



SAN RAFAEL CITY COUNCIL AGENDA REPORT

Department: City Manager's Office

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City Manager Approval: _____

TOPIC: GREENHOUSE GAS EMISSIONS REPORTS AND CLIMATE ACTION PRIORITIES UPDATE

SUBJECTS: ACCEPT THE GREENHOUSE GAS INVENTORY REPORTS FOR 2022 AND THE FISCAL YEAR 2023-2025 TWO-YEAR WORKPLAN PRIORITIES UPDATE

RECOMMENDATION:

Accept the Greenhouse Gas Inventory Reports for 2022 and the Fiscal Year 2023-2025 Two-Year Workplan Priorities Update.

EXECUTIVE SUMMARY:

The City conducts annual community greenhouse gas (GHG) emissions inventory reports to gauge progress toward GHG reduction targets as reflected in the [Climate Change Action Plan 2030](#) (CCAP). The most recent report is for calendar year 2022 which is the latest available data. This report shows San Rafael has achieved a 34% reduction in community GHG emissions since 2005, which is estimated to be a 22% reduction from 1990 levels. This year, the City also conducted an emissions inventory for local government operations, which is typically done every five years. Government operations comprise a small portion of community emissions. This report shows the City has achieved a 40% reduction in local government emissions since 2005, which is estimated to be a 29% reduction from 1990 levels. In addition, every two years, City staff develops a priority work plan and reports on progress at the one- and two-year marks. This year, the City completed three major projects related to energy, transportation, and economic development and has made progress on several others. Though the City has made significant progress in many areas, it will need to redouble efforts to meet its ambitious reduction targets of 40% below 1990 levels by 2030.

BACKGROUND:

State of the Climate

2023 was the warmest year on record. The first six months of 2024 have each set new temperature records. The world experienced its highest absolute global daily temperature on record on July 22. Over the past 12 months, 138 countries have recorded their hottest temperatures ever.

FOR CITY CLERK ONLY

Council Meeting:

Disposition:

Climate change and the efforts to address it touch every aspect of society, from infrastructure to health, natural ecosystems, the economy, and housing. For example, 2023 was a historic fire season in Canada, with a burned area six times greater than the average year. Over 4,600 wildfires have already occurred in Canada this year, mid-way through fire season. 2023 also saw the highest number of heat-related deaths ever recorded. Scientists are documenting increases in hurricanes, droughts, and extreme weather events and are attributing these increases to climate change. More information regarding these statistics can be found at [Carbon Brief](#) and the [World Meteorological Organization](#), among other sources.

California Climate Goals

The State of California has responded to growing concerns over the effects of climate change by adopting a comprehensive approach to addressing emissions in the public and private sectors. This approach was officially initiated with the passage of the [Global Warming Solutions Act](#) of 2006 (AB 32), which required the State to reduce its greenhouse gas (GHG) emissions to 1990 levels by 2020. The AB 32 Scoping Plan was developed to identify strategies for meeting the AB 32 goal and was adopted by the California Air Resources Board (CARB) in December 2008. Among many other strategies, it encouraged local governments to reduce emissions in their jurisdictions by fifteen percent below 2005 baseline levels by 2020 and proposed longer-term goals established by Executive Order S-3-05 to reduce emissions 80 percent below 1990 levels by 2050.

In 2016, the State Legislature passed [SB 32](#), which set interim targets of 40% reductions below 1990 levels by 2030. CARB subsequently updated its Climate Change Scoping Plan in 2017 to lay out a strategy to achieve the 2030 target. In 2018, Executive Order B-55-18 committed California to achieve carbon neutrality – the point at which the removal of carbon from the atmosphere meets or exceeds emissions – by 2045. CARB subsequently updated the [Scoping Plan](#) in 2022 to meet this goal.

City's Climate Change Action Plan

San Rafael's original [Climate Change Action Plan \(CCAP\)](#) was adopted by the City Council in 2009. In 2011, the City incorporated the CCAP measures into General Plan 2020 as a Sustainability Element. A GHG Emissions Reduction Strategy was also prepared to provide technical support to the Sustainability Element, CCAP was adopted. In 2017, then Councilmember Kate Colin and the City Manager's Office convened a 20-member community working group to update the CCAP to meet the new interim 2030 State greenhouse gas reduction targets referenced above. Over 350 San Rafael residents and business representatives gave input, which resulted in San Rafael's Climate Change Action Plan 2030 adopted by the City Council on [May 19, 2019](#).

In September 2021, the City Council adopted a [Climate Emergency Declaration](#) and set a new long-term greenhouse gas reduction target for San Rafael, committing the City to carbon neutrality by 2045.

San Rafael's CCAP was developed specifically to include strategies to address the three pillars of sustainable development: environment, equity, and economy. As such, it supports three of the City's four Policy Focus Areas: 1) Sustainability, Climate Change, and Disaster Preparedness, 2) Economic Growth, and 3) Diversity, Equity, Inclusion, and Belonging. The City's Climate Change Action Plan has also been integrated into [General Plan 2040](#) and serves as the City's Greenhouse Gas Reduction Strategy. This Strategy meets the California Environmental Quality Act (CEQA) for a "qualified" greenhouse gas reduction strategy. It commits the City to track implementation measures and emissions reductions while providing a useful streamlining tool for reviewing

development and building projects.

Councilmember Llorens Gulati is the current Sustainability Liaison to the City Council. As the Council Liaison, Councilmember Llorens Gulati meets regularly with staff and the executive leadership of Sustainable San Rafael to plan and host quarterly public CCAP implementation forums. The Liaison's role is important in helping staff prioritize requests from the public and in shaping projects and programs for City Council action.

Greenhouse Gas Inventory

The City measures progress toward GHG reduction goals through the completion of an annual community greenhouse gas (GHG) inventory report. These reports provide the City Council with an overview of community-wide emissions as well as the status of City actions accomplished in that same year. GHG emissions and reductions are calculated for various sectors, including energy, transportation, waste, and water. This is done using a common protocol local governments use to show in boundary, activity-based emissions, which primarily focus on the emissions created most directly within the geographical boundary of the City. Emissions data is typically not available for a year and a half; thus, inventories have a lag time. The last community inventory was conducted in 2023 for the 2021 calendar year.

In addition, approximately every five years, the City conducts a municipal inventory, which provides a deep analysis of the emissions from municipal operations and facilities. The last municipal inventory was conducted in 2018 for the calendar year 2016. This year, the City conducted a municipal inventory that covered the calendar year 2022. The City opted to delay the municipal inventory to calendar year 2022 to avoid significant anomalies that occurred due to the COVID-19 pandemic and ensure a better comparison to 2016. It is important to note that the majority of GHG emissions come from the community: residents, businesses, and visitors. Local government emissions make up only approximately 1% of community-wide emissions.

The City partners with the Marin Climate and Energy Partnership (MCEP) for conducting the inventories and developing the reports. MCEP publishes all the results on the MCEP website, [MarinClimate.org](https://www.marinclimate.org), and at [MarinTracker.org](https://www.marintracker.org) so that community members can easily access the data using an interactive map.

Two-Year Priorities

Every two years, City staff identifies key priorities taken from the Climate Change Action Plan on which to focus limited resources. These are reviewed with the City Council Sustainability Liaison and at the Climate Change Action Plan quarterly community forum for review before completing into a work plan. These priorities and work plan align with the subset of objectives represented in the *Sustainability, Climate Change and Disaster Preparedness Policy Focus Area* in the City Council's adopted fiscal year [2023-24 & 2024-25 Goals and Objectives](#). Staff brought the most recent [Two-Year Priority Workplan](#) to Council in September 2023.

ANALYSIS:

Community Greenhouse Gas Inventory Report

The 2022 Community Greenhouse Gas Emissions Inventory Report (Attachment 1) provides the City Council with an overview of community-wide emissions. The report provides a broad category of best-estimate community-wide emissions data for the calendar year 2022 based on publicly available data. This data shows an overall reduction of approximately 34% of community-wide emissions since 2005 and 22% below 1990 levels. Table 1 below shows where the reductions came from.

Table 1: Change in Emissions by Sector, Community

SECTOR	% CHANGE SINCE 2005
Transportation	-22%
Built Environment - Electricity	-85%
Built Environment – Natural Gas	-14%
Waste	-47%
Water	-100%
Off-Road	-29%
Wastewater	+12%
TOTAL	-34%

Some of the City programs and activities conducted in 2022 geared toward reducing community emissions included:

- Adopting [Green Building reach codes](#) for new buildings
- Adopting ordinances to [require composting](#) and limit the use of gas [leaf blowers](#)
- Completing the [Canal Community-Based Transportation Plan](#)
- Promoting electric vehicles at various events

The City also supported many programs such as Resilient Neighborhoods, California Youth Environmental Services’ Green House Calls, the Chamber Green Business Committee, two electric vehicle working groups, and Marin School of Environmental Leadership, among others.

The City has made significant progress towards the implementation of its CCAP and has a strong commitment to continuing to implement policies and programs. San Rafael met its interim goal of a 25% reduction in communitywide GHG emissions from the 2005 baseline by 2020. However, State targets set by SB 32 and the CCAP referenced above establish a new baseline of 1990 rather than 2005 for 2030 GHG reduction targets. Translating current reductions to a 1990 baseline means San Rafael has reduced emissions by 22% since 1990. To meet the City’s 40% reduction target by 2030 and net-zero target by 2045, San Rafael will need to redouble efforts and continue to innovate, collaborate, and be at the forefront of local GHG reduction strategies.

Finally, regarding GHG inventories, the value of an in-boundary, activity-based type of inventory is that it isolates emissions from local sources, providing a snapshot of sectors and activities that can be affected to some degree by local government actions and can most reliably be quantified and tracked on an annual basis. In addition, it allows for a rough aggregation of data to allow for county-wide, regional, state, and larger groupings of emissions calculations. This can be helpful in understanding California-wide emissions or comparing them to those of the U.S. at large. One thing it does not do, however, is get at the larger set of emissions driven by consumption.

Consumption includes all the “upstream” emissions from the things individuals buy, including the mining, manufacturing, packaging, and transportation of products, which carry a lot of embedded GHG emissions. A consumption-based inventory would show a very different picture of San Rafael’s GHG emissions. It could easily triple emissions per capita due to the number of materials and products we consume, mainly from imported food and goods. In San Rafael, we have chosen to include consumption messaging – our “carbon footprint” – in our engagement rather than just

rely on an in boundary inventory. This is a primary focus of the [Resilient Neighborhoods](#) program, which works county-wide to educate residents about this and help them reduce their household carbon footprint.

Municipal Greenhouse Gas Inventory Report

Municipal operations, facilities, and vehicles, including employee commutes, make up roughly 1% of San Rafael’s overall community greenhouse gas emissions. Nevertheless, municipal emissions are important to track and reduce to show leadership and demonstrate the importance of every entity needing to do their part. The City’s municipal emissions are done much less often than the community emissions inventory and require much more detail to complete, including collecting data on fuel use for all vehicles, equipment, pump stations, and buildings. It also requires a review of all the City’s electricity accounts, which number in the hundreds due to all the streetlights, traffic lights, electricity in parking garages and lots, irrigation controllers, and many other electricity-using facilities throughout San Rafael, including electric vehicle chargers.

The Local Government Operations Greenhouse Gas Emissions Inventory Report for 2022 (Attachment 2) shows a 40% reduction since 2005, which is equal to a 29% reduction in municipal emissions since 1990. Table 2 below shows where these reductions came from. This represents a multitude of actions the City has taken over the years, including switching to Renewable Diesel in the diesel fleet, conducting numerous energy efficiency projects in facilities, replacing the majority of our streetlights and other public lighting with LED bulbs, and moving all electricity accounts to MCE’s Deep Green 100% renewable and GHG-free electricity.

Table 2: Change in Emissions by Sector, Municipal

SECTOR	% CHANGE SINCE 2005
Buildings & Facilities	-48%
Vehicle Fleet	-29%
Public Lighting	-100%
Water Delivery	-100%
Waste	-17%
Employee Commute	-26%
TOTAL	-40%

Some of the City programs and activities conducted in 2022 geared toward reducing municipal emissions included:

- Transitioning all diesel vehicles in the fleet, including fire trucks, to Renewable Diesel
- Procuring electric parking buggies, a utility vehicle, and a Fire Administration vehicle
- Partnering with the Transportation Authority of Marin to provide new commuter benefits to City employees
- Hosting Climate Fellows to develop resources and training to reduce waste in City operations and facilities
- Re-convening the Employee Green Team to develop internal policies for conservation
- Piloting a draft surplus equipment procedure for no longer needed equipment and furniture

Every two years, the staff proposes work plan priorities from the CCAP to be efficient with City resources and stay focused on key initiatives. These priorities were developed with and based on input from community partners such as the County of Marin Sustainability Team, Sustainable San Rafael, members of our quarterly CCAP community forums, the Marin Climate and Energy Partnership, our utility partners, and others. This allows for county-wide collaboration and resource sharing as well as alignment with other City and public priorities and work plans. In addition, whenever possible, staff seeks opportunities to develop model work products that other cities or organizations can use as well to extend their impact beyond San Rafael.

Attachment 3 is a snapshot of the accomplishments and progress in the first year of the Workplan. Some of the items worth noting include:

- Completion of an [Electric Vehicle Acceleration Strategy](#) and work plan, which is being implemented
- Adoption of a [Green Building Reach Code](#) for existing buildings
- Completion of an [Equitable Low Carbon Economy Plan](#) Report with recommendations and work plan
- Execution of contracts with UC Berkeley and a consultant team to complete a sea level rise feasibility study in East San Rafael.
- Execution of an agreement with Zero Waste Marin to conduct outreach, enforcement, and procurement responsibilities on behalf of the City for SB 1383 implementation

Other activities completed in this past year include:

- Development of an [“8 Step Guide to Electrification”](#) for homeowners, now included in the [Marin Builder’s Association Home Guide](#)
- Development of [staff resources and training](#) to comply with SB 1383
- Completion of a [Surplus Equipment Policy](#)
- Adoption of a [Reusable Foodware Ordinance](#)
- Completion of several technical studies for sea level rise planning
- Completion of several engagements for the sea level rise feasibility study
- Replacement of seven gas hot water heaters with electric heat pump hot water heaters
- Acceptance of a \$297,000 [grant for a Climate Justice](#) and Engagement Coordinator

COMMUNITY OUTREACH:

Staff regularly gives presentations with opportunities for feedback to the following organizations: the CCAP quarterly implementation forums, and the San Rafael Chamber of Commerce Green Business Committee, school groups, and the Marin Climate and Energy Partnership, among others. Information regularly goes out to the public through the City’s Sustainability email newsletter, the City Manager’s Snapshot, and through City social media channels.

FISCAL IMPACT:

There is no direct fiscal impact to accepting the reports. Funding for implementation of programs is generally supported through existing budget resources as well as grants and utility-sponsored programs. Where required, supplemental funding requests for supplemental General Fund support will be contingent on separate City Council action through the budget process.

RECOMMENDED ACTIONS:

Accept the Greenhouse Gas Inventory Reports for 2022 and the Fiscal Year 2023-2025 Two-Year Workplan Priorities Update.

ATTACHMENTS:

1. Community Greenhouse Gas Emissions Inventory Report for 2022
2. Local Government Operations Greenhouse Gas Emissions Inventory Report for 2022
3. 2023-2025 Two-Year Sustainability Priority Workplan Update



CITY OF SAN RAFAEL

COMMUNITY GREENHOUSE GAS EMISSIONS INVENTORY FOR THE YEAR 2022



August 2024

Prepared by the
Marin Climate & Energy Partnership



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EXECUTIVE SUMMARY

THE TAKEAWAY:

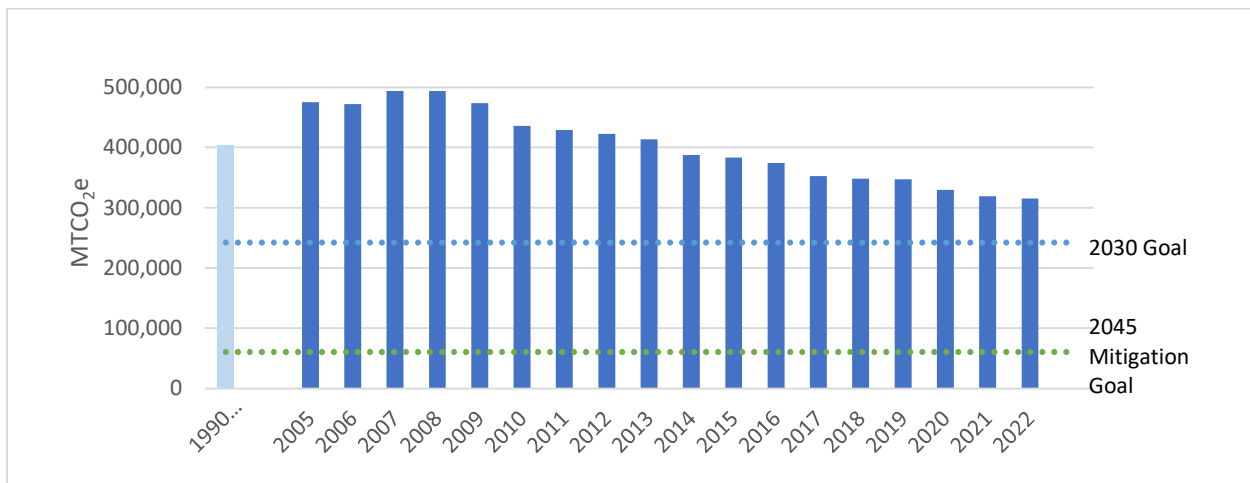
**COMMUNITY EMISSIONS ARE
DOWN 34% SINCE 2005 AND
22% SINCE 1990**

San Rafael publishes annual community greenhouse gas (GHG) emissions estimates through the Marin Climate & Energy Partnership (MCEP). Annual inventories help the City to more closely monitor its progress in meeting its goal to reduce community emissions at least 40% below 1990 emissions by 2030. The City also publishes GHG emissions inventories for municipal operations approximately every five years. Municipal emissions accounted for less than 1% of community emissions when the municipal inventory was

last conducted for year 2016.

This report reviews emissions generated from the community from 2005 through 2022, the most recent year data is available. The inventory shows that emissions dropped from about 475,000 metric tons carbon dioxide equivalents (MTCO_{2e}) in 2005 to 315,111 MTCO_{2e} in 2022, which is equivalent to 34% below the 2005 baseline and 22% below 1990 levels. The community emissions trend and targets are shown below. San Rafael needs to reduce emissions another 76,630 MTCO_{2e} to meet the local and State target for 2030. San Rafael adopted a Climate Emergency Resolution in 2021 that establishes a goal to achieve net-zero emissions by 2045 or earlier, similar to the State's long-term goal. This is expected to be accomplished by reducing GHG emissions approximately 85% below 1990 levels and employing sequestration and/or carbon capture strategies to offset the remaining emissions. San Rafael needs to reduce GHG emissions another 258,3000 MTCO_{2e} to meet the GHG mitigation target for 2045, as shown in Figure 1.

FIGURE 1: SAN RAFAEL GHG EMISSIONS AND REDUCTION TARGETS



Recognizing the need for a collaborative approach to greenhouse gas reductions, City and county leaders launched the Marin Climate and Energy Partnership (MCEP) in 2007. The City of San Rafael is a member of MCEP and works with representatives from the County of Marin and the other Marin cities and towns to address and streamline the implementation of a variety of greenhouse gas reduction measures. Funding for this inventory was provided by the Marin County Energy Watch Partnership, which administers public goods charges collected by PG&E. Community inventories are available on the MCEP website at marinclimate.org and are used to update the [Marin Sustainability Tracker](#).

INTRODUCTION

PURPOSE OF INVENTORY

The objective of this greenhouse gas emissions inventory is to identify the sources and quantify the amounts of greenhouse gas emissions generated by the activities of the San Rafael community in 2022. This inventory provides a comparison to 2005 and estimated 1990 emissions and identifies the sectors where significant reductions in greenhouse gas emissions have occurred. In some instances, previous year emissions were updated with new data and/or recalculated to ensure the same methodology was employed for all inventory years.

GENERAL METHODOLOGY

This inventory uses the national standard for the accounting and reporting of community-wide greenhouse gas emissions, the [U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, version 1.2 \(July 2019\)](#). Quantification methodologies, emission factors, and activity and source data are detailed in the appendix.

Community emissions are categorized according to seven sectors:

- Built Environment - Electricity
- Built Environment – Natural Gas
- Transportation
- Off-Road Vehicles and Equipment
- Waste
- Water
- Wastewater

CALCULATING EMISSIONS

Emissions are quantified by multiplying the measurable activity data – e.g., kilowatt hours of electricity, therms of natural gas, gallons of diesel or gasoline, etc. – by emissions factors specific to the greenhouse gas-generating source. Most emissions factors are the same from year to year. Emission factors for electricity, however, change from year to year due to the specific sources that are used to produce electricity. For example, electricity that is produced from coal generates more greenhouse gases than electricity that is generated from natural gas and therefore has a higher emissions factor. Electricity that is produced solely from renewable energy sources such as solar and wind has an emissions factor of zero.

This inventory calculates individual greenhouse gases – i.e., carbon dioxide, methane, and nitrous oxide – and converts each greenhouse gas emission to a standard metric, known as “carbon dioxide equivalents” or CO₂e, to provide an apple-to-apples comparison among the various emissions. Table 1 shows the greenhouse gases identified in this inventory and their global warming potential (GWP), a measure of the amount of warming each gas causes when compared to a similar amount of carbon dioxide over 100 years. Methane, for example, is 28 times as potent as carbon dioxide over 100 years; therefore, one metric ton of methane is equivalent to 28 metric tons of carbon dioxide. Greenhouse gas emissions are reported in this inventory as metric tons of carbon dioxide equivalents, or MTCO₂e.

TABLE 1: GREENHOUSE GASES

Gas	Chemical Formula	Emission Source	Global Warming Potential
Carbon Dioxide	CO ₂	Combustion of natural gas, gasoline, diesel, and other fuels	1
Methane	CH ₄	Combustion, anaerobic decomposition of organic waste in landfills and wastewater	28
Nitrous Oxide	N ₂ O	Combustion, wastewater treatment	265

Source: IPCC Fifth Assessment Report (2014), 100-year values

TYPES OF EMISSIONS

Emissions from each of the greenhouse gases can come in a number of forms:

- **Stationary or mobile combustion** resulting from the on-site combustion of fuels (natural gas, diesel, gasoline, etc.) to generate heat or electricity, or to power vehicles and equipment.
- **Purchased electricity** resulting from the generation of power from utilities outside the jurisdictional boundary.
- **Fugitive emissions** resulting from the unintentional release of greenhouse gases into the atmosphere, such as methane from waste decomposition.
- **Process emissions** from physical or chemical processing of a material, such as wastewater treatment.

UNDERSTANDING TOTALS

The totals listed in the tables and discussed in the report are a summation of emissions using available estimation methods. Each inventoried sector may have additional emissions sources associated with them that were unaccounted for due to a lack of data or robust quantification methods. For example, greenhouse gas emissions associated with air travel and the production of goods outside the community's boundary are not included in the inventory. Additionally, the community inventory does not include refrigerants released into the atmosphere from the use of air conditioning in cars and buildings.

COMMUNITY INVENTORY

COMMUNITY INVENTORY SUMMARY

In 2005, the activities taking place by the San Rafael community resulted in approximately 475,000 metric tons of CO₂e.¹ In 2022, those activities resulted in approximately 315,111 metric tons of CO₂e, a reduction of 34% from 2005 levels, which is equivalent to 22% below 1990 levels.

The community inventory tracks emissions in seven sectors:

- The **Built Environment – Electricity** sector represents emissions generated from the use of electricity in San Rafael homes and commercial, industrial, and governmental buildings and facilities.
- The **Built Environment – Natural Gas** sector represents emissions generated from the use of natural gas in San Rafael homes and commercial, industrial, and governmental buildings and facilities. Propane used as a primary heating source is also included, although it represents less than 1% of emissions in this sector.
- The **Transportation** sector includes tailpipe emissions from passenger vehicle trips originating and ending in San Rafael, as well as a share of tailpipe emissions generated by medium and heavy-duty vehicles travelling on Marin County roads. The sector also includes emissions from Marin Transit and Golden Gate Transit buses and the SMART train as these vehicles travel within San Rafael’s boundaries. Electricity used to power electric vehicles is embedded in electricity consumption reported in the Built Environment - Electricity sector.
- The **Waste** sector represents fugitive methane emissions that are generated over time as organic material decomposes in the landfill. Although most methane is captured or flared off at the landfill, approximately 25% escapes into the atmosphere.
- The **Off-Road** sector represents emissions from the combustion of gasoline and diesel fuel from the operation of off-road vehicles and equipment used for construction and landscape maintenance.
- The **Water** sector represents emissions from energy used to pump, treat, and convey potable water from the water source to the San Rafael water users.
- The **Wastewater** sector represents stationary, process and fugitive greenhouse gases that are created during the treatment of wastewater generated by the community. Emissions created from energy used to convey and treat wastewater are included in the Built Environment sectors.

Table 2 shows how emissions in each sector have changed since 2005. The greatest reductions have occurred in the Built Environment – Electricity sector (75,853 MTCO₂e), followed by the Transportation sector (58,607 MTCO₂e) and the Built Environment – Natural Gas sector (12,632 MTCO₂e). The likely reasons for the largest emissions decreases are described in the remainder of this report.

¹ Baseline and historical emissions are recalculated in the annual inventory to integrate new data and improved calculation methodologies and to ensure consistent comparison across each year. For this reason, emission levels may differ from levels reported in previous inventories.

TABLE 2: EMISSIONS SUMMARY BY SECTOR (MTCO₂E), 2005 THROUGH 2022

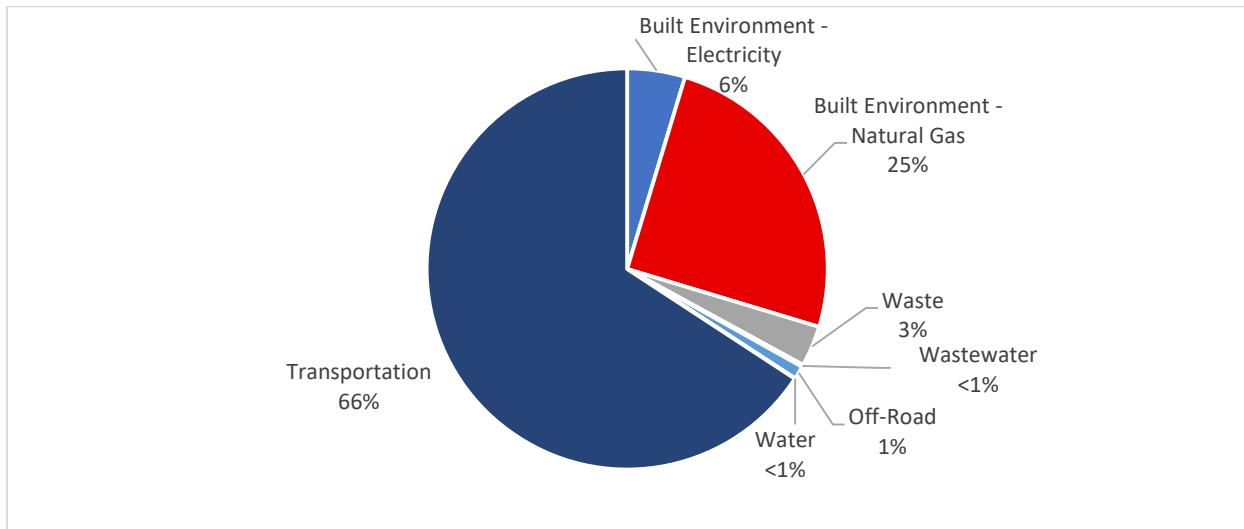
Year	Built Environment - Electricity	Built Environment - Natural Gas	Transportation	Waste	Water	Wastewater	Off-Road	Total	% Change from 2005	% Change from 1990 ²
1990 (est.) ¹								403,713		
2005	88,767	92,247	266,928	19,075	2,371	484	5,085	474,956	0%	
2006	83,610	95,425	266,209	18,913	2,074	485	5,008	471,723	-1%	
2007	111,739	92,455	264,388	17,101	2,804	488	4,895	493,868	4%	
2008	112,024	93,985	265,598	14,205	2,579	490	4,611	493,491	4%	
2009	101,128	92,767	259,960	12,223	2,593	492	4,235	473,398	0%	
2010	76,081	93,296	248,651	12,006	1,486	496	3,895	435,911	-8%	
2011	71,056	96,073	244,487	11,718	1,053	498	3,784	428,670	-10%	
2012	72,706	90,344	241,741	12,149	1,136	503	3,707	422,286	-11%	
2013	68,716	89,797	236,978	12,303	1,323	506	3,666	413,289	-13%	
2014	61,976	76,304	231,401	12,437	1,189	517	3,645	387,469	-18%	
2015	61,260	77,920	226,110	12,887	933	491	3,609	383,209	-19%	
2016	49,936	81,715	222,389	15,147	692	551	3,554	373,984	-21%	
2017	26,412	85,650	220,291	15,852	202	541	3,491	352,440	-26%	
2018	25,961	85,625	218,402	14,054	0	539	3,396	347,977	-27%	
2019	25,813	86,037	217,805	13,397	0	538	3,295	346,884	-27%	-13%
2020	18,412	79,679	214,924	12,732	0	553	3,244	329,543	-31%	-17%
2021	14,955	80,158	209,252	10,514	0	550	3,429	318,857	-33%	-21%
2022	12,913	79,615	208,320	10,103	0	543	3,616	315,111	-34%	-22%
Change from 2005	-75,853	-12,632	-58,607	-8,972	-2,371	58	-1,469	-159,846		
% Change from 2005	-85%	-14%	-22%	-47%	-100%	12%	-29%	-34%		

¹ Per California Air Resources Board guidance, 1990 levels are estimated at 15% below 2005 levels.

² In 2019, San Rafael adopted a Climate Action Plan that established a goal to reduce emissions 40% below 1990 levels by 2030. This column will track that progress over time.

Figure 2 shows the relative contribution of emissions from these sectors in 2022. Transportation emissions represent the largest share of communitywide emissions (66%), while the use of natural gas and propane in the Built Environment accounts for one-quarter of emissions.

FIGURE 2: EMISSIONS BY SECTOR, 2022

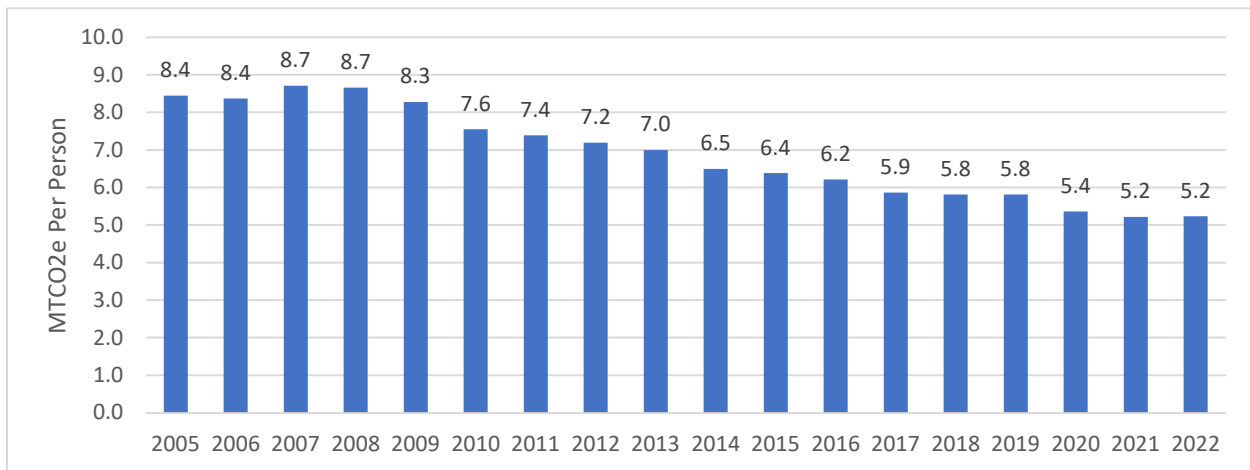


PER CAPITA EMISSIONS

Per capita emissions can be a useful metric for measuring progress in reducing greenhouse gases and for comparing one community’s emissions with neighboring cities and against regional and national averages. That said, due to differences in emission inventory methods, it can be difficult to produce directly comparable per capita emissions numbers. Per capita emission rates may be compared among Marin jurisdictions, although some jurisdictions may have higher rates due to the presence of commercial and industrial uses.

Dividing the total communitywide GHG emissions by residents yields a result of 8.4 metric tons CO₂e per capita in 2005. Per capita emissions decreased 38% between 2005 and 2022, falling to 5.2 metric tons per person. Figure 3 shows the trend in per capita emissions over time. It is important to understand that this number is not the same as the carbon footprint of the average individual living in San Rafael, which would include lifecycle emissions, emissions resulting from air travel, etc.

FIGURE 3: EMISSIONS PER CAPITA



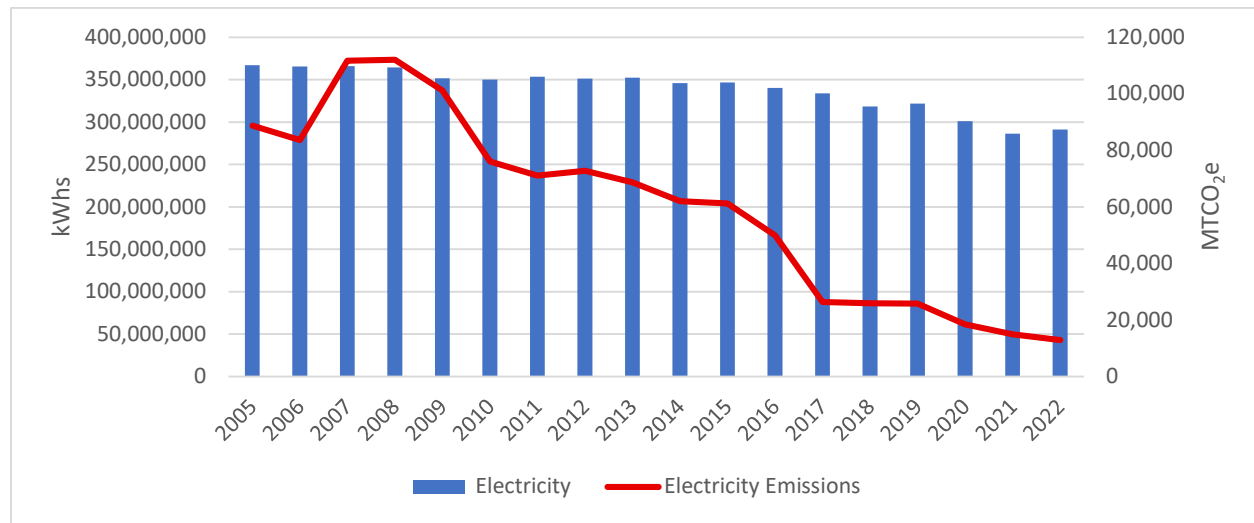
SIGNIFICANT SOURCES OF EMISSIONS

The following sections provide a year-by-year analysis of the changes in source GHG emissions in the Built Environment, Transportation, Waste, and Water sectors. Whenever possible, each section discusses the change in emissions from previous years and the likely influence of state and local programs or policies and external factors on reducing emissions.

BUILT ENVIRONMENT - ELECTRICITY

Purchased electricity consumption in homes and businesses in San Rafael decreased about 21% between 2005 and 2022. Greenhouse gas emissions from this electricity use decreased 85% since 2005, as shown in Figure 4. This is primarily due to the lower carbon intensity of electricity. PG&E has been steadily increasing the amount of renewable energy in its electricity mix. In 2022, PG&E electricity came from a mix of renewable (38%), large hydroelectric (8%), nuclear (49%), and natural gas (5%) energy sources and was 95% GHG-free.² MCE Light Green electricity came primarily from renewable (60%) and hydroelectric (40%) sources and was 95% GHG-free.³ In 2022, about 12.6% of MCE electricity purchased by San Rafael customers was 100% renewable Deep Green electricity, including electricity purchased by the City for facilities and operations. San Rafael's Climate Action Plan target is to reduce electricity emissions 93% below the 2005 level by 2030.

FIGURE 4: ELECTRICITY USE AND EMISSIONS



BUILT ENVIRONMENT - NATURAL GAS

Natural gas is used in residential, commercial, and industrial buildings to provide space and water heating and power appliances. Use of natural gas is highly variable depending on the weather conditions. This variability has led natural gas use consumption in San Rafael to fluctuate from year to year, from a high of 18 million therms in 2011 to a low

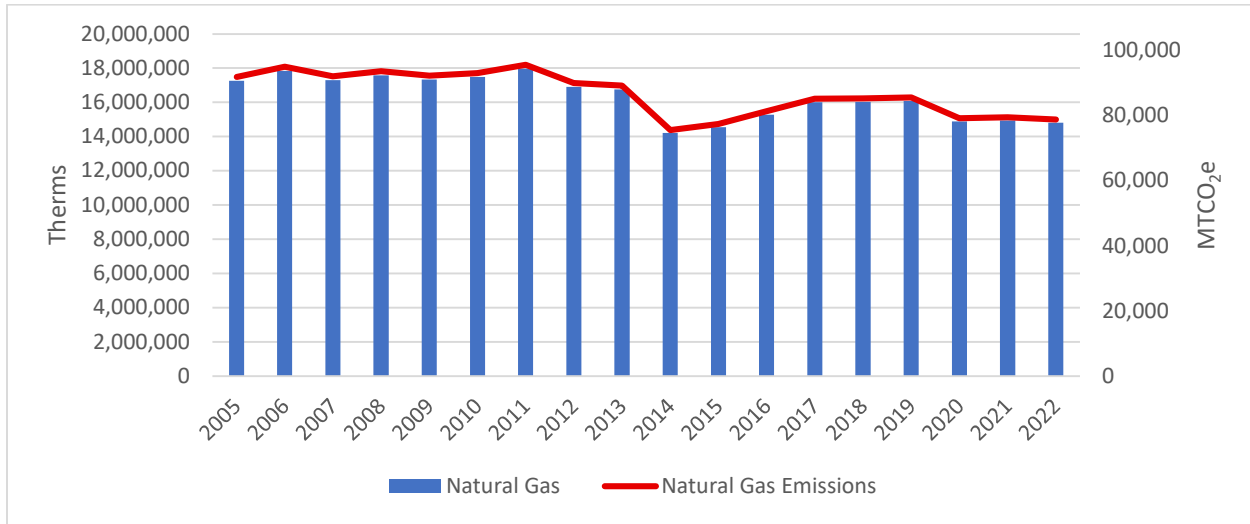
² PG&E 2022 Power Content Label, <https://www.pge.com/content/dam/pge/docs/account/billing-and-assistance/power-content-label.pdf>. Nuclear and large hydro sources are considered GHG-free.

³ MCE 2022 Power Content Label, <https://www.mcecleanenergy.org/energy-suppliers/>

of 14.2 million therms in 2014. Reduction in energy use may also be attributed to energy efficiency programs and rebates, local green building ordinances, and State building codes.

Natural gas consumption decreased 1% between 2021 and 2022 and was 14% below the 2005 level. Unlike electricity emissions which reflect the power content mix, natural gas emissions track the amount of natural gas consumed (Figure 5). The Climate Action Plan target is to reduce natural gas consumption and emissions 28% below the 2005 level by 2030.

FIGURE 5: NATURAL GAS USE AND EMISSIONS



TRANSPORTATION

Transportation activities accounted for approximately 66% of San Rafael’s emissions in 2022. According to the transportation model and annual data the City uses to calculate passenger and commercial vehicle miles, vehicle miles traveled (VMT) have decreased less than 1% since 2005.

On-road transportation emissions have decreased 22% since 2005 due to more fuel-efficient and alternatively fueled cars (Figure 6). As shown in Figure 7, most transportation emissions come from passenger vehicles, which accounted for 72% of transportation emissions in 2021. Marin County continues to be a leader in zero emission vehicles (ZEVs) – second only to Santa Clara County – with 15,449 ZEVs in Marin at the end of 2022, or about 7.5% of registered automobiles. ZEVs include battery electric cars, plug-in hybrid electric cars, hydrogen fuel cell cars, and zero-emission motorcycles. San Rafael had 3,438 ZEVs by the end of 2022, or 5.8% of registered light-duty vehicles. San Rafael’s Climate Action Plan targets 25% of passenger vehicles registered in Marin and traveling in San Rafael to be ZEVs by 2030 and a 46% reduction in transportation emissions.

While it is difficult to pinpoint exactly how each land use and transportation policy affects emissions, the City has undertaken many efforts to reduce transportation emissions. The City encourages workforce housing and has made improvements to the transportation network to make it easier for residents to bicycle, walk, and take public transportation. The City has also promoted electric vehicle adoption by installing chargers and providing free electricity at select municipal EV charging stations.

FIGURE 6: ON-ROAD TRANSPORTATION VEHICLE MILES TRAVELED AND EMISSIONS

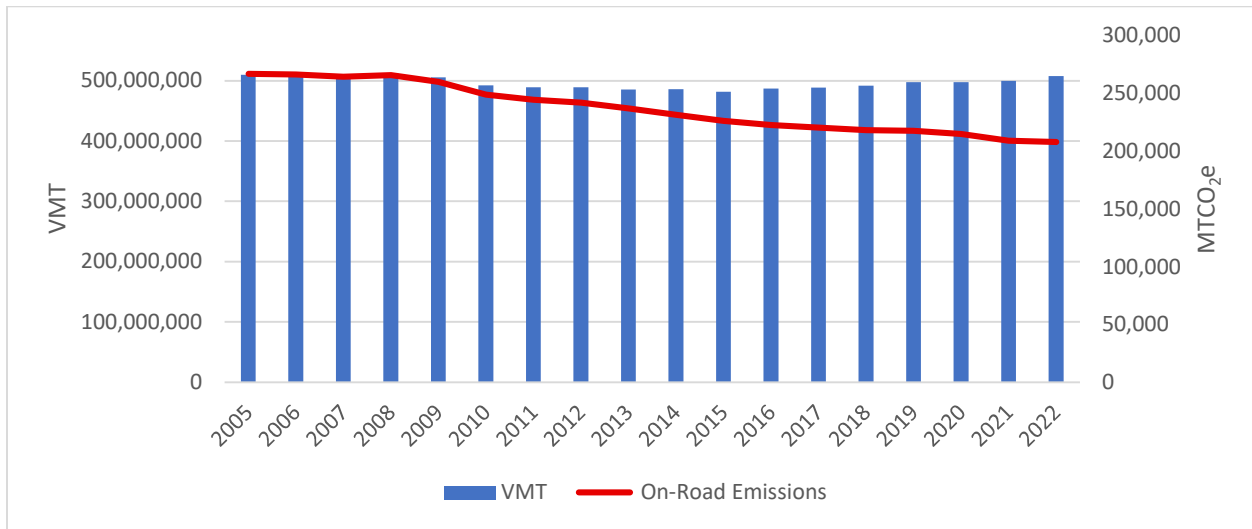
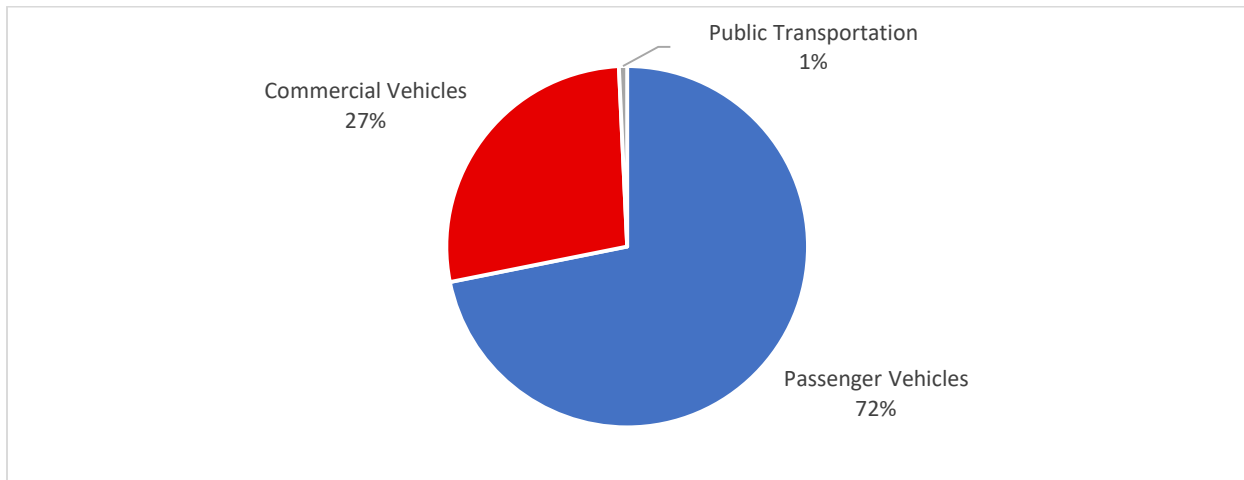


FIGURE 7: TRANSPORTATION EMISSIONS BY VEHICLE CATEGORY, 2022



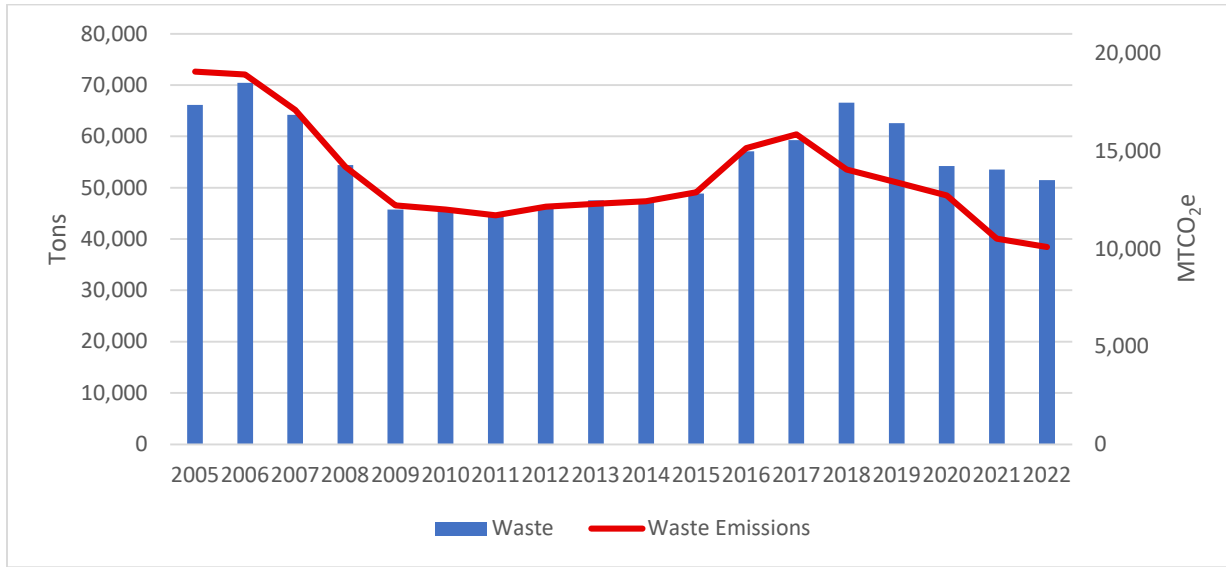
Note: Public transportation includes emissions from Marin Transit and Golden Gate Transit fixed-route buses and the SMART train.

WASTE DISPOSAL

Waste generated by the community decreased 4% between 2021 and 2022 and was 22% below the 2005 level by 2022 as shown in Figure 8 (based on countywide disposal data). Total landfilled waste includes alternative daily cover.⁴ Emissions from waste disposal decreased 47% due to the lower organic content of landfilled waste and material used for alternative daily cover (Figure 8). The City’s Climate Action Plan targets a 74% reduction in waste emissions by 2030.

⁴ Alternative daily cover is material other than earthen material placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging.

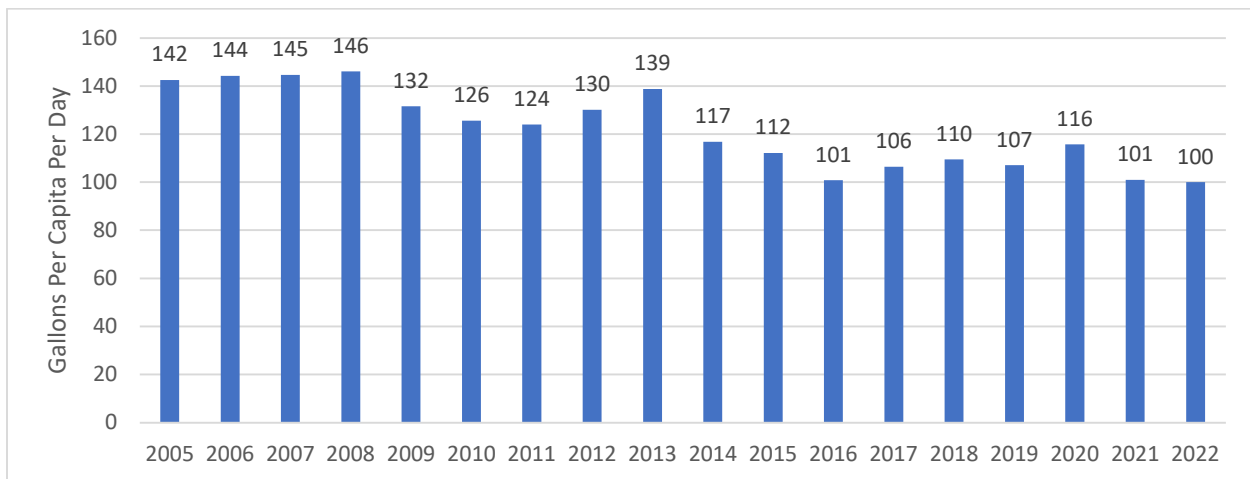
FIGURE 8: DISPOSED WASTE



WATER USE

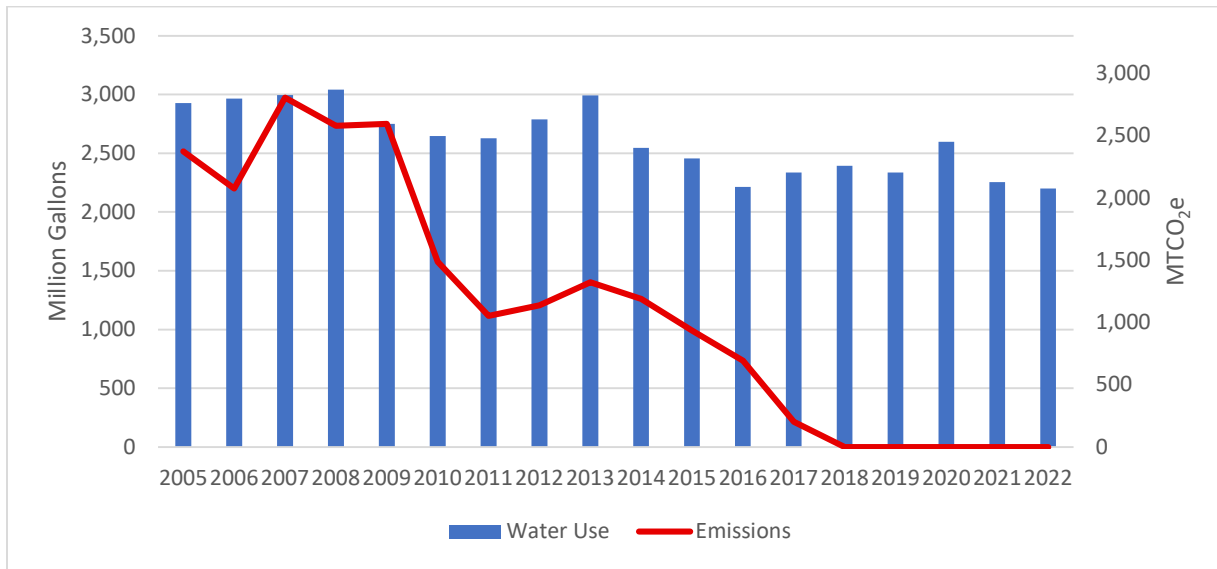
Per capita water use declined 30% since 2005, as shown in Figure 9, based on Marin Municipal Water District (Marin Water) district-wide data. Emissions, which are based on an estimate of energy used to pump, treat, and convey water from the water source to the City limits, dropped 100% between 2005 and 2022 due to the water agencies’ use of carbon-free electricity. Marin Water purchases MCE Deep Green for its electricity needs, and the Sonoma County Water Agency, which supplies approximately 25% of Marin Water’s water, uses renewable and carbon-free sources for its electricity. Total water consumption decreased 25% since 2005; The City’s Climate Action Plan targets a 26% reduction in water consumption by 2030.

FIGURE 9: PER CAPITA WATER USE



Source: Marin Water

FIGURE 10: WATER USE AND EMISSIONS



Marin Water provides rebates and programs to reduce water use. Rebates are available to replace fixtures with high-efficiency clothes washers and to purchase cisterns and rain barrels. Marin Water provides free home and landscape water-use evaluations as well as free high-efficiency showerheads and faucet aerators. The City of San Rafael actively promotes water conservation and Marin Water rebates and programs to residents and businesses.

WASTEWATER

Greenhouse gas emissions are created during the treatment of wastewater generated by the community. These emissions have increased 12% since 2005 as San Rafael’s population has increased.

Emissions created from energy used to convey and treat wastewater are included in the Built Environment sectors. The Central Marin Sanitation Agency (CMSA), located in San Rafael, has two anaerobic digesters that process primary sludge, thickened waste-activated sludge, and organic waste to produce biogas. The biogas is used to generate heat and renewable electricity via the cogeneration system. CMSA normally produces 100% of the facility’s power needs, and, at times, exports renewable energy to the grid, which is procured by MCE.

In 2023, the Las Gallinas Valley Sanitary District completed a Secondary Treatment Plant that expanded the treatment plant’s capacity and the recycled water facility’s capacity from 1.4 million to over 5 million gallons per day.

APPENDIX: COMMUNITY INVENTORY

Community GHG Emissions Summary Table

Jurisdiction: City of San Rafael

Population: 60,237 (CA Department of Finance)

Number of Households: 23,494 (CA Department of Finance)

Inventory Year: 2022

Date Prepared: February 9, 2024

Reporting Framework: Communitywide Activities

ID	Emissions Type	Source or Activity	Included, Required Activities	Included, Optional Activities	Excluded (IE, NA, NO or NE)	Notes	Emissions (MTCO ₂ e)
1.0	Built Environment						
1.1	Use of fuel in residential and commercial stationary combustion equipment	Both	•				79,615
1.2	Industrial stationary sources	Source			NE		
1.3	Power generation in the community	Source			NO		
1.4	Use of electricity in the community	Activity	•			Includes transmission and distribution losses	12,913
1.5	District heating/cooling facilities in the community	Source			NE		
1.6	Use of district heating/cooling facilities in the community	Activity			NE		
1.7	Industrial process emissions in the community	Source			NO		
1.8	Refrigerant leakage in the community	Source			NE		
2.0	Transportation and Other Mobile Sources						
2.1	On-road passenger vehicles operating within the community boundary	Source			IE	Obtained data for preferred activity-based method instead	
2.2	On-road passenger vehicles associated with community land uses	Activity	•				150,195
2.3	On-road freight and service vehicles operating within the community boundary	Source			IE	Obtained data for preferred activity-based method instead	
2.4	On-road freight and service vehicles associated with community land uses	Activity	•				56,568
2.5	On-road transit vehicles associated with community land uses	Activity		•			1,281
2.6	Transit rail vehicles operating with the community boundary	Source		•			276
2.7	Use of transit rail travel by the community	Activity			NE		

2.8	Inter-city passenger rail vehicles operating within the community boundary	Source			NO		
2.9	Freight rail vehicles operating within the community boundary	Source			NO		
2.10	Marine vessels operating within the community boundary	Source			NE		
2.11	Use of ferries by the community	Activity			NE		
2.12	Off-road surface vehicles and other mobile equipment operating within the community boundary	Source		•			3,616
2.13	Use of air travel by the community	Activity			NE		
3.0	Solid Waste						
3.1	Operation of solid waste disposal facilities in the community	Source			NE		
3.2	Generation and disposal of solid waste by the community	Activity	•			Includes alternative daily cover	10,103
4.0	Water and Wastewater						
4.1	Operation of water delivery facilities in the community	Source			IE	Energy use is included in 1.1 and 1.4	
4.2	Use of energy associated with use of potable water by the community	Activity	•				0
4.3	Use of energy associated with generation of wastewater by the community	Activity	•			Energy use is included in 1.1 and 1.4	
4.4	Process emissions from operation of wastewater treatment facilities located in the community	Source			NE	Wastewater treatment facilities are located in the community but only process emissions associated with generation of wastewater by the community are reported in 4.5	
4.5	Process emissions associated with generation of wastewater by the community	Activity	•				543
4.6	Use of septic systems in the community	Source			NE		
5.0	Agriculture						
5.1	Domesticated animal production	Source			NE		
5.2	Manure decomposition and treatment	Source			NE		
6.0	Upstream Impacts of Communitywide Activities						
6.1	Upstream impacts of fuels used in stationary applications by the community	Activity			NE		
6.2	Upstream and transmission and distribution (T&D) impacts of purchased electricity used by the community	Activity			IE	Transmission and distribution losses included in 1.4	
6.3	Upstream impacts of fuels used by water and wastewater facilities for water used and wastewater generated within the community boundary	Activity			IE		
6.4	Upstream impacts of select materials (concrete, food, paper, carpets, etc.) used by the whole community.	Activity			NE		

Legend

IE – Included Elsewhere: Emissions for this activity are estimated and presented in another category of the inventory. The category where these emissions are included should be noted in the explanation.

NE – Not Estimated: Emissions occur but have not been estimate or reported (e.g., data unavailable, effort required not justifiable).

NA – Not Applicable: The activity occurs but does not cause emissions; explanation should be provided.

NO – Not Occurring: The source or activity does not occur or exist within the community.

Community Emissions Data Sources and Calculation Methodologies

Sector/ID	Emissions Source	Source and/or Activity Data	Emission Factor and Methodology
1.0 Built Environment			
1.1 Stationary Combustion	Stationary Combustion (CO ₂ , CH ₄ & N ₂ O)	Known fuel use (meter readings by PG&E) and estimated fuel use (American Community Survey 5-Year Estimates, and U.S. Energy Information Administration Household Site Fuel Consumption data).	Default CO ₂ , CH ₄ & N ₂ O emission factors by fuel type (U.S. Community Protocol v. 1.1, Appendix C, Tables B.1 and B.3). U.S. Community Protocol v. 1.1, Appendix C, Method BE.1.1 and BE.1.2.
1.4 Electricity Use	Electricity Use (CO ₂ , CH ₄ & N ₂ O)	Known electricity use (meter readings by PG&E and MCE) and estimated direct access electricity consumption.	Verified utility-specific emission factors (PG&E and MCE) and eGrid subregion default emission factors. U.S. Community Protocol v. 1.1, Appendix C, Method BE.2.1.
	Electric Power Transmission and Distribution Losses (CO ₂ , CH ₄ & N ₂ O)	Estimated electricity grid loss for Western region from eGrid.	U.S. Community Protocol v. 1.1, Appendix C, Method BE.4.1.
2.0 Transportation and Other Mobile Sources			
2.2 On-Road Passenger Vehicle Operation	On-Road Mobile Combustion (CO ₂)	Estimated passenger vehicle miles traveled associated with origin and destination land uses (Metropolitan Transportation Commission, CAPVMT Data Portal 2.0 (mtcanalytics.org)).	CO ₂ for on-road passenger vehicles quantified in the EMFAC2021 v.1.0.2 model. Passenger vehicle emissions calculated according to U.S. Community Protocol v. 1.1, Appendix D, Method TR.1.A.
	On-Road Mobile Combustion (CH ₄ & N ₂ O)	Estimated vehicle miles traveled associated with origin and destination land uses (Metropolitan Transportation Commission, CAPVMT Data Portal 2.0 (mtcanalytics.org)).	CH ₄ and N ₂ O for on-road passenger vehicles quantified in the EMFAC2021 v.1.0.2 model. Passenger vehicle emissions calculated according to U.S. Community Protocol v. 1.1, Appendix D, Method TR.1.A.
2.4 On-Road Freight and Service Truck Freight Operation	On-Road Mobile Combustion (CO ₂)	Estimated commercial vehicle miles traveled within the boundary (Metropolitan Transportation Commission utilizing Plan Bay Area 2050).	CO ₂ for on-road commercial vehicles quantified in the EMFAC2021 v.1.0.2 model. Emissions allocated utilizing LEHD data according to U.S. Community Protocol v. 1.1, Appendix D, Method TR.2.A.
	On-Road Mobile Combustion (CH ₄ & N ₂ O)	Estimated commercial vehicle miles traveled within the boundary (Metropolitan Transportation Commission utilizing Plan Bay Area 2050).	CH ₄ and N ₂ O for on-road commercial vehicles quantified in the EMFAC2021 v.1.0.2 model. Emissions allocated utilizing LEHD data according to U.S. Community Protocol v. 1.1, Appendix D, Method TR.2.A.
2.5 On-Road Transit Operation	On-Road Mobile Combustion (CO ₂)	Estimated vehicle miles traveled within the boundary (Marin Transit and Golden Gate Transit) and estimated diesel fuel efficiency for transit fleet (Golden Gate Transit). Fuel type provided by Marin Transit and Golden Gate Transit.	Renewable diesel emission factor provided by NEXGEN . U.S. Community Protocol v. 1.1, Appendix D, Method TR.4.A.
	On-Road Mobile Combustion (CH ₄ & N ₂ O)	Estimated vehicle miles traveled within the boundary (Marin Transit and Golden Gate Transit) and estimated diesel fuel efficiency for transit fleet (Golden Gate Transit). Fuel type provided by Marin Transit and Golden Gate Transit.	Renewable diesel emission factor provided by NEXGEN . U.S. Community Protocol v. 1.1, Appendix D, Method TR.4.B.

2.6 Passenger Rail	Mobile Combustion (CO ₂ , CH ₄ & N ₂ O)	Estimated train-miles by multiplying the number of train cars per day (in both directions, according to the SMART published schedule) by the railway track mileage located within the community boundary (Marin Map). Average Diesel Multiple Unit fuel efficiency provided by SMART.	U.S. Community Protocol v. 1.1, Appendix D, Method TR.5. Emission factors from Equation TR.5.2.
2.12 Off-Road Vehicles and Equipment	Off-Road Mobile Combustion (CO ₂)	Estimated fuel use from OFFROAD 2021 v.1.0.1 for Lawn and Garden and Construction equipment. All categories are allocated by share of countywide households.	CO ₂ emissions calculated according to U.S. Community Protocol v. 1.1, Appendix D, Method TR.8. Emission factors provided in Table TR.1.6.
	Off-Road Mobile Combustion (CH ₄ & N ₂ O)	Estimated fuel use from OFFROAD 2021 v.1.0.1 for Lawn and Garden and Construction equipment. All categories are allocated by share of countywide households.	CH ₄ and N ₂ O emissions calculated according to U.S. Community Protocol v. 1.1, Appendix D, Method TR.8. Emission factors provided in the Local Government Operations Protocol Table G.11 and G.14.
3.0 Solid Waste			
3.2 Solid Waste Generation and Disposal	Fugitive Emissions from Landfilled Waste (CH ₄)	Estimated landfilled tons based on reporting to CalRecycle by Marin County Solid and Hazardous Waste JPA and allocated to jurisdiction based on share of countywide population. Waste characterization based on the Statewide Waste Characterization Study (2008, 2014, 2018 and 2021) and Alternative Daily Cover by Jurisdiction of Origin and Material Type as reported to CalRecycle.	Emission factors calculated utilizing U.S. Community Protocol for Accounting and Report of Greenhouse Gas Emissions, Version 1.1, July 2013, Appendix E, Method SW.4.
4.0 Water and Wastewater			
4.2 Water Supply & Conveyance, Treatment and Distribution	Electricity Use (CO ₂)	Water consumption data provided by Marin Water. Sonoma County Water Agency (SCWA) delivery amount provided by SCWA .	Verified utility-specific emission factors (PG&E, MCE and SCWA). Emissions calculated according to U.S. Community Protocol v. 1.1, Appendix F, Method WW.14.
	Electricity Use (CH ₄ & N ₂ O)	Water consumption data provided by Marin Water. Electricity consumption data provided by MMWD.	eGrid subregion default emission factors. Emissions calculated according to U.S. Community Protocol v. 1.1, Appendix F, Method WW.14.
4.5 Treatment of Wastewater	Stationary Emissions from Combustion of Digester Gas (CH ₄)	Known amount of digester gas produced per day and known percent of methane in digester gas provided by Central Marin Sanitation Agency. Known amount of digester gas produced per day (2016) and known percent of methane in digester gas (2017) provided by Las Gallinas Valley Sanitary District.	Emissions calculated according to U.S. Community Protocol v. 1.1, Appendix F, Method WW.1.a.
	Stationary Emissions from Combustion of Digester Gas (N ₂ O)	Known amount of digester gas produced per day and known percent of methane in digester gas provided by Central Marin Sanitation Agency. Known amount of digester gas produced	Emissions calculated according to U.S. Community Protocol v. 1.1, Appendix F, Method WW.2.a.

		per day (2016) and known percent of methane in digester gas (2017) provided by Las Gallinas Valley Sanitary District.	
	Process Emissions from Wastewater Treatment Plant without Nitrification or Denitrification	Estimated population served by wastewater treatment plant provided by Central Marin Sanitation Agency.	Emissions calculated according to U.S. Community Protocol v. 1.1, Appendix F, Method WW.8.
	Process Emissions from Wastewater Treatment Plant with Nitrification or Denitrification	Estimated population served by wastewater treatment plant provided by Las Gallinas Valley Sanitary District (2010 data).	Emissions calculated according to U.S. Community Protocol v. 1.1, Appendix F, Method WW.7.
	Fugitive Emissions from Effluent Discharge (N ₂ O)	Estimated population served by wastewater treatment plant provided by Central Marin Sanitation Agency. Assumed significant industrial or commercial input.	Emissions calculated according to U.S. Community Protocol v. 1.1, Appendix F, Method WW.12(alt).
	Fugitive Emissions from Effluent Discharge (N ₂ O)	Estimated population served by wastewater treatment plant provided by Las Gallinas Valley Sanitary District. Assumed no significant industrial or commercial input.	Emissions calculated according to U.S. Community Protocol v. 1.1, Appendix F, Method WW.12.

CITY OF SAN RAFAEL

LOCAL GOVERNMENT OPERATIONS GREENHOUSE GAS INVENTORY FOR 2022

August 2024

Prepared by the
Marin Climate & Energy Partnership



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EXECUTIVE SUMMARY

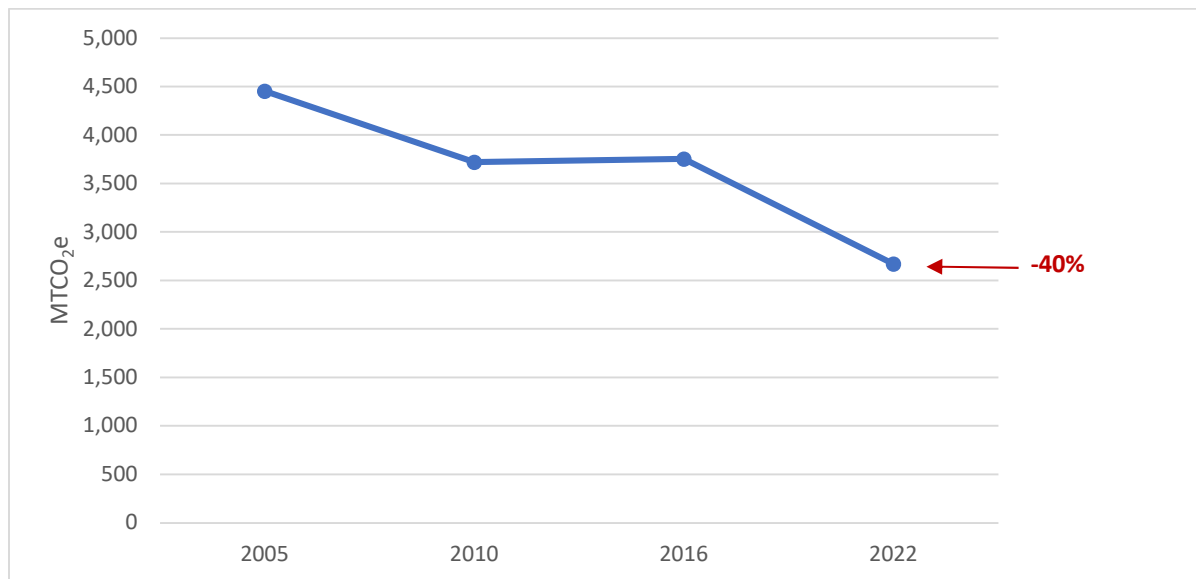
THE TAKEAWAY:

GOVERNMENT OPERATIONS
EMISSIONS DOWN 40% SINCE 2005

San Rafael publishes annual community greenhouse gas (GHG) emissions estimates through the Marin Climate & Energy Partnership (MCEP). Annual inventories help the City to more closely monitor its progress in meeting its local goal to reduce community emissions 25% below baseline (2005) emissions by 2020 and to meet the statewide goal to reduce emissions 40% below 1990 emissions by 2030. In addition to the community inventories, MCEP periodically prepares inventories for government operations emissions.

This report reviews emissions from government operations, a subset of community emissions. Emissions from government operations decreased 40% between 2005 and 2022, or about 1,783 metric tons CO₂e. This is equivalent to 29% below the estimated 1990 level. While government emissions are less than 1% of overall community emissions, the local government plays a large role in setting an example for the rest of the community.

TABLE 1: TREND IN LOCAL GOVERNMENT OPERATIONS EMISSIONS, 2005-2022



Recognizing the need for a collaborative approach to greenhouse gas reductions, City and county leaders launched the Marin Climate and Energy Partnership (MCEP) in 2007. The City of San Rafael is a member of MCEP and works with representatives from the County of Marin and the other Marin cities and towns to address and streamline the implementation of a variety of greenhouse gas reduction measures. Funding for this inventory was provided by the Marin County Energy Watch Partnership, which administers public goods charges collected by PG&E. Community inventories are available on the MCEP website at marinclimate.org and are used to update the [Marin Sustainability Tracker](#).

INTRODUCTION

PURPOSE OF INVENTORY

The objective of this greenhouse gas emissions inventory is to identify the sources and quantify the amounts of greenhouse gas emissions generated by the activities of the San Rafael local government operations in 2022. This inventory provides a comparison to baseline 2005 emissions and identifies the sectors where significant reductions in greenhouse gas emissions have occurred.

GENERAL METHODOLOGY

This inventory uses national standards for the accounting and reporting of greenhouse gas emissions. The [Local Government Operations Protocol, version 1.1 \(May 2010\)](#) was used for the quantification and reporting of greenhouse gas emissions from local government operations. Quantification methodologies, emission factors, and activity and source data are detailed in the appendices.

Local government operations emissions are categorized according to the following sectors:

- Buildings and Other Facilities
- Public Lighting
- Water Delivery Facilities
- Vehicle Fleet
- Solid Waste
- Employee Commute

CALCULATING EMISSIONS

Emissions are quantified by multiplying the measurable activity data – e.g., kilowatt hours of electricity, therms of natural gas, and gallons of diesel or gasoline – by emissions factors specific to the energy source. Most emissions factors are the same from year to year. Emission factors for electricity, however, change from year to year due to the specific sources that are used to produce electricity. For example, electricity that is produced from coal generates more greenhouse gases than electricity that is generated from natural gas and therefore has a higher emissions factor. Electricity that is produced solely from renewable energy sources such as solar and wind has an emissions factor of zero.

This inventory calculates individual greenhouse gases – e.g., carbon dioxide, methane and nitrous oxide – and converts each greenhouse gas emission to a standard metric, known as “carbon dioxide equivalents” or CO₂e, to provide an apple-to-apples comparison among the various emissions. Table 1 shows the greenhouse gases identified in this inventory and their global warming potential (GWP), a measure of the amount of warming each gas causes when compared to a similar amount of carbon dioxide. Methane, for example, is 28 times as potent as carbon dioxide over 100 years; therefore, one metric ton of methane is equivalent to 28 metric tons of carbon dioxide. Greenhouse gas emissions are reported in this inventory as metric tons of carbon dioxide equivalents, or MTCO₂e.

TABLE 1: GREENHOUSE GASES

Gas	Chemical Formula	Emission Source	Global Warming Potential
Carbon Dioxide	CO ₂	Combustion of natural gas, gasoline, diesel, and other fuels	1
Methane	CH ₄	Combustion, anaerobic decomposition of organic waste in landfills and wastewater	28
Nitrous Oxide	N ₂ O	Combustion, wastewater treatment	265
Hydrofluorocarbons	Various	Leaked refrigerants, fire suppressants	4 to 12,400

Source: IPCC Fifth Assessment Report (2014)

TYPES OF EMISSIONS

Emissions from each of the greenhouse gases can come in a number of forms:

- **Stationary or mobile combustion** resulting from the on-site combustion of fuels (natural gas, diesel, gasoline, etc.) to generate heat or electricity, or to power vehicles and equipment.
- **Purchased electricity** resulting from the generation of power from utilities outside the jurisdictional boundary.
- **Fugitive emissions** resulting from the unintentional release of greenhouse gases into the atmosphere, such as leaked refrigerants and methane from waste decomposition.
- **Process emissions** from physical or chemical processing of a material, such as wastewater treatment.

UNDERSTANDING TOTALS

The totals listed in the tables and discussed in the report are a summation of emissions using available estimation methods. Each inventoried sector may have additional emissions sources associated with them that were unaccounted for due to a lack of data or robust quantification methods.

GOVERNMENT OPERATIONS INVENTORY

GOVERNMENT PROFILE

The City of San Rafael is a general law city and operates under the council-city manager form of government. The local government operates administrative, planning, building, public works, community services, fire and police departments. In 2022, there were 496 total employees.

GOVERNMENT OPERATIONS INVENTORY SUMMARY

In 2005, San Rafael's government operations produced approximately 4,453 metric tons CO₂e. In 2022, those activities resulted in approximately 2,670 metric tons CO₂e, a reduction of 1,783 metric tons, or 40%, and the local government's share of community emissions was 0.8%. The following summaries break down these totals by sector and sources.

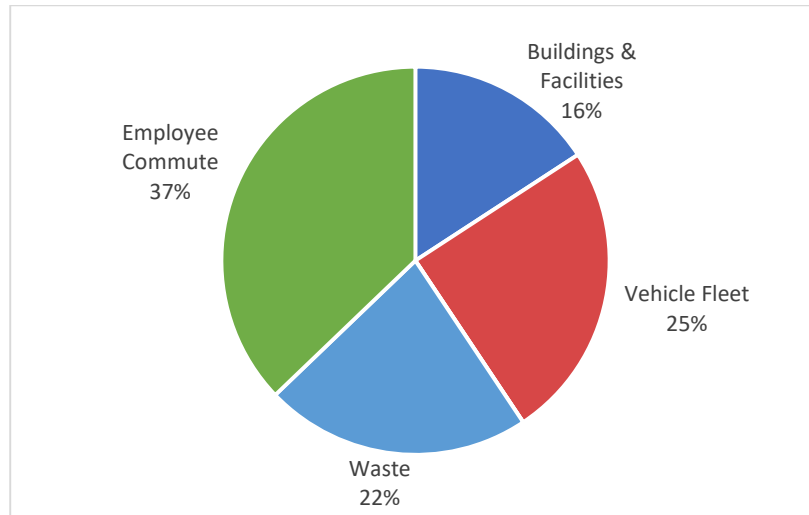
SUMMARY BY SECTOR

As shown in Table 2, emissions from government operations were reduced in all sectors. The greatest reduction occurred in the public lighting sector, where emissions dropped 545 metric tons CO₂e, or 100% due to the conversion of most lighting to LED and the City's purchase of 100% renewable electricity. Other significant reductions occurred in the buildings and facilities sector (387 metric tons) and the vehicle fleet sector (270 metric tons). Figure 2 shows that the employee commute sector was the largest emitter of greenhouse gas emissions in 2022 (37% of total emissions), followed by the vehicle fleet sector (25%), the waste sector (22%), and the buildings and facilities sector (16%).

TABLE 2: SUMMARY BY SECTOR, 2005 AND 2022

Sector	2005 Metric Tons CO ₂ e	2022 Metric Tons CO ₂ e	Change Metric Tons CO ₂ e	% Change
Buildings & Facilities	809	422	-387	-48%
Vehicle Fleet	933	663	-270	-29%
Public Lighting	545	0	-545	-100%
Water Delivery	118	0	-118	-100%
Waste	711	593	-117	-17%
Employee Commute	1,337	992	-345	-26%
Total	4,453	2,670	-1,783	-40%

FIGURE 2: EMISSIONS BY SECTOR, 2022



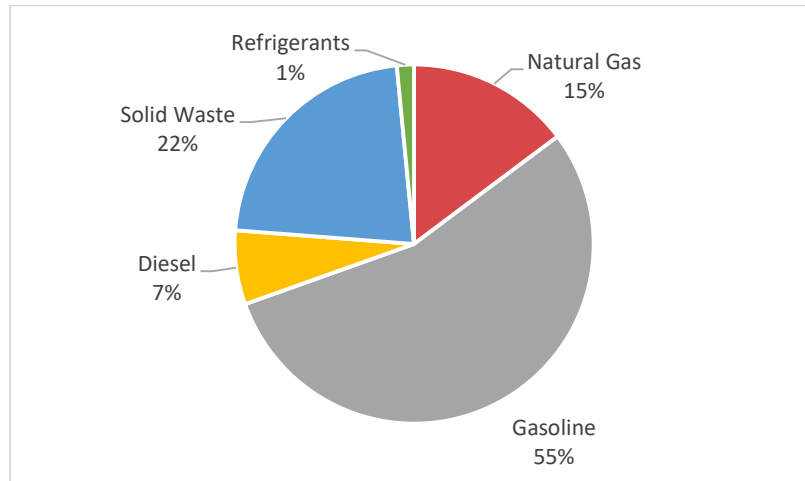
SUMMARY BY SOURCE

Table 3 shows a summary of the City’s greenhouse gas emissions by source. The greatest decreases occurred in emissions from electricity (1,161 metric tons) and gasoline (523 metric tons), which includes gasoline used in both the municipal fleet and City employees’ commute. Emissions from the combustion of natural gas increased 32%. Despite the decrease in gasoline emissions, gasoline was the largest source of greenhouse gas emissions in San Rafael’s governmental operations in 2022 (see Figure 3), contributing more than one-half of all emissions.

TABLE 3: SUMMARY BY SOURCE, 2005 AND 2022

Source	2005 Metric Tons CO _{2e}	2022 Metric Tons CO _{2e}	Change Metric Tons CO _{2e}	% Change
Electricity	1,161	0	-1,161	-100%
Natural Gas	298	394	96	32%
Gasoline	1,986	1,463	-523	-26%
Diesel	271	178	-92	-34%
Solid Waste	711	593	-117	-17%
Refrigerants	26	41	15	56%
Total	4,453	2,670	-1,783	-40%

FIGURE 3: EMISSIONS BY SOURCE, 2022



GOVERNMENT OPERATIONS INVENTORY DETAIL BY SECTOR

This section explores government operations and emissions by taking a detailed look at each primary sector.

BUILDINGS AND OTHER FACILITIES

Facilities operations contribute to greenhouse gas emissions in two major ways. First, facilities consume electricity and fuels such as natural gas. This consumption is associated with the majority of greenhouse gas emissions from facilities. In addition, air conditioning and refrigeration equipment in buildings can emit hydrofluorocarbons (HFCs) and other greenhouse gases when these systems leak refrigerants. Refrigerants are very potent greenhouse gases and have Global Warming Potential (GWP) of up to many thousand times that of CO₂. For example, HFC-134a, a very common refrigerant, has a GWP of 1300, or 1300 times that of CO₂. Therefore, even small amounts of leaked refrigerants can have a significant effect on greenhouse gas emissions.

In 2022, San Rafael operated several major facilities, including City Hall, the public safety center, the library, fire stations, public works buildings, childcare facilities, and community centers. As shown in Table 4, emissions from the buildings sector decreased 48% between 2005 and 2022. Electricity consumption decreased 6%, and natural gas consumption increased 41%. Emissions from refrigerants increased due to the City’s installation of new HVAC units in the Public Safety Center and fire stations. Total emissions from buildings and facilities decreased, however, primarily because the City purchased MCE Deep Green electricity for all facilities in 2022.

TABLE 4: BUILDINGS AND OTHER FACILITIES EMISSIONS, 2005 AND 2022

Source	2005 Energy Consumption	2005 GHG Emissions (MTCO ₂ e)	2022 Energy Consumption	2022 GHG Emissions (MTCO ₂ e)	% Change in Energy Consumption	% Change in GHG Emissions (MTCO ₂ e)
Electricity	2,231,608 kWh	498	2,095,090 kWh	0	-6%	-100%
Natural Gas	56,042 therms	298	79,110 therms	389	41%	41%
Refrigerants	--	13	--	28	--	112%
Total	--	809	--	422	--	-48%

Table 5 shows electricity and natural gas usage by facility.

TABLE 5: ENERGY USAGE AT SAN RAFAEL BUILDINGS AND FACILITIES, 2005 AND 2022

Building/ Facility	Energy Source	2005 Energy Consumption	2022 Energy Consumption	% Change in Energy Consumption
City Hall	Electricity	637,920 kWh	30,965 kWh	-95%
	Natural Gas	5,651 therms	17,099 therms	203%
Community Centers	Electricity	329,020 kWh	366,767 kWh	11%
	Natural Gas	27,758 therms	43,946 therms	58%
Childcare Facilities	Electricity	111,985 kWh	76,759 kWh	-31%
	Natural Gas	4,304 therms	2,847 therms	-34%
Public Works	Electricity	324,010 kWh	98,152 kWh	-70%
	Natural Gas	5,541 therms	3,577 therms	-35%
Fire Department	Electricity	248,214 kWh	1,060,651 kWh	327%
	Natural Gas	9,431 therms	6,286 therms	-33%
Library	Electricity	117,350 kWh	159,540 kWh	36%
	Natural Gas	0 therms	5,016 therms	-
Parking Garages & Lots	Electricity	211,118 kWh	177,894 kWh	-16%
Other Facilities	Electricity	251,991 kWh	101,397 kWh	-60%
	Natural Gas	3,357 therms	339 therms	-90%

PUBLIC LIGHTING

San Rafael operates streetlights, traffic signals, and other outdoor lighting. Emissions associated with the operation of this public lighting are from electricity consumption. Electricity consumption in the public lighting sector decreased 44% between 2005 and 2022 due to conversion of inefficient lighting to LED fixtures and bulbs. Emissions decreased 100%; the additional reduction is due to the City's purchase of MCE Deep Green electricity in 2022.

TABLE 6: PUBLIC LIGHTING EMISSIONS, 2005 AND 2022

Source	2005 Electricity Consumption	2005 GHG Emissions (MTCO _{2e})	2022 Electricity Consumption	2022 GHG Emissions (MTCO _{2e})	% Change in Electricity Consumption	% Change in GHG Emissions (MTCO _{2e})
Streetlights	2,066,450 kWh	461	1,054,493 kWh	0	-49%	-100%
Traffic Signals	249,861 kWh	56	238,530 kWh	0	-5%	-100%
Outdoor Lighting	126,245 kWh	28	63,397 kWh	0	-50%	-100%
Total	2,442,556 kWh	545	1,356,420 kWh	0	-44%	-100%

WATER DELIVERY

This sector includes any facilities used for the management and distribution of water. Typical systems included in this sector are potable water delivery pumps, sprinkler and irrigation controls, and stormwater management. The systems identified for this report and used by the City were water delivery pumps and sprinkler and irrigation systems. The source of San Rafael's water delivery emissions is from electricity consumption. Overall, electricity usage declined 42% and emissions dropped 100%.

TABLE 7: WATER DELIVERY EMISSIONS, 2005 AND 2022

Source	2005 Electricity Consumption	2005 GHG Emissions (MTCO _{2e})	2022 Electricity Consumption	2022 GHG Emissions (MTCO _{2e})	% Change in Electricity Consumption	% Change in GHG Emissions (MTCO _{2e})
Irrigation	7,410 kWh	2	5,369 kWh	0	-28%	-100%
Water Pumps	520,185 kWh	116	301,444 kWh	0	-42%	-100%
Total	527,595 kWh	118	306,813 kWh	0	-42%	-100%

VEHICLE FLEET

The vehicles and mobile equipment used in San Rafael’s daily operations include public works trucks and equipment, police cars and motorcycles, fire trucks, and vehicles for use by administration and other department staff. These vehicles and equipment burn gasoline and diesel, which result in greenhouse gas emissions. In addition, vehicles with air conditioning use refrigerants that leak from the vehicle. This sector also includes fuel consumption and emissions from the operation of off-road and stationary equipment.

Table 8 shows that gasoline consumption decreased 14% since 2005 and diesel consumption decreased 12%, for a total decrease in fuel consumption of 14%. Emissions fell 29%; the additional decline is due to the City using renewable diesel in all vehicles in 2022.

TABLE 8: VEHICLE FLEET EMISSIONS, 2005 AND 2022

Source	2005 Fuel Consumption	2005 GHG Emissions (MTCO _{2e})	2022 Fuel Consumption	2022 GHG Emissions (MTCO _{2e})	% Change in Fuel Consumption	% Change in GHG Emissions (MTCO _{2e})
Gasoline	72,682 gallons	649	62,182 gallons	549	-14%	-15%
Diesel	26,489 gallons	271	23,443 gallons	100	-12%	-63%
Refrigerants	--	13	--	13	--	0%
Total	99,171 gallons	933	66,062 gallons	663	-14%	-29%

WASTE

Waste generated by government buildings and operations include organic material such as paper, food scraps, plant debris, textiles, and construction waste. This organic material generates methane as it decays in the anaerobic environment of a landfill. An estimated 75% of this methane is routinely captured via landfill gas collection systems; however, a portion escapes into the atmosphere. Emissions from waste are an estimate of methane generation that will result from the decomposition of organic waste sent to the landfill in the inventoried year, even though those emissions will occur over the 100+ year timeframe that the waste will decompose.

Waste generated by governmental operations increased 19% between 2005 and 2022 and emissions decreased 17% due to the lower organic content of waste sent to the landfill.

TABLE 9: WASTE EMISSIONS, 2005 AND 2022

Source	2005 Landfilled Waste	2005 GHG Emissions (MTCO _{2e})	2022 Landfilled Waste	2022 GHG Emissions (MTCO _{2e})	% Change in Landfilled Waste	% Change in GHG Emissions (MTCO _{2e})
Street Cans	1,438 tons	402	1,713 tons	336	19%	-16%
Parks	548 tons	153	160 tons	31	-71%	-79%
Community Centers	239 tons	67	339 tons	67	42%	0%
Other Facilities	135 tons	38	270 tons	82	210%	118%
Waste Hauled by the City	184 tons	51	391 tons	77	112%	49%
Total	2,544 tons	711	3,022 tons	593	19%	-17%

EMPLOYEE COMMUTE

Emissions in the employee commute sector are due to the combustion of fuels used by City employees commuting to and from work in San Rafael. Emissions dropped 26% due to an improvement in the fuel-efficiency of the vehicles San Rafael employees are driving to work. However, it is difficult to draw definitive conclusions from the data, as emissions are determined from employee commute surveys. Twenty-one percent of City employees responded to the survey. Estimates for total employee commutes were extrapolated from this data.

TABLE 10: EMPLOYEE COMMUTE EMISSIONS, 2005 AND 2022

	2005	2022	% Change
Number of Employees	425	496	17%
Vehicle Miles Traveled	2,572,471	2,867,029	11%
Emissions per Employee	3.1	2.0	-%
GHG Emissions (MTCO_{2e})	1,337	992	-26%

APPENDIX

BUILDINGS AND OTHER FACILITIES SECTOR NOTES

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2005

Scope	Emission Type	Energy Consumption	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 1	Stationary Combustion	56,042 therms	297.13	0.00	0.03	0.00	298.07
	Fugitive Emissions	Refrigerants	0.00	0.00	0.00	0.00	13.15
	TOTAL		297.13	0.00	0.03	0.00	311.22
Scope 2	Purchased Electricity	2,231,608 kWh	495.15	0.01	0.03	0.00	498.23
	TOTAL		495.15	0.01	0.03	0.00	498.23

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2022

Scope	Emission Type	Energy Consumption	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 1	Stationary Combustion	79,110 therms	388.04	0.00	0.04	0.00	394.08
	Fugitive Emissions	Refrigerants	0.00	0.00	0.00	0.00	27.90
	TOTAL		388.04	0.00	0.04	0.00	421.98
Scope 2	Purchased Electricity	2,095,090 kWh	331.52	0.00	0.04	0.00	0.00
	TOTAL		331.52	0.00	0.04	0.00	0.00

Energy usage was provided by Pacific Gas & Electric Company (PG&E) based on PG&E service accounts. LGO Protocol recommended methods were followed in collection and analysis of this activity data. For electricity, verified utility-specific (PG&E and MCE) CO₂ emissions factor and eGrid subregion default N₂O and CH₄ emission factors for WECC California were used. For natural gas, default CO₂, CH₄ & N₂O emission factors by fuel type were used (U.S. Community Protocol, v. 1.1, May 2010, Tables B.1 and B.3).

Refrigerant type and capacity for air conditioning units were provided by San Rafael public works staff. 2010 refrigerant data was used as a proxy for 2005. LGO Protocol alternate methods were followed in collection and analysis of refrigerant activity data.

PUBLIC LIGHTING SECTOR NOTES

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2005

Scope	Emission Type	Energy Consumption	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 2	Purchased Electricity	2,442,556 kWh	541.95	0.01	0.04	0.00	545.33

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2022

Scope	Emission Type	Energy Consumption	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 2	Purchased Electricity	1,356,420 kWh	0.00	0.00	0.03	0.00	0.00

Energy usage was provided by Pacific Gas & Electric Company (PG&E) based on energy usage of PG&E service accounts. LGO Protocol recommended methods were followed in collection and analysis of this activity data. Verified utility-specific (PG&E and MCE) CO₂ emissions factor and eGrid subregion default N₂O and CH₄ emission factors for WECC California were used to calculate emissions.

WATER DELIVERY SECTOR NOTES

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2005

Scope	Emission Type	Energy Consumption	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 2	Purchased Electricity	527,595 kWh	117.06	0.00	0.01	0.00	117.79

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2022

Scope	Emission Type	Energy Consumption	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 2	Purchased Electricity	306,813 kWh	0.00	0.00	0.01	0.00	0.00

Energy usage was provided by Pacific Gas & Electric Company (PG&E) based on energy usage of PG&E service accounts. LGO Protocol recommended methods were followed in collection and analysis of this activity data. Verified utility-specific (PG&E and MCE) CO₂ emissions factor and eGrid subregion default N₂O and CH₄ emission factors for WECC California were used to calculate emissions.

VEHICLE FLEET SECTOR NOTES

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2005

Scope	Emission Type	Energy Consumption	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 1	Combustion	72,682 gallons gasoline	638.15	0.04	0.03	0.00	648.84
	Combustion	26,489 gallons diesel	270.45	0.00	0.00	0.00	270.68
	Fugitive Emissions	Refrigerants	0.00	0.00	0.00	0.01	13.15
	TOTAL		908.60	0.04	0.03	0.01	932.67

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2022

Scope	Emission Type	Energy Consumption	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 1	Combustion	62,182 gallons gasoline	545.96	0.01	0.02	0.00	549.40
	Combustion	23,443 gallons diesel	99.91	0.00	0.00	0.00	100.09
	Fugitive Emissions	Refrigerants	0.00	0.00	0.00	0.01	13.15
	TOTAL		645.87	0.01	0.02	0.01	662.64

On and off-road vehicle fleet and equipment fuel data were provided by City of San Rafael. VMT data for 2010 was used as a proxy for 2022. LGO Protocol methods were followed in collection and analysis of vehicle fuel consumption and vehicle miles traveled (VMT). Default CO₂ emission factors for transport fuel from the Local Government Operations Protocol, v. 1.1, May 2010, Table G.11 were used for gasoline and diesel. Renewable diesel emission factor provided by NEXGEN. Default N₂O and CH₄ emission factors for highway vehicles by model year from the from the Local Government Operations Protocol, v. 1.1, May 2010, Table G.12. 2005 emissions were used and were adjusted to reflect IPCC AR5 values for N₂O and CH₄.

Refrigerant capacities for vehicles were estimated using sources provided by ICLEI. LGO Protocol alternate methods were followed in collection and analysis of refrigerant activity data. 2010 activity data and emissions were used as a proxy for 2005 and 2022 data.

WASTE SECTOR NOTES

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2005

Scope	Emission Type	Weight	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 3	Landfilled Waste	2,543.6 tons	0.00	0.00	25.38	0.00	710.68

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2022

Scope	Emission Type	Weight	Greenhouse Gas Emissions (metric tons)				
			CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 3	Landfilled Waste	3,022.2 tons	0.00	0.00	21.19	0.00	593.41

Solid waste collection data for quantity of containers, container size, pick-ups per week was provided by Marin Sanitary Service. Containers were assumed to be 100% filled at 250 lbs. per cubic yard. 2005 data was revised to reflect a higher weight per cubic yard estimate as recommended by Marin Sanitary Service. All trash bins were assumed to have a 0% diversion rate.

Waste characterization estimated based on the Statewide Waste Characterization Study (2008 and 2021). Emission factors calculated utilizing U.S. Community Protocol for Accounting and Report of Greenhouse Gas Emissions, Version 1.1, July 2013, Appendix E, Method SW.4. 2005 emissions were adjusted to reflect IPCC AR5 values for CH₄.

EMPLOYEE COMMUTE SECTOR NOTES

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2005

Scope	Emission Type	Number of Employees	Vehicle Miles Traveled	Greenhouse Gas Emissions (metric tons)				
				CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 3	Mobile Combustion	220	2,572,471	1,306.95	0.11	0.08	0.00	1,337.23

LGO PROTOCOL – EMISSIONS BY SCOPE AND EMISSION TYPE, 2022

Scope	Emission Type	Number of Employees	Vehicle Miles Traveled	Greenhouse Gas Emissions (metric tons)				
				CO ₂	N ₂ O	CH ₄	HFCs	CO ₂ e
Scope 3	Mobile Combustion	496	2,867,029	986.48	0.02	0.05	0.00	913.86

In 2024, the City distributed commute surveys to its employees regarding travel mode, vehicle type and model year, fuel type, fuel efficiency, and miles traveled to work. Information provided by respondents was used to estimate gallons of fuel consumed and, if necessary, to determine fuel efficiency at www.fueleconomy.gov. Weekly data were converted into annual VMT data assuming 10% reduction for vacation days, sick days and holidays for full-time and part-time employees. 103 employees responded to the survey, a response rate of 21%. Estimates for total employee commutes were extrapolated from this data. Utilized default CO₂ emission factors for transport fuel from the Local Government Operations Protocol, v. 1.1, May 2010, Table G.11. 2005 emissions were adjusted to reflect IPCC AR5 values for N₂O and CH₄.

INFORMATION ITEMS

Information items are emissions sources that are not included in the inventory but are reported here to provide a more complete picture of emissions from San Rafael’s government operations. Information items for this inventory include one parks department vehicle, refrigerators, freezers, and air conditioning units using R-12 and R-22 refrigerants. These refrigerants are not included in the inventory because they are ozone-depleting substances and are being phased out by 2020 under the terms of the Montreal Protocol.

INFORMATION ITEMS

Source	Refrigerant	Metric Tons CO ₂ e
Refrigerators and Air Conditioning	R-12, R-22	13.83
Total		13.83



SUSTAINABILITY PROGRAM WORKPLAN – FY 2023-2025 STATUS UPDATE

2023-2025 ACTION STRATEGIES	STATUS	UPCOMING
1. Work with City departments to integrate climate action and resilience into department goals and projects.	In progress. Met and developed activities with Digital Services, Economic Development and Parking Services.	Hosting an open house for employees in September. Anticipate completion February 2025.
2. Implement SB 1383 , including enforcement, reporting, procurement, and edible food recovery requirements.	In progress. Signed agreement with Zero Waste Marin to enforce. Conducted internal operations planning and trainings and purchasing . Conducted community outreach . First review by CalRecycle in progress.	Respond to CalRecycle this fall. Continue outreach and education and internal coordination ongoing.
3. Explore a Climate Financing District with County & other stakeholders to help plan adaptation and mitigation combined with housing security	In progress. Met with Finance Director and NHS Advisors, convened a Bay Area Wide climate finance panel to develop knowledge across jurisdictions.	Continue discussions with Finance, Economic and Community Development and continue participation in countywide sea level rise adaptation planning effort with County of Marin.
4. Adopt and implement an Electric Vehicle Strategy Workplan based on the Countywide EV Acceleration Strategy. Include City fleet as well as public charging infrastructure and a focus on equity.	Adoption completed. Implementation in progress. Contracted with consultant to develop a 5-year plan for medium and heavy-duty vehicle transition and infrastructure upgrades. Reserved spot in PGE EV Fleet Program. Received awards for technical assistance from MCE and Metropolitan Transportation Commission. Participating on MCE Charged by Public Power clean vehicle working group. Participating on PGE EV Fleet Electrification Advisory Group.	Complete new Fleet Policy. Complete application for PG&E EV Fleet Program. Develop RFP for EV charger project at City Facilities. Complete fleet transition plan. Anticipated completion June 2025 Continue participation in community EV working groups. Anticipated completion in future years.



SUSTAINABILITY PROGRAM WORKPLAN – FY 2023-2025 STATUS UPDATE

<p>5. Work with County to promote energy efficiency and electrification of existing buildings, including investigating potential for community Microgrids</p>	<p>In progress. Completed the development of an existing buildings energy efficiency ordinance, adopted by Council May 2024. Participating in countywide building electrification roadmap development.</p>	<p>Participate in completion of countywide building electrification and energy efficiency roadmap. Consider new green building reach codes for next building code cycle. Convene stakeholders to develop local clean energy and microgrid proposals. Anticipated completion June 2024.</p>
<p>6. Develop the Equitable Low Carbon Economy program recommendations and begin work on relevant projects.</p>	<p>Research and recommendations report completed, including priority work plan. Updated web resources for businesses. Implementation in Progress. Applied for clean transportation workforce development project for East San Rafael/Canal.</p>	<p>See workplan priorities. Anticipated completion in future years.</p>
<p>7. Continue the Illegal Dumping program pilots and bring a suite of solutions to Council for consideration for long-term dumping reductions.</p>	<p>In progress. 5 years of pilot programs and data collection completed.</p>	<p>Proposal anticipated to go to Council Fall 2024. Implementation anticipated in 2025.</p>
<p>8. Complete the grant-funded Canal Collaboration and SLR Feasibility Assessment project toward identifying adaptation priorities to pursue.</p>	<p>In progress. Feasibility study underway. Contracts in place with two community nonprofits, UC Berkeley, and consultant team. Conducted dozens of engagements and educational activities. Completed numerous data and mapping studies deepening our knowledge of vulnerabilities.</p>	<p>Host community education events. Complete feasibility study. Anticipated completion by fall 2025. Identify new funding for continuation of planning effort.</p>



SUSTAINABILITY PROGRAM WORKPLAN – FY 2023-2025 STATUS UPDATE

<p>9. Develop a citywide climate resilience plan and integrate with Local Hazard Mitigation Plan and other resilience planning efforts and documents.</p>	<p>In progress. Participating in County engagement to determine countywide collaboration and plan development. Participating in Bay Conservation Development Commission regional climate adaptation process.</p>	<p>Anticipated to continue to build our data and suite of proposals throughout 2025, with plan development in the future based on new regional guidelines under development.</p>
<p>10. Implement and respond to state laws such as automated solar permitting, green building, renewable energy, and others that arise.</p>	<p>Ongoing. Have been implementing or responding to state laws and regulations including SB 272, solar permitting, and green building requirements.</p>	<p>Ongoing.</p>
<p>11. Reimagine and rebuild the Volunteer Program including development of new positions in departments and new community volunteer opportunities such as increasing community cleanups and tree and landscape programs.</p>	<p>In progress. Developing proposal in conjunction with Human Resources and City Manager.</p>	<p>Finalize proposal and hire accordingly by early 2025.</p>