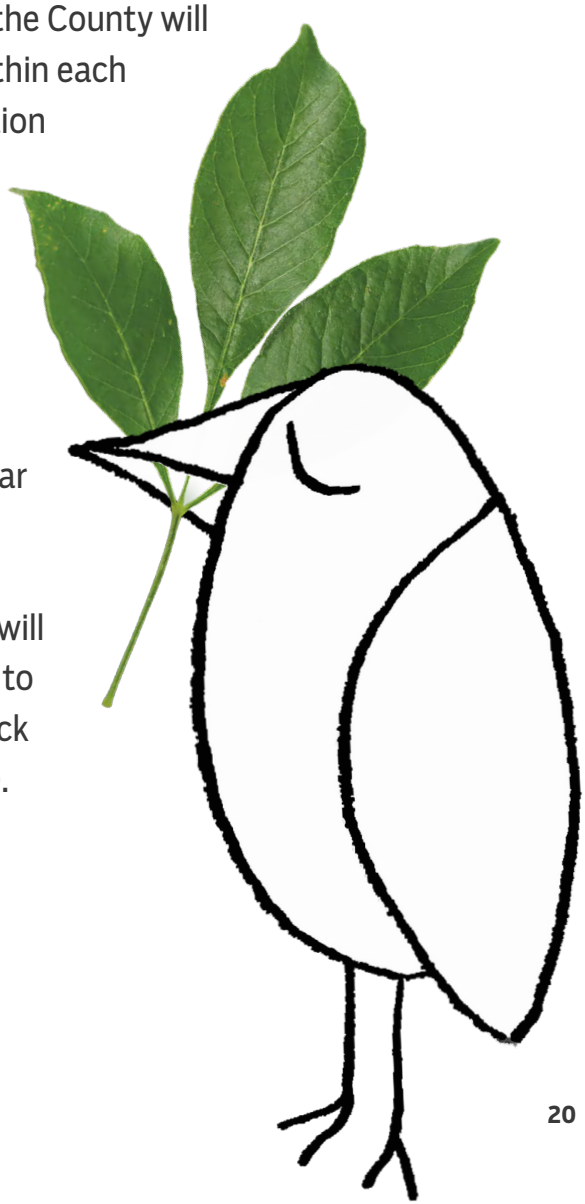
Wastewater data was obtained from the County including information about County-owned lift stations and the Quill Wastewater Treatment facility. Quill lagoon emissions and emissions from onsite disposal systems (OSDS), when data indicated the presence of such systems at various facilities, were derived from the estimated County population during the inventory year.

Next Steps

These GHG emissions inventories are the first step toward preparing a comprehensive action plan to further reduce emissions and increase resilience in the face of climate change.

High impact strategies within each sector will help achieve emission reduction targets that align with the Paris Agreement.

In the next phase of this project, the County will specify high impact strategies within each sector to achieve emission reduction targets that are in alignment with the Paris Agreement: a 26-28% or more reduction from 2005 levels by 2025, and net-zero GHG emissions by 2050. A comprehensive GHG reduction plan by sector in five year increments will be made available to the public and implemented by the County in mid-2021. Progress will then be assessed every five years to ensure the County remains on track to meet the net-zero goal by 2050.



Appendix

1.1 Fuel Usage by Sector

TABLE 2: SECTOR-SPECIFIC ENERGY USAGE TOTALS

Fuel Type	Sector	2005 Use	2017 Use	2018 Use
ELECTRICITY (kWh)	Buildings & Facilities	4,932,811	7,893,742	8,380,463
	Streetlights	73,494	174,928	179,096
	Solid Waste	95,840	87,319	87,157
	Water & Wastewater	2,480,639	2,470,303	2,808,079
	TOTAL	**7,582,784**	**10,626,292**	**11,454,795**
NATURAL GAS (therms)	Buildings & Facilities	290,028	345,177	437,239
	Water & Wastewater	25,555	23,633	24,760
	TOTAL	**315,583**	**368,810**	**461,999**
PROPANE (gallons)	Buildings & Facilities	37,262	39,663	43,746
	Solid Waste	4,168	3,512	3,512
	TOTAL	**41,430**	**43,175**	**47,258**
GASOLINE (gallons)	Vehicle Fleet	286,045	69,401	72,328
DIESEL (gallons)	Vehicle Fleet	112,500	40,569	42,152

1.2 Fuel Usage and Costs

TABLE 3: FUEL USAGE AND COST ESTIMATES[12]

	2005		2017			2018		
Fuel Type	Usage	Usage (GGE)*	Usage	Usage (GGE)	Cost	Usage	Usage (GGE)	Cost
ELECTRICITY (kWh)	7,582,784	225,008	10,626,292	315,320	$778,608	11,454,795	339,905	$913,365
NATURAL GAS (therms)	315,583	276,827	368,810	323,518	$67,431	461,999	405,262	$222,601
PROPANE (gallons)	41,430	54,657	43,175	56,959	$61,240	47,258	62,346	$65,123
DIESEL (gallons)	112,500	127,841	40,569	46,101	$110,023	42,152	47,900	$135,814
GASOLINE (gallons)	286,045	286,045	69,401	69,401	$173,364	72,328	72,328	$207,364
TOTAL (GGE, USD)		970,379		811,299	$1,190,666		927,741	$1,544,267

12 Gasoline and diesel cost estimates are limited by the lack of complete fleet data, discussed above, and estimates are lower than actual County gasoline and diesel expenditures. Per gallon cost estimates are based on data obtained from https://www.eia.gov/dnav/pet/PET_PRI_GND_DCUS_R40_A.htm. 2005 costs were not estimated because of the lack of data available from that year and the resulting inherent inaccuracy in any estimations.

* (GGE): Gallons of Gasoline Equivalent

1.3 Glossary

Carbon Dioxide Equivalent (CO_2e): The common unit used to measure the six greenhouse gases regulated under the Kyoto Protocol. Since each gas contributes a different level of atmospheric warming, CO_2e is calculated by multiplying each gas by its global warming potential.

Cooling Degree Day (CDD): The equivalent number of days needed to cool a building by 1 degree to accommodate the cooling requirement. For example, if on one day the temperature is 75ºF, that day is worth 10 Cooling Degree Days because it is 10 degrees above 65ºF, which is the standard temperature used in the United States. CDD is calculated in this way for each day of the year and summed up to get the total annual CDD.

Climate Change: A change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Fossil Fuel: A general term for organic materials formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years.

Global Warming Potential (GWP): Global Warming Potential factors represent the heat-trapping ability of each greenhouse gas relative to that of carbon dioxide.

Government Management and Budgetary Accounting (GMBA): A numerical coding system whereby the data presented in budget requests and reflected in appropriations are consistently coded within the accounting system. This compatibility facilitates comparisons between actual expenditures across previous fiscal periods and even across other governmental bodies. In the case of the County, all expenditures are coded with an established, defined Chart of Accounts or COA, which lists the GMBA number and the relevant associated data like "Tesuque Fire". These codes are available for download from the County Sunshine Portal, checkbook register.

Greenhouse Gas (GHG): A gas that absorbs radiation at specific wavelengths within the spectrum of radiation (infrared radiation) emitted by the Earth's surface and by clouds. The gas in turn emits infrared radiation from a level where the temperature is colder than the surface. The net effect is a local trapping of part of the absorbed energy and a tendency to warm the planetary surface. Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), Hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) are the six primary greenhouse gases.

Heating Degree Day (HDD): The equivalent number of days needed to heat a building by 1 degree to accommodate the heating requirement. For example, if on one day the temperature is 55ºF, that day is worth 10 Heating Degree Days because it is 10 degrees below 65ºF, which is the standard temperature used in the United States. HDD is calculated in this way for each day of the year and

summed up to get the total annual HDD. A number of organizations use HDD data as provided by the U.S. Energy Information Administration (https://www.eia.gov/energyexplained/units-and-calculators/degree-days.php).

Kilowatt hour (kWh): A derived unit of energy equal to 3.6 megajoules. Electrical energy is sold in kilowatt hours. If the energy is being used at a constant rate (power) over a period of time, the total energy in kilowatt hours is the product of the power in kilowatts and the time in hours.

Light-emitting diode (LED): A light-emitting diode is a two-lead semiconductor light source. LEDs have many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching.

Metric Ton (MT): Common international measurement for the quantity of greenhouse gas emissions. A metric ton is equal to 2205 pounds or 1.1 short tons.

Onsite Disposal System (OSDS): Commonly known as septic systems, these wastewater treatment systems are designed to treat and dispose of effluent on the same property that produced the wastewater typically in anaerobic environments. OSDSs are known sources of NO_2 and CH_4 emissions depending on the specifics of the system in use.

Scopes 1, 2 and 3: The World Resource Institute and World Business Council on Sustainable Development developed a classification system for different types of GHG emissions for GHG accounting purposes. Scope 1 emissions come directly from owned equipment and buildings. Scopes 2 and 3 are indirect emissions from sources shared by the reporting institution with other entities.

Therms: The therm is a unit of heat energy equal to 100,000 British thermal units (BTU). It is approximately the energy equivalent of burning 100 cubic feet (often referred to as 1 CCF) of natural gas. Since natural gas meters measure volume and not energy content, a therm factor is used by natural gas companies to convert the volume of gas used to its heat equivalent, and thus calculate the actual energy use.

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SANTA FE COUNTY